GEOTECHNICAL INVESTIGATION AND REPORT FOR SAN HOSPITAL, WAHROONGA

Taylor Thomson Whitting Level 3, 48 Chandos Street, St Leonards, NSW, 2065

GEOTLCOV23462AA-AD 29 April 2008



30 April 2008

Taylor Thomson Whitting Level 3 48 Chandos Street ST LEONARDS NSW 2065

Attention: Barry Young

Dear Barry,

RE: Geotechnical Investigation and Report for SAN Hospital, Wahroonga

We are pleased to submit our geotechnical investigation report for SAN Hospital, in Wahroonga, Sydney.

If you have any comments or queries, please contact either Mr Sam Henwood or the undersigned on 99111000.

For and on behalf of Coffey Geotechnics Pty Ltd.

t-1,laddell

Peter Waddell

Principal Geotochnical Engineer

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1 copy by Coffey Geotechnics Pty Ltd 4 copies to Taylor Thomson Whitting

4.2.3 Groundwater

Groundwater seepage was only observed in three boreholes surrounding the proposed Building 3 site. Within boreholes CBH1, CBH7 and CBH18 seepage was observed at depths of 3.5m, 1.0m and 5.5m respectively. Within the cored boreholes, water was used as a drilling fluid which prevented groundwater observations.

It should be noted that groundwater levels are subject to variation due to the influence of rainfall, temperature, local drainage and the seasons. There may also be the potential for development of perched groundwater tables following periods of rainfall.

4.3 Laboratory Test Results

The six CBR test were carried out in potential subgrade soils for road pavements. CBR values varied from 2% to 10%

Testing of pH, Sulphate and Chloride was carried out on six samples from fill and residual soil. Values for pH were found to vary from 4.7 to 8.1. The Sulphate and Chloride levels obtained from the tests were generally low with sulphate levels varying from 33 to 78 mg/kg (SO_a) and chloride levels from 2 to 290 mg/kg (CI).

5 DISCUSSION AND RECOMMENDATIONS

Comments relevant to each separate building are provided in sections 5.1 to 5.4. Recommendations relevant to Buildings 1 to 3 are presented in sections 5.5 to 5.10. Earthquake load factors are provided for Buildings 1 to 4 in section 5.11.

5.1 Bullding 1

The subsurface conditions across the Building 1 site generally consist of fill, overlying a thin layer of residual soil, overlying sandstone. The existing car park was constructed by cut and fill techniques, with the eastern side of the car park cut into the natural ground and the western side filled up to 2.5m (within C8H15). The fill generally consists of Sandy Clay and Clayey Sand. In the absence of fill placement records and compaction control test results, the fill should be considered to be uncontrolled

Preliminary sketches of the proposed car park show the base level to be at 154.6m AHD. With the depth to sandstone varying from 0.9m to 2.5m below current surface levels, it is likely that rock will be exposed or at relatively shallow depth below the proposed car park structure. With foundations spanning rock and soil there is a greater potential for differential settlements, compared to rock foundations. To avoid possible problems with differential settlement we recommend that building loads such as basement retaining walls and column loads be supported on rock. Strip, pad footings or bored piers could be adopted, depending on the bulk excavation levels and the depth to bedrock. Figure 4 shows cross sections through the site with inferred rock levels.

5.2 Building 2

The subsurface conditions across the Building 2 site generally consist of fill, overlying a thin layer of residual soil, overlying sandstone. Although the surface level of the existing car park falls at the eastern end this is where the greatest thickness of till was observed and probably indicates the presence of a minor gully that was filled as part of the car park construction. Fill thickness varies from 0.2m at the

CONTENTS

| 1 | INTRODUCTION | 1 |
|-------|---|---|
| 2 | PROJECT APPRECIATION | 1 |
| 3 | INVESTIGATION METHODOLOGY | 1 |
| 3.1 | Fieldwork | 1 |
| 3.1.1 | Buildings 1, 2, 3 | 1 |
| 3.1.2 | Building 4 Assessment | 2 |
| 3.2 | Laboratory Testing | 2 |
| 4 | RESULTS OF THE INVESTIGATION | 3 |
| 4.1 | Site Descriptions | 3 |
| 4.1.1 | Building 1 | 3 |
| 4.1.2 | Building 2 | 3 |
| 4.1.3 | Building 3 | 3 |
| 4,1.4 | Building 4 | 3 |
| 4.2 | Sub surface conditions | 4 |
| 4.2.1 | Published Geology | 4 |
| 4.2.2 | Sub Surface Conditions | 4 |
| 4.2.3 | Groundwater | 5 |
| 4.3 | Laboratory Test Results | 6 |
| 5 | DISCUSSION AND RECOMMENDATIONS | 6 |
| 5.1 | Building 1 | 6 |
| 5.2 | Building 2 | 8 |
| 5.3 | Building 3 | 7 |
| 5.4 | Building 4 | 7 |
| 5.5 | Site Preparation and Excavation Conditions | 8 |
| 5.6 | Dewatering | 8 |
| 5.7 | Support Requirements | 8 |
| 5.7.1 | Cut and Fill Batters and Slope Stability Issues | ŧ |
| 5,7.2 | Retaining Structures | 8 |

CONTENTS

| 5.7.3 | Vertical Excavations in Rock | 10 |
|-----------|--|----|
| 5.8 | Foundations | 11 |
| 5.9 | Pavement Design | 12 |
| 5.10 | Soil Aggressivity | 12 |
| 5.11 | Earthquake Loading Factor | 13 |
| 6 | LIMITATIONS | 13 |
| IMPORTA | ANT INFORMATION ABOUT YOUR COFFEY REPORT | |
| Tables | | |
| Table 1: | Subsurface Profile at Test Locations and Geotechnical Model | |
| Table 2: | Trapezoidal Pressure Distribution | |
| Table 3: | Vertical Excavation Face Support Requirements | |
| Table 4: | Rock Foundation Design Parameters | |
| Table 5: | Footing Inspection and Assessment Requirements | |
| Figures | | |
| Figure 1: | Site Plan | |
| Figure 2: | Detailed Plan of Building 1 / 3 Showing Borehole Locations | |
| Figure 3: | Detailed Plan of Building 2 Showing Borehole Locations | |
| Figure 4. | Geotechnical Long Sections A-A' and B-B' | |
| Figure 5: | Geotechnical Long Sections C-C' and D-D' | |
| Figure 6: | Geotechnical Long Sections E-E' and F-F' | |
| Appendi | ices | |
| Appendix | x A: Engineering Logs, Core Photographs and Explanation Sheets | |
| Appendix | x B: Laboratory Test Reports | |
| | | |

A stairway leads to the basement from within the building. Within the basement in rooms titled "South Wing Switch Room" and the "Electrical Store Room", brick strip footings supporting a concrete slac associated with the ground floor were visible. The footings were bearing on shallo which was clearly visible in the cut which forms the basement as shown in photo 1 below.



Photo 1: Basement wall to the left and shale bedrock exposure to the right

4.2 Sub surface conditions

4.2.1 Published Geology

The Sydney 1:100,000 Geological Sheet indicates the site locality spans the contact between Ashfield Shale and Hawkesbury Sandstone. Ashfield Shale is described as a black to dark grey shale and laminate, while Hawkesbury Sandstone is described as medium to coarse grained quartz sandstone, very minor shale and laminate lenses.

4.2.2 Sub Surface Conditions

For a description of the subsurface conditions encountered at the berehole locations, refer to the Engineering Logs presented in Appendix A. Based on the information obtained from the boreholes, a general geotechnical model has been developed and is presented in Table 4.1. Sections showing the general geology for each building are also shown on Figures 4, 5 and 6.

1 INTRODUCTION

This report presents the results of a geotechnical investigation carried out by Coffey Geotechnics Pty Itd (Coffey) for the proposed additions to the Sydney Adventist Hospital (SAN), Wahroonga. The work was commissioned by Barry Young of Taylor Thomson Whitting (TTW) on behalf of Coffey Projects Pty Ltd and was carried out in general accordance with our fee proposal reference GEOTLCOV23464AA-AA, dated 4 February 2008.

This report presents the results of the fieldwork, laboratory testing and a summary of the ground conditions encountered. It also provides geotechnical assessment for each of the proposed structures which form part of the proposed site development.

2 PROJECT APPRECIATION

The existing SAN Hospital is located on the western side of Fox Vailey Road and is bounded by The Comenarra Parkway to the south, Fox Vailey Road to the east and Coups Creek to the west and north. Existing developments within the hospital grounds include multi-storey buildings, roads, car parks, sport facilities and landscaped grassed areas. There are four proposed additions to the hospital and these are labelled Building 1, 2, 3 and 4 as shown on the Site Pian in Figure 1. Details of the proposed improvements are as follows:

- Building 1: A new five storey multi deck dar park to be built in the same area as an existing car
 park at grade.
- Building 2: A new four storey reinforced concrete framed building to replace an existing car
 park at grade.
- Building 3. A new building with a possible three storey basement.
- Building 4: An existing three storey brick building with modifications to load bearing internal
 walls within the eastern corner. The building will appear unchanged from the outside.

The objectives of the geotechnical investigation were to provide information on the subsurface conditions, a geotechnical model, and discussions and recommendations on relevant geotechnical aspects of the project.

An environmental assessment has also been carried out on this site and is detailed π a separate report

3 INVESTIGATION METHODOLOGY

3.1 Fieldwork

3.1.1 Buildings 1, 2, 3

Floidwork to investigate Buildings 1, 2 and 3 was carried out from 10 to 25 March 2008 and comprised the drilling of 27 boreholes (CBH1 to CBH27).

The boreholes were drilled using a truck mounted drilling rig equipped with a continuous flight auger, to depths ranging between 1m and 12.36m with the exception of CBH26 and CBH27 where a hand auger was used to depths of 0.1m and 0.2m respectively. The boreholes were augered in soils using a solid flight auger and a steel V shaped bit or tungsten carbide bit. Standard Penetration Testing was carried

out in all boreholes to assess strength and to obtain samples for logging and laboratory analysis. Upon encountering rock, diamond coming techniques were used to advance the boreholes and to obtain core for analysis.

A Coffey engineering geologist monitored the fieldwork on a full-time basis and recorded an engineering log of the subsurface profile observed at each location

Water level readings have been made in the drill holes at times and under conditions stated on the borehole logs. In cored boreholes, water was used as a drilling fluid and groundwater levels could not be monitored. It must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors.

Borehole locations were measured by tape relative to site boundaries. Test elevations were measured by staff and dumpy level to a datum of 162,54m AHD located within the hospital grounds.

Engineering logs of the borchoies are presented in Appendix A, together with colour core photographs and Explanation Sheets defining the terms and symbols used.

3.1.2 Building 4 Assessment

A site visit to Building 4 was carried out on 28 March 2008. The brick building is generally three stories high with a basement and is inter-connected to new structures along the north western and south western walls. The assessment involved walking through the existing building and looking at the existing footings through access doors in the basement. The assessment took into consideration the following:

- Construction materials used in existing structure.
- · Condition assessment of the walls and floors of the structure
- Assessment of topography surrounding the building.
- Assessment of the footings for the existing building.

3.2 Laboratory Testing

Six soaked CBR tests were carried out on bulk samples obtained from C8H7, CBH10, CBH11, CBH14, CBH15 and CBH18. Six samples from CBH1, CBH8, CBH12, CBH13, CBH15 and CBH16 were tested for pH, sulphate and chloride content

The results of the CBR, pH, Sulphate and Chloride content tests are presented in Appendix C.

Rock point load strength index tests were carried out on rock core and the results are presented on the engineering logs.

4 RESULTS OF THE INVESTIGATION

4.1 Site Descriptions

4.1.1 Building 1

The proposed Building 1 site is located along the western perimeter of the hospital where currently a level car park is situated. The land adjacent to the car park generally slopes downwards to the west, with the car park having been cut into the slope along the eastern and filled along the western boundaries respectively. The fill was estimated to be 2m high at the north western end of the car park. Batter angles of 18° and 19° were measured for the cut and fill sections respectively using a hand held cinometer.

To the west of the car park was a well maintained grassed strip of land approximately 20m wide. Further west the land falls sharply and the vegetation consists of bushes and mature trees.

4.1.2 **Building 2**

The proposed Building 2 site is located along the central northern perimeter of the hospital where a car park is situated. In this area, the land falls to the north at an angle of 3° to 4° with the car park terraced over 3 levels to accommodate the slope. There was minor cut and fill earthworks estimated at 1m height associated with the terracing. The eastern end of the car park is lower than the western end and has been filled where a former gully was located.

Adjacent to the north west of the car park is a grassed drainage basin. The basin is approximately 2m deep and in the base is a galvanised steel grill probably associated with a drainage system. Beyond the basin the land slopes downwards to the north towards Coups Creek where dense vegetation is present

4.1.3 Building 3

The detail and location of proposed Building 3 was not finalised at the time this report was prepared, however we understand it is to be located adjacent and to the south of the proposed Building 1 site. In this area is a grassed drainage basin similar to that found in the Building 2 area. The basin is 2m deep and has a galvanised steel grill and manhote in the base. At the western end of the basin is a 6m wide well maintained grassed crest. Beyond this, the land falls at an angle of approximately 18° to the west and is vegetated with thick grass. At the base of the slope are mature trees and business. Fragments of broken brick observed on the surface at the northern end of the basin suggest that the basin walls may have been constructed using fill material.

Adjacent to the south of the basin is a car park. The south western end of the car park has been raised approximately 1.5m above the surrounding ground level. To the east of the basin are two single storey buildings. An in-ground swimming pool is located to the northeast of the basin.

4.1.4 Building 4

Building 4 is an existing three storey brick structure located in the eastern area of the hospital. The building has a basement along its south eastern side and is inter-connected to new structures along the north western and south western walls. The land surrounding the building generally slopes down to the east.

TABLE 1: SUBSURFACE PROFILE AT TEST LOCATIONS AND GEOTECHNICAL MODEL

| Unit | Description | Thickness of Unit (m) ⁽¹⁾ | R.L. Top of Layer (m AHD) (1) |
|-----------------------|---|---|----------------------------------|
| Unit 1 – Fill | Bitumen and Roadbase for borehotes excavated in car parks overlying silty sand, clayey sand, sandy clay and clay, with some sandstone gravel up to cobbles size, concrete rubble, organic fragments and tree roots. | 0.2 to 6.8 | 156.5 to 162.9 |
| Unit 2 – Residual | Typically Sandy Clay and Clay: stift, low to high plasticity, orange brown, pale grey and red Sifty Sand and Sand: fine to medium grained, brownish grey | - 0 to 1.2 | 154.2 to 162.7 |
| Unit 3 ~ Sandstone | Unit 3A typically: • Very low to medium strength, yellow, red, orange, grey, extremely to moderately weathered • Class V and IV sandstone(2) | 0 to 3.7 | 151.8 to 162.2 |
| | Unit 3B typically: Medium to high strength, grey, yellow, orange, red and brown, moderately weathered to tresh Class III or better sandstone ⁽²⁾ | - | 149.7 to 161.0 |
| Unit 4 - Shale | Found only beneath Building 4. Very low to medium strength, highly to moderately weathered, grey and orange shale. Estimate Class (V shale (2)) | - | Not measured |

Notes:

⁽¹⁾ The unit thickness and base of unit values are based on the boreholes and may not represent the extremes (maximum or minimum) values across the site.

⁽²⁾ Hock classified in accordance with Pells et al (1998) "Foundations on Sandstone and Shale in the Sydney Region" Aust, Geomech, Jul, Dec 1998.

western end up to 3.14m (within CBH17) at the eastern end. The fill consists of Clay, Sandy Clay, Sand, Sifty Sand and Clayey Sand. In the absence of fill placement records and compaction control test results, the fill should be considered to be uncontrolled.

The level of the base of proposed Building 2 was not defined at the time this report was compiled. With the depth to sandstone varying from 0.6m to 3.6m below current surface levels, the base level of the proposed structure may lie within both soil and rock. With foundations spanning rock and soil there is a greater potential for differential settlements, compared to rock foundations. To avoid possible problems with differential settlement we recommend that building loads such as basement retaining walls and column loads be supported on rock. Strip, pad footings or bored piers could be adopted, depending on the bulk excavation levels and the depth to bedrock. Figure 5 shows cross sections through the site with inferred rock levels.

5.3 Building 3

The subsurface conditions across the Building 3 site consist of a relatively thick layer of fill overlying either a thin layer of residual soil or bearing directly on sandstone. Fill thickness varies from 2.7m (within CBH7) at the north eastern area of the proposed structure to 6.8m (within CBH18) at the south western end. The fill consists of Clay, Sandy Clay, Sand, Silty Sand and Clayey Sand. In the absence of fill placement records and compaction control test results, the fill should be considered to be uncontrolled.

Uncontrolled fill is not suitable for supporting building loads and as such, we recommend building loads be supported on rock using either piled footings or a shallow footing system. Strip, pad footings or bored piers could be adopted, depending on the bulk excavation levels and the depth to bedrock. Figure 6 shows cross sections through the site with inferred rock levels.

The proposed Building 3 may contain a three storey basement and as such will require retaining structures as part of the development. Retaining structures may take the form of a soldier piled wall with timber infill panels or shotcrete panels, although groundwater seepage could cause ground loss, requiring careful construction with infill panels being constructed in relatively short depth increments. Alternatively, contiguous piles could be used with provision for grouting between piles in the event that seepage and ground loss occurs between piles.

5.4 Building 4

Improvements to Building 4 will consist of modifications to load bearing internal walls within the eastern corner of the existing structure. Based on site observations, shale was observed beneath the existing concrete ground floor stab in the area where the improvements are proposed.

We recommend an allowable bearing pressure for the shale exposed beneath Building 4 of 1000kPa. Footings should be embedded at least 0.3m into the rock and the base cleaned of debris.

The existing basement in the eastern corner of the building was cut into the shale creating a near vertical unsupported rock cutting up to approximately 2m high in places. New footings for load bearing walls will need to be placed a distance of at least 2 footing widths from the edge of any rock cutting. If this is not feasible, our preference would be to excavate the shale to the base of the existing cut and extend the footing. Alternatively, a reduction in the altowable bearing pressure to 600kPa and an inspection by a geotechnical engineer to observe the condition of the near vertical rock face will be

required. Following the inspection, further recommendations such as the removal of any loose rock, placement of rock dowels or shotcreting of exposed face may be required.

Settlement of footings should be less than 1% of the least footing dimension.

5.5 Site Preparation and Excavation Conditions

If fill is used to support structures or pavements it will need to be excavated and re-compacted if suitable, or replaced with an imported fill. Re-compacted clayer sands, sandy clays or imported granular fills that are to support floor slabs or pavements should be placed and compacted in maximum 200mm thick layers to at least 98% Standard Density Ratio at a moisture content within $\pm 2\%$ of Standard Optimum Moisture Content. Fill within 0.5m of pavement subgrade level should be compacted to at least 100% Standard Density Ratio.

Soils should be readily excavated using a tracked loader. The upper weathered sandstone bedrock is likely to be able to be excavated using a tracked excavator. The less weathered sandstone at depth will require ripping or the use of an impact hammer. Contractors should be provided with the borehole logs and core photographs and be required to make their own assessment of the suitability and productivity of specific plant.

5.6 Dewatering

Groundwater seepage was observed in three boreholes within the proposed Building 3 area during the investigation at ground levels varying from 153mAHD to 156.7mAHD. No groundwater seepage was observed in the other boreholes during the investigation, however, due to water being used as a drilling medium during rock coring, groundwater maybe present in excavations. Dewatering, it required, should be able to be achieved using standard sump and pump methods.

5.7 Support Requirements

5.7.1 Cut and Fill Batters and Slope Stability Issues

Excavations within compacted fill and residual soils are likely to stand temporarity at relatively steep slopes (between 1H:1V and 1.5H:1V). Such batters will be of marginal stability and are likely to suffer instability, particularly in wet weather. We recommend that allowance be made for laying back temporary excavations at 1.5H:1V where there is limited access required to the base of the excavation or 2H:1V where workers require access. Surcharge loads should be kept well clear of the crest of cuts

A batter angle of 26 ° (approximately 2H:1V) is recommended for permanent works. Retaining walls will be required where there is insufficient room to form unsupported batters.

5.7.2 Retaining Structures

Preliminary sketches of the proposed Building 1 car park show retaining structures associated with cut and fill earthworks. Buildings 2 and 3 are also likely to require retaining structures.

Where retaining walls are cantilevered or supported by a single row of anchors, and some wall movements can be tolerated, walls can be designed assuming a triangular earth pressure distribution using an earth pressure coefficient, K, of 0.4. A bulk unit weight of 20kN/m³ should be assumed for Unit 1 and 2 materials. For weathered rock a bulk unit weight of 22kN/m³ is recommended. Passive

pressure coefficients, K_p , of 2.5 may be assumed for the Unit 1 Fill and Unit 2 Residual Soil. A passive pressure coefficient, K_p , of 3.7 may be assumed for Unit 3A extremely weathered sandstone bedrock.

Lateral and vertical ground movements will be dependent on the design and construction of the retention system. For example, the use of higher earth pressure coefficients, tie-back anchor loads and stiffer walls will reduce lateral deflections.

Minimum wall movements of about 1% of retained wall height are required to cause the earth pressure coefficient to reduce to the active condition. Vertical movements could be expected to be of a similar order to the lateral movements. The extent of the horizontal movement behind the excavation face is typically between 1.5 and 3 times the excavated height.

Where ground anchors restrain retaining wall movement, or where significant movements cannot be tolerated, higher earth pressure coefficients should be adopted. We recommend an earth pressure coefficient of 0.5 for propped or anchored rotaining walls where movements are restrained. However, it should be understood that walls designed for this higher coefficient would still undergo some lateral movements, depending on the nature of the wall and the construction sequences. To assess the extent of lateral movements, a detailed soil structure analysis (using programmes such as WALLAP) should be undertaken.

For preliminary design of retaining walls, which are anchored or strutted at several levels, design can be based on the trapezoidal earth pressure distribution as shown in Table 2.

TABLE 2: TRAPEZOIDAL PRESSURE DISTRIBUTION

| Depth (m) | Horizontal Pressure (kPa) |
|----------------|-------------------------------|
| 0 | K,p₄ |
| 0. 25 H | K (0,8.γ. |
| 0.75 H | K (0.8,γ,H + p ₄) |
| н | K.p. |

Where:

K = Earth pressure coefficient which depends upon material type; whether movement needs to be limited as discussed above.

p. = Design surcharge pressure (kHa).

H = Thickness of layer being retained (m).

v = Upit weight (kN/m³)

Hydrostatic pressures should be added to earth pressures unless walls can be provided with effective drainage, and pressures due to adjacent footings will also need to be taken into account. The above pressures assume level ground above the retaining wall. Surcharge loads should be added to earth pressures, as appropriate.

For the preliminary design of anchors, an allowable bond stress of 600kPa may be adopted for Class III or better (Unit 3B) sandstone where anchors have a hand length of between 3m and 7m in medium strength sandstone. Anchors should be checked for an anchor pullout failure mechanism assuming a 45° lailure cone in addition to bond strength.

Where structures sensitive to ground movements lie close to the site, dilapidation surveys should be carried out prior to excavation. Numerical analysis should be carried out to assess the potential ground movement and interaction with the shoring wall design to control deflection to tolerable limits. Survey monitoring should also be carried out to confirm that movements are within the predicted range.

5.7.3 Vertical Excavations In Rock

Provision for the installation of support will be required where vertical excavations are made in rock. Specific rock support requirements in un-shored sections of excavations can only be assessed during excavation. An experienced geolechnical engineer/engineering geologist should carry out regular inspections as excavation progresses (at least every 2m depth of excavation). For preliminary design purposes the support guidelines presented in table 3 are recommended:

TABLE 3: VERTICAL EXCAVATION FACE SUPPORT REQUIREMENTS

| Rock Class | Support | | |
|---|---|--|--|
| Class V and IV Sandstone (Unit 3A) | Shoring wall; or Anchors or Soil Neils, mesh supported by 0.5m long dowels and shotcrete (minimum 75 mm thick) or fibre reinforced shotcrete of fractured zones below shoring walls. | | |
| Class III Sandstone or better (Unit 3B) | Generally only isolated rock bolting to support potentially unstable wedges. | | |
| | Localised pattern rock bolting, mesh supported by 0.5m long dowels and shotcrete (minimum 75 mm thick) or fibre reinforced shotcrete of fractured zones. (Within CBH16, a 0.6m thick day seam was observed at approximately 52mAHD which will likely require shotcrete and dowel support) | | |

Where long-term support is required below the site retention system, anchors and rock boils must be provided with a high level of corrosion protection if they cannot be maintained (i.e. inspected and replaced, if necessary). Stainless steel boils or multiple layers of corrosion protection such as encapsulating plain or galvanised boils in both grout and PVC sheaths may be required.

5.8 Foundations

Foundation design parameters for sandstone are provided in Table 4.

Open bored piles should be practical, although dewatering and temporary liners may be required for drilling in sand and/or if groundwater is encountered.

TABLE 4: ROCK FOUNDATION DESIGN PARAMETERS

| Unit | Allowable Shaft Adhesion (kPa) ^(a) | Allowable Bearing Pressure (kPa) (b) |
|--|--|--------------------------------------|
| Unit 3A Class V and Class IV Sandstone | 100 | 1000 |
| Unit 3B Class III Sandstone or better | 350 | 2000 – 5000 ^(r) |

Note:

- (a) Assumes minimum embedment of 3 pile diameters into the relevant stratum
- (b) Assumes a minimum embedment of 0.3m into the relevant bearing stratum.
- (c) Value dependant on level of assessment carried out during construction (see Table 5).

For uplift capacity, the shaft adhesion should be multiplied by 0.6. In addition to shaft adhesion, the uplift capacity should be checked for a cone pullout failure mode assuming a cone angle of 70° considering the submerged weight of the soil or rock and adopting a factor of safety of 1 against pullout.

An experienced geotechnical engineer should observe the boring of the piles in order to assess the rock levels and to confirm the rock is suitable for the adopted design parameters. Within CBH16, located in the south eastern corner of proposed Building 3, a 0.6m thick clay seam was observed within the Unit 3B sandstone at a depth of approximately 9m below existing ground level. We recommend bored footings be carried through this seam. Where footings are designed to bear directly onto bedrock, the footing inspection and assessment requirements are provided in Table 5.

Footings designed using the parameters presented in Table 4 should result in settlements less than 1% of the footing width or diameter.

TABLE 5: FOOTING INSPECTION AND ASSESSMENT REQUIREMENTS

| Rock Unit | Testing Requirements | | | |
|---|---|--|--|--|
| Unit 3A Unit 3B Design Searing Pressure up to 2,000kPa | Visual inspection of all pad footings Observation of piling and correlation with horehole information Visual inspection of all pad footings Observation of piling and correlation with borehole information | | | |
| Unit 3B Design Bearing Pressure greater than 2,000kPa | Visual inspection of all pad footings Observation of piling and correlation with borehole information Spoon testing or coring of all least 1/3 of footing locations | | | |

5.9 Pavement Design

CBR testing on potential subgrade soils for road pavements indicate values ranging from 2% to 10%. For design purposes, we recommend a CBR value of 2% be adopted subject to confirmation by a geotechnical engineer during construction

Pavement areas should be prepared by:

- Stripping all topscil.
- Stripping all fill. Where fill is exposed at a depth of 1m below proposed subgrade level, remove
 to this level and proof roll in the presence of an experienced geotechnical engineer with a
 minimum of 6 passes of a smooth drum, 10 tonne roller. Soft or heaving areas will require
 further excavation and replacement.
- For other areas, proof roll at subgrade level with a minimum of 6 passes of a smooth drum, 10 tenne roller.
- Remove and replace soft or heaving areas.

5.10 Soil Aggressivity

Test results from Building 1 and 3 sites indicate that the fill and natural so is are not highly acidic and have low sulphate and chloride concentrations. Within the Building 2 site if it soils are mildly acidic, with pH values of 4.7 and 5.5, however, the tested sulphate and chloride concentrations were low. In consideration of this, we recommend a non-aggressive exposure classification in accordance with AS 2159-1995 for concrete in contact with all soils across the site.

5.11 Earthquake Loading Factor

Based on Australian Standard AS 1170.4-2007, Structural Design Actions – Part 4: Farthquake Actions in Australia, the site is assessed as having a sub-soil class $C_{\rm e}$ – Shallow soil site.

6 LIMITATIONS

The findings within this report are the result of discrete/specific investigations methodologies used in accordance with normal practices and standards. Subsurface conditions can change over relatively short distances and the subsurface conditions revealed at the test locations may not be representative of subsurface conditions across the site. We recommend that a geotechnical engineer be engaged during construction to confirm the subsurface conditions are consistent with design assumptions

Retaining wall design is complex and detailed soil structure interaction analysis may be required to assess shear stresses, bending moments and anchor loads in retaining walls. Coffey would be happy to assist in a detailed analysis of retaining walls for basements.

The reader's attention is drawn to the attached document entitled 'Important Information about your Coffey Report', which presents additional information on the uses and limitations of this report.

For and on behalf of Coffey Geotechnics Pty Ltd.

Peter Waddell

Principal Geolechnical Engineer

Petabladdell



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 propared 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 i mitations 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 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 tikely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no maller how qualitied, 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 conter 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.



Important information about your Coffey Report

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 attected 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 incorporate 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 generolironmental 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 Cottey for information relating to geoenvironmental issues.

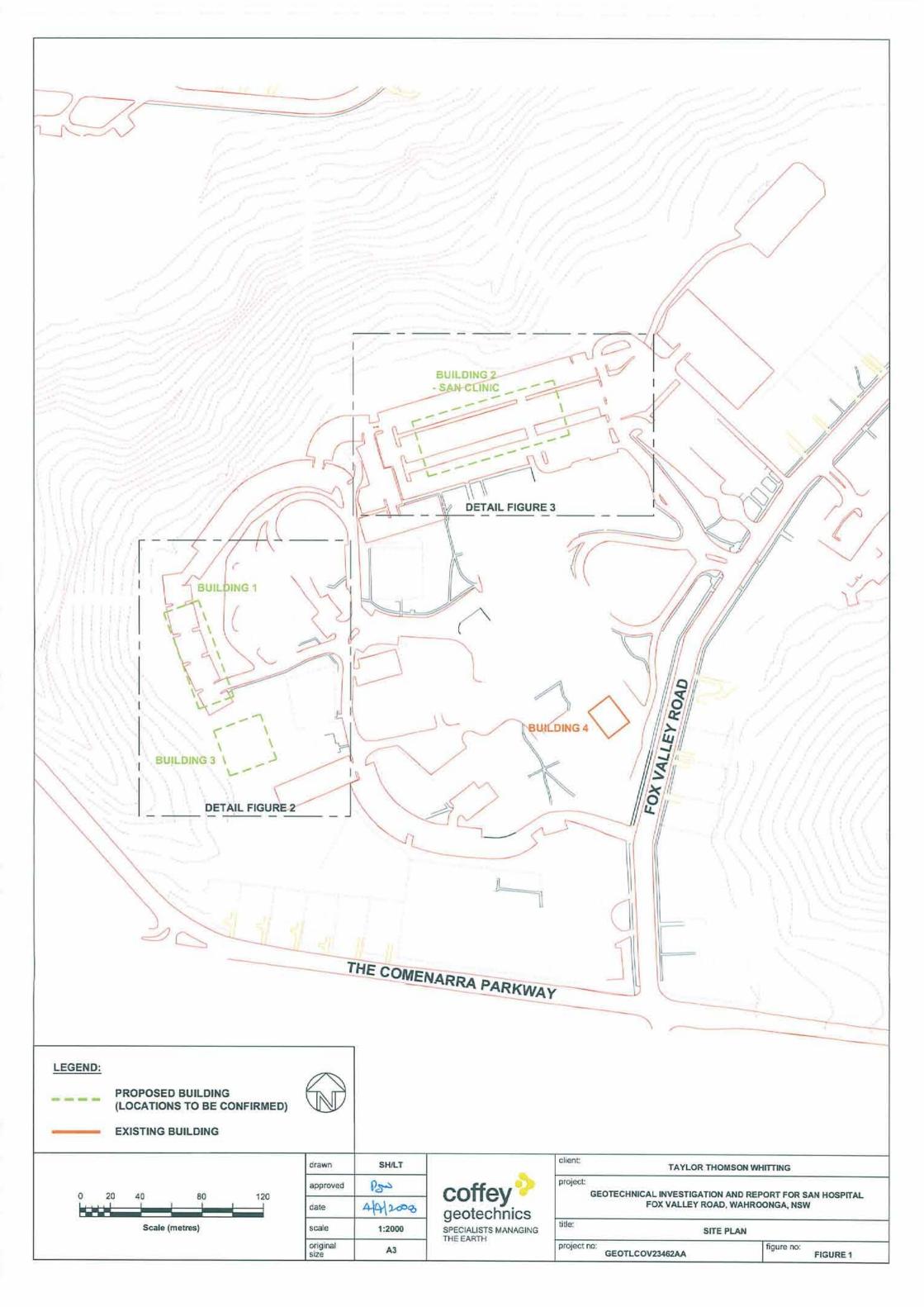
Rely on Coffey for additional assistance

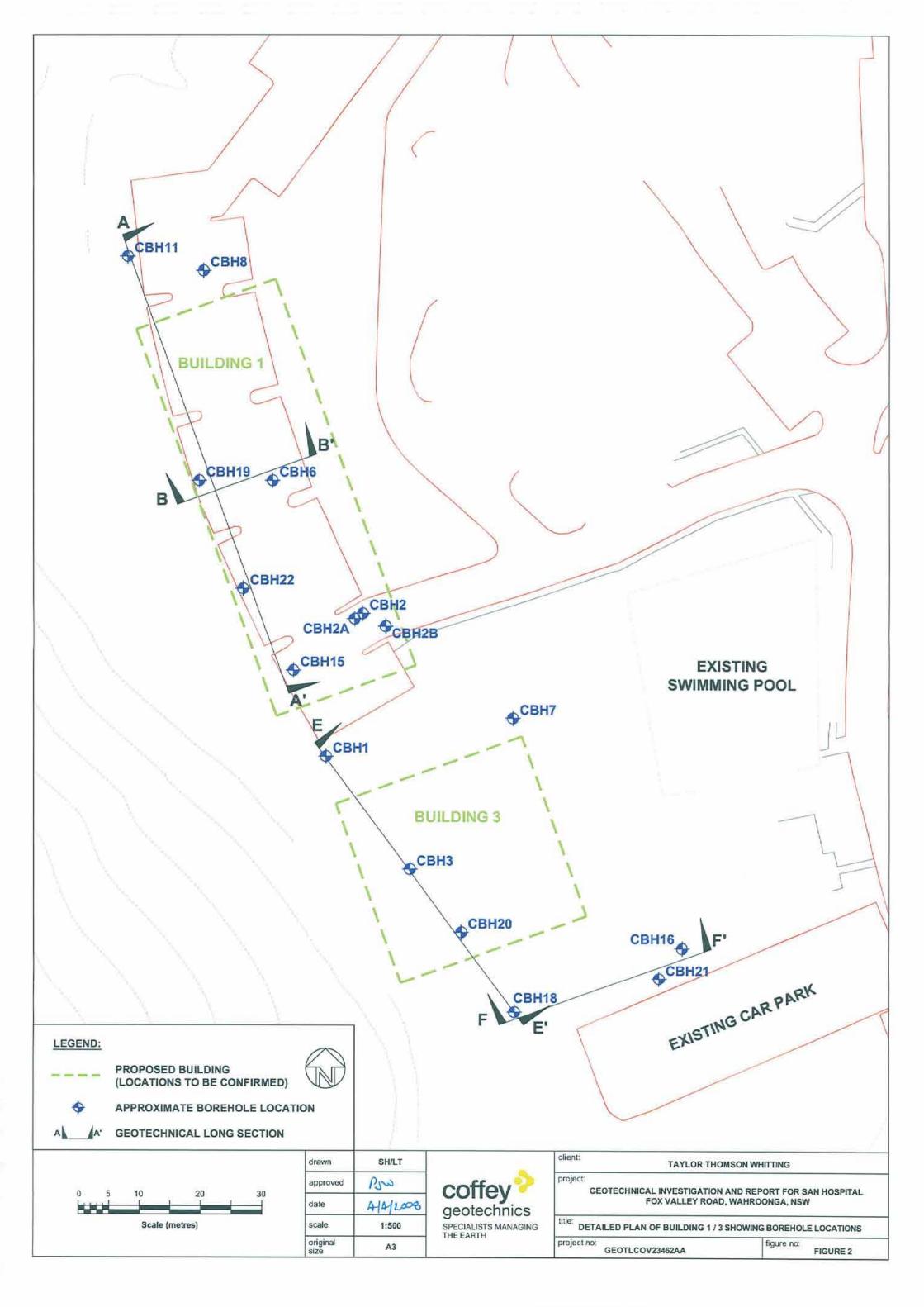
Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction, it is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As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

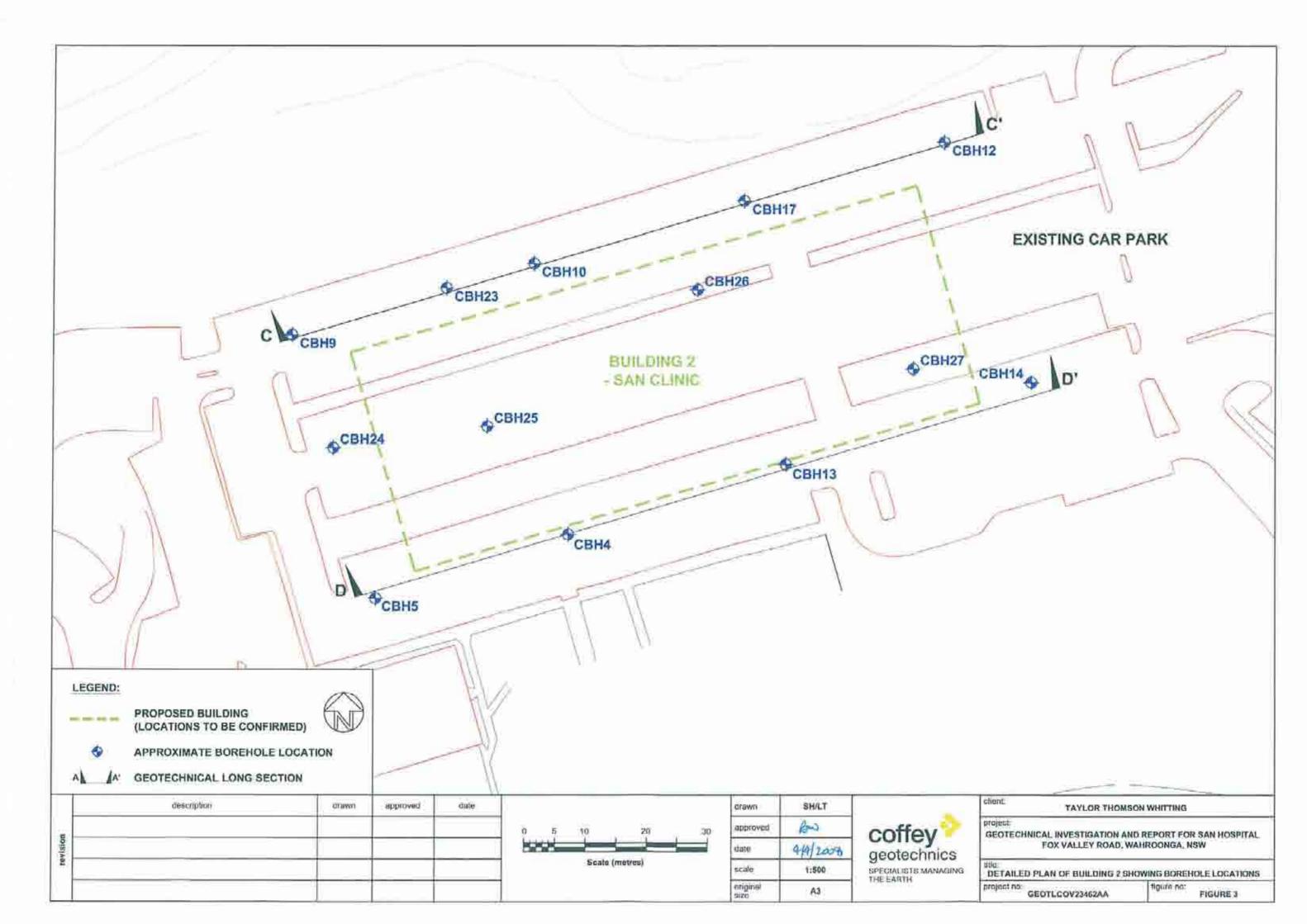
Responsibility

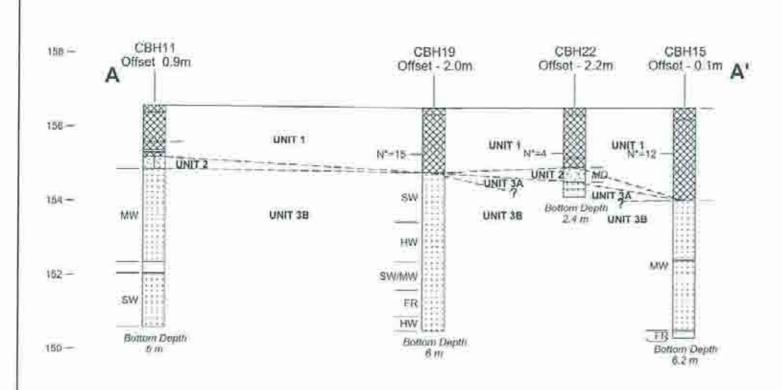
Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, 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 Geotechnica" information in Construction Contracts" published by the Institution of Engineers Australia. National Headquarters, Cenberra, 1987.

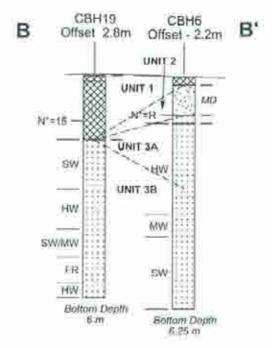








SECTION A-A'



SECTION B-B'

N*=17

LEGEND

FILL

SILTY SAND

ROCK CLASSIFICATION (PELLS ET AL, 1998)

SAND

WEATHERING (SEE EXPLANATION SHEETS) Y WATER LEVEL

STANDARD PENETRATION TEST RESULT

SANDSTONE

NO CORE

ttrawn

date scale

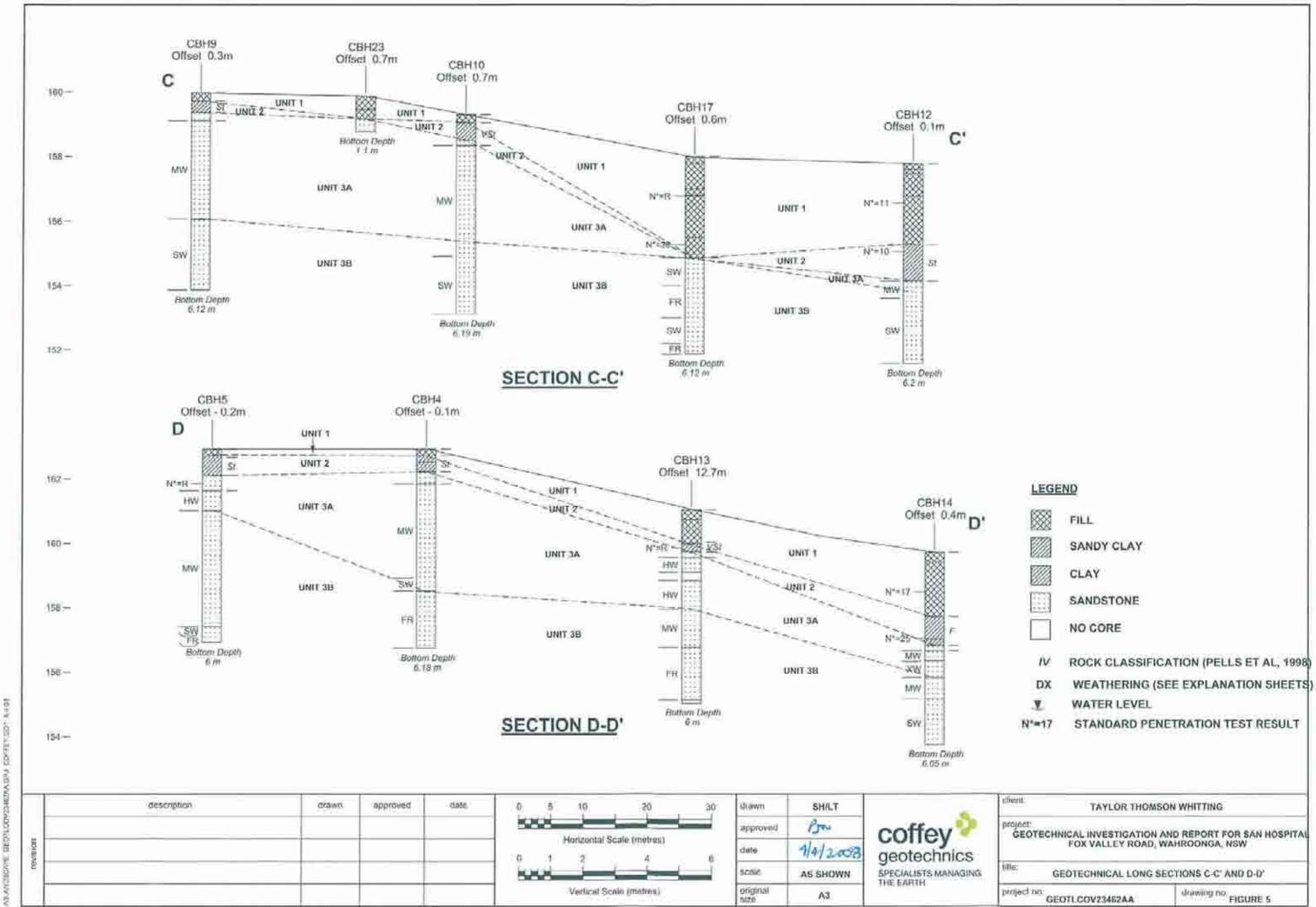
original size

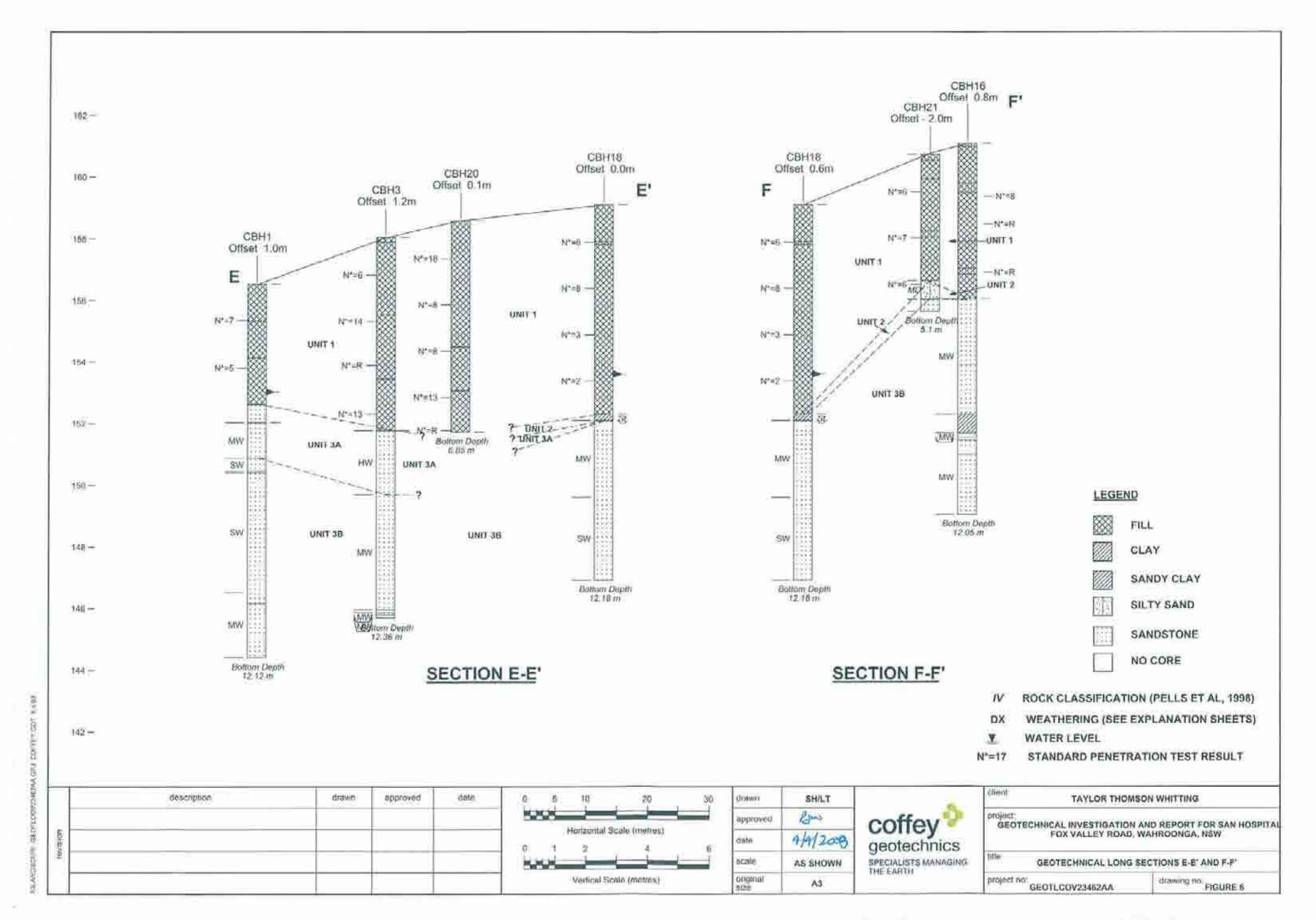
approved

| description | drawn | approved | date | 0 | 5 | 10 | 20 | 30 |
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| | | | | 200 | NC)VIIII | Vertical Sci | ale (metres) | |

| SHALT | - |
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| Por | coffey |
| 4/4/2003 | geotechnics |
| AS SHOWN | SPECIALISTS MANAGING THE FARTH |
| Λ3 | THE POINT. |

| chent | TAYLOR THOM | SON WHITTING | |
|--------------------|--|------------------------|--|
| geoteci Geoteci | project GEOTECHNICAL INVESTIGATION AND REPORT FOR SAN HOSPITAL FOX VALLEY ROAD, WAHROONGA, NSW | | |
| title | GEOTECHNICAL LONG | SECTIONS A-A' AND B-B' | |
| project no. | FOX COVER (CO.) | drawing nd: | |





| Appendix A | Α |
|------------|---|
|------------|---|

Engineering Borehole Logs, Core Photographs and Explanation Sheets



Soil Description Explanation Sheet (1 of 2)

DEFINITION:

In engineering terms soil includes every type of undemonted or partially demonted inorganic or organic motorial found in the ground. In practice, if the material can be remoulded an disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using red-describtion terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the United Soil Classification (UCS) as shown in the table on Sheet 2.

PARTICLE SIZE DESCRIPTIVE TERMS

| NAME SUBDIVISION | | SIZE |
|------------------|----------|--------------------------|
| Boulders | , | >200 mm |
| Comples | ļ | 63 mm to 200 mm |
| Gravel | coarse | 20 mm to 63 mm |
| | medium | 6 mm to 20 mm |
| | j fine i | 2 38 mm to 6 mm |
| Sand | coarse | 600 μm to 2.36 mm |
| | mediam | 200 jem to 600 inc |
| | fine | 75 um to 2 0 0 um |
| _ | | |

MOISTURE CONDITION

Dry I coks and I feels only Cohesive and demented so a are hard. Inable or powdery. Uncernented granulay soils run freely through I hands.

Moist Shift feets contland darketed in colour. Chitesive soils can be moulded. Granular soils tend to cohere-

We: As for moist but with free water forming on bands when handled

CONSISTENCY OF COHESIVE SOILS

| TERM | UNDRAINEC STRENGTHI Su (kPa | FIELD GUIDE |
|------------|-----------------------------------|---|
| Very Soft | 41۶ | A finger can be pushed wall into the soil with latte effort. |
| Soft | 12 25 | A finger can be pushed into the soil to about 25mm depth. |
| Firm | 25 - 5 0 | The soil can be indented about 5mm with the thumb, but not penetrated. |
| Staff | 50 10 0 | The surface of the soil can be indented with the thumb, but not penetrated. |
| Very Stift | 100 - 200 | The surface of the scal can be marked but not indented with thumb pressure |
| Hard | >200 | The surface of the soil can be marked only with the fourname. |
| Friable | _ | Crumbles of pawders when scraped by thumbnoid |

DENSITY OF GRANULAR SOILS

| TERM | DENSITY INDEX (% | |
|--------------|-----------------------------|------|
| Vory loose | Less than 15 | ï |
| Loose | 15 - 35 | • |
| Medium Donse | 3 5 - 8 5 | į• |
| Danse | . 65 - 85 | ı |
| Vary Dense | Greater than 8E | 1 |
| | 1 | |

MINOR COMPONENTS

| TERM | ASSESSMENT GUIDE | PROPORTION OF MINOR COMPONENT IN |
|-----------|---|---|
| Trace of | Presence just detectable by feel or eyo, but soil properties liftle or no different to general properties of primary component. | Coarse grained solis: <5% Fine grained solis: <15% |
| With some | Presence easily detected by foot or eye, so- proportios (little different to general properties of primary component). | Coarse grained soils. 5 - 12% Fine grained soils: 15 - 00% |

SOIL STRUCTURE

| | ZONING | CE | MENTING |
|---------|--|------------------------|--|
| Layers | Continuous across exposure or samps. | Weakly camented | Fasily broken up by hand in air or water. |
| Lenses | Discontinuous layers of lentic (i.e., shape. | Moderately cemented | Effort is required too break up the sailing hand in air or water |
| Pockets | frequiat inclusions of different material | | |

GEÖLÖĞİCAL ORIĞIN

material

WEATHERED IN PLACE SOILS

Extremely Structure and fabric of parent rock visible weathered

Residual soil - Structure and fabric of perent rock not visible:

TRANSPORTED SOILS

Aeolian soil Deposited by wind

Alluviar soil Deposited by streams and livers

Coll.rvial soil Deposited on slopes (transported downslone

Fil Man mage deposit. Fill may be significantly

more variable between tested locations their naturally occurring soils.

Lacustrine soil. Deposited by takes.

Marine soil — Deposited in locean basins, bays, beaches and estuares.



Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

| (Excli | iding | | | | ION PROCEDURE and basing fractions | | USC | PRIMARY NAME |
|---|-------------------------------------|---|---|-------|--|------------------|-----|---------------|
| ** | | arse 2.0 mm | GLEAN GRAVELS (Little or no fnes) | | e range in grain size a unts of all intermedial | | GW | GRAVEL |
| 3 mm | | ELS If of co | GRAN GRAN Par Par A | | ominantly one size or more intermediate siz | | GP | GRAVEL |
| SOILS than 6 | eye) | GRAVELS Mare than half of coarse ction is larger than 2.0 m | GRAVELS WITH FINES (Appreciable amount of fnes) | | plastic fines (for iden edures see ML below | | GM | SILTY GRAVEL |
| VAIINED riels less 0.075 m | the naked eye) | GRAVELS Mare than half of coarse fraction is larger than 2.0 mm | GRAVELS WTH FINE (Apprecab amount of fnes) | | ic fines (for identifica CL below) | tion procedures | GC | CLAYEY GRAVEL |
| COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm | to | arsa .0 mm | AN IDS III III III | | range in grain sizes : unts of all intermediat | | SW | SAND |
| 00/ an 50% | ticle visi | SANDS More than half of coarse ction is smaller than 2.0 r | CLEAN SANDS (Little or no fines) | | ominantly one size or some intermediate si | | SP | SAND |
| More tha | More tha | | SANDS WITH FINES Appreciable amount of fines) | | plastic fines (for iden adures see ML below | | SM | SILTY SAND |
| | about the smallest particle visible | SANDS More than half of coarse fraction is smaller than 2.0 mm | SAL WITH (Appre | | ic fines (for identificat CL below). | tion procedures | SC | CLAYEY SAND |
| | pont | | IDENTIFICAT | ION P | ROCEDURES ON FR | ACTIONS <0.2 mm. | | |
| Han H | 133 | 10 | DRY STREN | GTH | DILATANCY | TOUGHNESS | | |
| less t | tic e | CLAYS limit an 50 | None to Low | | Quick to slow | None | ML | SILT |
| FINE GRAINED SOILS in 50% of manerial less is smaller than 0.075 | im pai | SILTS & CLAYS Liquid limit less than 50 | Medium to H | ligh | None | Medium | CL | CLAY |
| of me | (A 0.075 mm particle | SH | Low to med | um | Slow to very slow | Low | OL | ORGANIC SILT |
| FINE GRAINED SOILS than 50% of material less tha mm is smaller than 0.075 mm | (A.O. | CLAYS limit han 50 | Low to medi | um | Slow to very slow | Low to medium | MH | SILT |
| FINE GRAINED SOILS More than 50% of marerial less than 63 mm is smaller than 0.075 mm | | SILTS & CLAYS Liquid limit greater than 50 | High | | None | High | СН | CLAY |
| Mo | | SILTS & Liquid greater t | Medium to H | ligh | None | Low to medium | ОН | ORGANIC CLAY |
| HIGHLY | Y OF | RGANIC | Readily identification | | y colour, odgur, spon | gy feel and | Pt | PEAT |

COMMON DEFECTS IN SOIL

| TERM | DEFINITION | DIAGRAM | TERM | DEFINITION | DIAGRAM |
|--------------------|--|--|------------------|--|------------------|
| PARTING | A surface or crack across which the soil has little or no tensile strongth. Perallel or sub parallel to layering (eg bedding). May be open or closed. | | SOFTENED ZONE | A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere. | W. Ball Michigan |
| TAIOL | A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to leyering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length. | | TUBE | Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with day or strengthened by denser packing of grains. May contain organic matter | |
| SHEARED | 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. | A STATE OF THE STA | 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 cernented. | 0 |
| 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. | | INFILLED SEAM | Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints. | |



Rock Description Explanation Sheet (1 of 2)

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:

Rock Substance In engineering terms roch substance is any naturally occurring aggregate of minerals and organic material which cannot be disintegrated or remoulded by hand in air or water. Other material is described using soil descriptive terms. Effectively

homogenous 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

| SUBSTANCE | DESCR | IPTIVE TERMS: | ROCK | SUBSTA | ANCE STRE | NGTH TERMS |
|------------------------------------|-----------|---|-----------|-------------------|---|--|
| ROCK NAME | | e rock names are used rather than precise gloaf classification. | Term | Abbrev- lation | Point Load Index, I ₃ 50 (MPa) | Field Guide |
| PARTICLE SIZE | Grains | size terms for sandstone are: | | | | |
| Coarse graine | d Mainly | 0.6mm to 2mm | | | | |
| Medium graine | ed Mainly | 0.2mm to 0.6mm | Very Lov | , VL | Less than 0.1 | Material crambles under firm |
| Fine grained | Mainly | 0.06mm (ust visible) to 0.2mm | | | | blows with sharp end of pick can be peeled with a knife; pieces up to 30mm trick car |
| ABRIC | | for layering of penetrative fabric (eg. bedding, age etc.) are: | | | | be broken by finger pressure |
| Massive | No lay | cring or penetrative fabric. | | | 0.4 | |
| Indistinct | Layern | g or fabric just visible. Little effect on properties. | Low | L | 0.1 to 0.3 | Easily scored with a knite; indentations 1mm to 3mm show with firm bows of a |
| O'stinct | | ng or fabric is easily visible. Rock breaks more parallel to layering of fabric. | | | | prok point: has a dull sound under hammer. Pleces of core 150mm long by 50mm |
| CLASSIFICAT | TION OF | WEATHERING PRODUCTS | | | | diameter may be broken by |
| Term Abb | reviation | Definition | | | | hand. Sharp edges of core |
| Residual Soil | AS | Soil derived from the weathering of rock; the mass structure and substance fabric are no longer evident; there is a large change in | | | | may be friable and break during handling. |
| | | volume but the soil has not been significantly transported. | Medium | м | 0.3 to 1.0 | Readily scored with a knife; piece of core 150mm long b 50mm diameter can be |
| Extremely Weathered Material | xw | Material is weathered to such an extent that it has soll properties, ie, it either disintegrates or can be remoulded in water. Or ginal rock fabric | Uiah | ш | 1 to 3 | broken by hand with difficult |
| ##!-#-b- | нw | still visible. | High | Н | 1103 | A piece of core 150mm long by 50mm can not be broken by hand but can be broken |
| Highly Weathered | 1111 | Rock strength is changed by weathering. The whole of the rock substance is discoloured. | | | | by a pick with a single firm |
| Rock | | usually by iron staining or bleaching to the | | | | blow; rack rings under |
| | | extent that the colour of the original rock is not | | | | hammer. |
| | | recognisable. Some minerals are decomposed | | | | |
| | | to clay minerals. Porosity may be increased by leaching or may be decreased due to the | Very Hig | h VH | 3 to 10 | Hand specimen breaks after |
| | | deposition of minerals in pores. | | | | more than one blow of a |
| | | , , , , , , , , , , , , , , , , , , , | | | | pick; rack rings under |
| Moderately | MW | The whole of the rock substance is discoloured, | | | | hamme r . |
| Weathered | | usually by from staining or bleaching , to the extent that the colour of the fresh rock is no | | | | |
| Rock | | longer recognisable. | Extreme | ly EH | More than 10 | Specimen requires many |
| | | | High | | | blows with geological pick t |
| Slightly | SW | Rock substance affected by weathering to the | | | | break; rock rings under hammer. |
| Weathered | | extent that partial staining or partial | | | | nammer, |
| Rock | | discolouration of the rock substance (usually by timonite) has taken place. The colour and | | | | |
| | | texture of the frosh rock is recognisable; strength properties are essentially those of the | Notes on | Book S | ubstance Stre | nath |
| | | fresh rock substance. | | | | o strength applies to the strengt |
| | | | | | | h strength anisotropic rocks ma |
| Fresh Rock | FR | Rock substance unaffected by weathering. | break rea | idi y parall | e to the planar ar | isotropy |
| Notes on Weat | serine: | | | | | as a rock substance strength |
| | | 'Distinctly Weathered' (DW) to cover the range of | | | | 26-1993, the field guide thereis strength range are soils in |

- substance weathering conditions between XW and SW. For projects where it is not practical to delineate between HW and MW or it is judged that there is no advantage in making such a distinction. DW may be used with the definition
- given in AS1726.

 2. Where physical and chemical changes were caused by hot gasses and liquids associated with igneous rocks, the term "affered" may be substituted for "weathering" to give the abbreviations XA, HA, MA, SA and DA.
- engineering terms.
- 3. The unconfined compressive strength for isotropic rocks (and anisotropic rocks which tall across the planar anisotropy) is typically 10 to 25 times the point load index (Is50). The ratio may vary for different rock types. Lower strength rocks often have lower ratios than higher strength rocks.



Rock Description Explanation Sheet (2 of 2)

| COMMON ROCK MA | DEFECTS IN SSES | Diagram | and the same of th | Note 1) | DEFECT SHAPE Planar | TERMS The defect does not vary in |
|---|---|---------------|--|------------------|------------------------|--|
| Term | Definition | | | 11010 17 | | orientation |
| Parting | A surface or crack across which the rock has little or no tensile strength. Parallel or sub-parallel to layering | | 20 | ы | Gurved | The defect has a gradual change in orientation |
| | (eg bedding) or a planar anisotropy in the rock substance (eg, cleavage). | | 20 J Cleavage | | Undulating | The defect has a wavy surface |
| | May be open or closed. | | • | (Note 2) | Stepped | The defect has one or more well defined steps |
| Joint | A surface or crack across which the rock has little or no tensile strength. | (*** | | 5.27 | Irregular | The defect has many sharp changes of orientation |
| | but which is not parallel or sub parallel to layering or planar anisotropy in the rock substance. | | 400 | (Note 2) | | ment of defect snape is partly by the scale of the observation. |
| | May be open or closed. | | | (Marie E) | ROUGHNESS Slickensided | FERMS Grooved or striated surface usually polished |
| Sheared Zone | Zone of rock substance with roughly parallel near planar, curved or | | | | Polished | Shiny smooth surface |
| (Note 3) | undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of | A | 35 | | Smooth | Smooth to touch. Few or no surface irregularities |
| | the defects are usually curved and intersect to divide the mass into lenticular or wedge shaped blocks. | SPERE | | 121 | Rough | Many small surface irregularities (amplitude generally less than 1mm). Feels like fine to coarse sand paper. |
| Sheared Surface (Note 3) | A riear planar, curved or undulating surface which is usually smooth, pollshed or slickensided. | | 40 8/2- | 0.02(0.0 | Very Rough | Many large surface irregularities (amplitude generally more than 1mm). Fools like, or coarser than very coarse sand paper. |
| Crushed | Seam with roughly parallel almost | | | | COATING TER | MS |
| Seam (Note 3) | planar boundaries, composed of discriented, usually angular | 11/01 | 50 | | Clean | No visible coating |
| , | fragments of the host rock substance which may be more weathered than the host rock. The | (3) | 7/5 | S. | Stained | No visible coating but surfaces are discoloured |
| | seam has soil properties. | | | S ^a A | Veneer | A visible coating of soil or mineral, too thin to measure; may be patchy |
| 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. | | By " | · A | Coating | A visible coating up to 1mm thick. Thicker soil material is usually described using appropriate defect terms (eg. infilled seam). Thicker rock strength material is usually described as a vein. |
| Extremely | Seam of soil substance, often with | | 0 1742 | | BLOCK SHAPE Blocky | TERMS Approximately equidimensional |
| Weathered Seam | gradational boundaries. Formad by weathering of the rock substance in place. | WALL STATE OF | TIME | STS | Tabular | Thickness much less than length or width |
| | WOOD CO. | Souri | 100 | 15 | Columnar | Height much greate than |

- 1. Usually beneficible use show the true dip of defects and face sketches and sections the apparent dip
 2. Partirigs and joints are not usually shown on the graphic log unless considered significant.
 3. Sheared zones, sheared surfaces and crushed seams are faults in goological terms.



Borehale No. CBH1

1 of 3

Sheet Project Ng: GEOTLCOV23462AA

10.3.2008

Date started.

10.3.2008

Coffey Projects

Date completed:

JA

Principal:

Client:

Engineering Log - Borehole

Taylor Thomson Whitting

Lagged by:

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

| d A | ന്നാ | (e) (| ing n | ndy | nting: 1 | Viobile | DNI8 | B Đ | | Easting: | 323702.8 | slope: | 90' | | | | R.L | . Surface: | 156.5 |
|----------|------|--------------|----------|----------------|------------------------|--------------------------------|-------------------------|---------------------|------------------|------------------|---|-----------------------------|--|---|--------------------------------|--------------|-------------|-------------------|--------------------------------|
| - | | met | _ | | tion : | 100 m | (C) | 1 :: | | Northing | 6266692.2 | bearing | <u>: </u> | | | | det | Umi: | AHD |
| metrod | 3 | action of 3 | ١ | Walley. | semples, hests, etc | RL | depth metres | got one | classification a | 904 t/rp | material e: plasticity or partici r, secondary and min | e graničlens os compones | ites, | racistore constian | conssistings/ density inter | tabout 2 000 | 3 | | system and net observations |
| ą | | | H | 7 | <u> </u> | | _ | XXX | | | EY SANDO Modium low plasticity day. | grained, brov | Am and | ο. | | П | 1 | FILL | |
| ` | | i | | - | 85 + D + E | 156 | - | ※ | | , | | | | |] | Ш | 1 | ļ | |
| | | | | | 85 | Γ | 7 | | | | | | | | | lil. | 11 | | |
| | | | | - | SPT | I | 1 1 | | | | | | | | | | | ŀ | |
| | | | | | 2,2,5 N*=7 | | ; | | | FILL CEAY | : Mediano plasticity. | _В ону — — — | | <n p<="" td=""><td></td><td></td><td>11</td><td>[</td><td></td></n> | | | 11 | [| |
| | | | | | | 155 | | | | | | | | | | | 11 | | |
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| ٥ | | | | | | l I | 4 | XXX | | SANDSTON | E: Fine grained, ga | e orange. | | | | | | V-tilk refusation | |
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Borehole No. CBH1

Engineering Log - Cored Borehole

Sheet 2 of 3

Client Taylor

Project No:

GEOTLCOV23462AA

. . . .

Taylor Thomson Whitting

Date started:

10.3.2008

Principal:

Coffey Projects

Oate completed:

10.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JΑ

| Borehole Location: Building 3 Checked by SH | | , | | - |
|---|-------------------|------------|-----------------|----------|
| | Borehole Location | Building 3 | Checked by: | _SH_ |

| 6 না | л) (| atel i | moon & | ibing: Mo | 08¢ Call 980 | Easting: | 3 | 23702.8 | slope: | | 90" | R.L. Surface: | 158.5 |
|-------------|----------|----------|--------|------------------------|--|--------------------------------|------------------|--------------------------|--|------------------|------------------------------------|--|-----------------------------------|
| | | ame | | | mm Drilling fluid: | Northing: | 6 | 266692.2 | bearm | <u> </u> | | | AHD |
| de | illi | ng i | | ation | material substance | | | | · - | n | ck mass | | |
| Demos. | -Ji-euco | Water | RL | depth metres | material Tock type: grain characteristics, of shucture, minor component | zekur, judas | alteralion | esumated etrength | IS ₍₉₀₎ M ² 6 Or deant- extent A- 2409 | ROD 14 | defect specias main 88888 | defect desc type, inclination, plans coating, this particular | artity, roughness, |
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| 힣 | Н | | 152 | | Continued from non-cored bord SANDSTONE: Fine to medium gra- | med. N | evv | +;;;;; | € A_ 0.4 0.66 | Н | ;;~ | | |
| NACC. | | | i | _ { | jefore and pale distingle, extistinally distinctly bedoed at 22* | (o | j | 1 1 1 1 | | 1 | | —SM, Pt., SO, 2mm clay i | ก กีป, 20*. |
| | | | i | 5 | | | ļ | | } | ē | | — SM, PL, 5O, 0°, 4mm d | ey loft) |
| | | | | 1 | · : : | | | | | | | - SM. Pt. SO. 8°, 4mm d - Pt. Pt. RO, 5°, VN | ay infil |
| | | | _151 | "] | <u> </u> | | | | | \Box | | SM, PL, SO, 9", 2mm of | 37 মধুৱ |
| | | ĺ | ı | | SANDSTONE: Medium grained, per initiallinity to distinctly bedded at 22 | Na gray, S | S₩ | | 0.560.34 | | ן די י | —J1, PL, SO, 26°, CO | |
| | | | | 6 | NO CORE: 0.04m | | . - | | | | | | LETS |
| | | ١ | | 1 | | 3 | \$₩ ⁻ | | | ' | | | |
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| | | l | | 1 | :::: | | | 2000 | 0.680.61 | | | Ì | |
| | | | | | | | - 1 | | D A | | | PT, 22', PL, RO, SAND | YCLAY, IMM |
| | | | _149 | - | · · · · · · · · · · · · · · · · · · · | | 1 | | 0 58 0 4 1 | | 1 | | Y CLAY, IMVE |
| | | | | | | ĺ | ļ | | • |] | Ľ | | Y CLAY, 1MW |
| ribė | | 4 | | . <u>8</u> 1 | core-tiff | water | | | weelhedi SN fr | 8 •\$h | <u>. · . ·</u> | Select type J1 (cin) | roughness VR very (ough |
| AS | | | | er sengwid | a Casing used | 100 /Si | | | SW 61 | hghiliy Voces | siely woodho | PT parting SW seam | HD rough SO amooth |
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| CB CB | | | NAC | Or Blade C com | graphic legicore recovery | —<) paréal — d sumpé | | uid loas Il Ruid lose | - 6 | | ay waadi ere o MAV and M | IW) | |
| NO. |). HI | J. PÜ | wire | ine core | come recovered - giaspine syrobiolo | • | | | | ery ka | ™ | plenarity Pt plans: CU curved | coefing Cili dean SN cisved |
| | | | | | incicale majerial | | | we test result | M M | es Nector | Mr. | UN undividing ST slapped | VM yenger GO coaring |
| | | | | | no cora recovered | 税 llugeor | - | | VH ν | egy αγ | ရွှုံး (မျှော ဂါဌနာ | 19 uragular | waly |

CORED BOREHOLE GEOMICOV234524X GPJ COFFEY GDT 4 18 03

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Borehole No. CBH1

Sheet

3 of 3

Project No:

GEOTLCOV23462AA

Client:

Taylor Thomson Whitting

Engineering Log - Cored Borehole

Date started.

10.3.2008

Principal:

Coffey Projects

Date completed:

10.3.2008

Project.

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

| ή | ŒΚ | odel - | S /MOU | iling: Mo | bile Cr | M B60 East | ing: | 323702.6 | alópe: | | -90* | R.L. Surface: 156.5 |
|----------------------|---------|-----------|-----------------------|---|-------------|--|--|----------------------|--|-------------------------------|---|---|
| ю | d | eme | ten: | 10 | omm. | Driffing fluid: Nort | hing; i | 5266602.2 | bearin | g; | _ | dalum AHD |
| d٢ | iQi | ng i | nterm | ation | mat | erial substance | | | | 71 | ock mass | defects |
| me;hoc | GOC9-I∰ | Noter | Fû. | ರ ಕ್ಕಾರಗಿ ಗುಣ್ಣರಾಕ್ಕ | graphic log | meterial FOCA type; grain charactéristes, céléur, structure, minor components | neaheing alleration | estreted strength | ts _{och} Mil-a D-claire etrai A-saiol | ROD % | 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | defect description typo, inclination, planarity, roughness, coaling, thinkness particular gen |
| NAIC | | | _14 8 | 9 | | Lace of pyrite mineralisation an detect scalars. | 5W | | O A 0.50 0.52 | 100 | | PT, 22", PL, RO, CO PT, 15", IR, RD, CN PT, 10", HR, RO, CN PT, 20", UN, RO, CO |
| | | | 147 | 10 - 11 | | 8.96 - 10.37- day seams and fault. SANDSTONE: Mexikum grained, dark orango to pale grey, stong femp a teration and seactly to distinutly bedded at 22°. | OW . | | D A 6.386 34 0 A 0.940.92 | 96 | | SM, 0°, PL, 20, LAMINATEU CLAY, TRAM FAULT, 0°, PL, SI, CLAY, 2MM SM, 0°, IR, SO, CLAY, 30MM SM, 0°, PL, SO, CLAY, 100MM JT, 70°, PL, SO, CLAY, 1MM JT, 80°, PL, RO, CLAY & IRON STANNING, 0.5MM |
| | | _ | L145 | 12 | | CBH1 terminoted at 12,12m | | | D ∧ Ñ 64 ∩ 48 | | | PT, 15°, PL, 80, CLAY, 0.5MM — JT, 70°, PL, RO, CO (IRON), 1MM |
| | | | 144 | 13_ | | garrianiiioteo ar partum | | | | | | |
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| | #Ho | | _141 | 16 | | core-INI water | | | weatherin | 99 | | detect type roughness |
| AS AD RR CB | n.C | | rolle clav Note | rbe er screwing er dreing er blade Græle line does | | ☐ casting used ☐ barrel withdrawn practic log/core mistorethy ☐ c | ovinga waa n date sho alle iniliuw artial di ii ii omalate dii | NA. | SW SH MW III MW III XW 69 DW G | oderi yhly area sana | weathered also retailed weathered bely weathered by weathered a LAV and HA | T joint VR very rough PT parting RC rough (ed Sty sear) Sy searn zone 30 meteods Sy spared buriace I SS phared buriace I CS prushod seam W) planarity conting |
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| date | 4/4/2008 |
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| origina. sıza | Д4 |



| CHBIN | Taylor Thomson Whitting | | | | | | | | | |
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| project | | OAD, SAN HOSPITAL OONGA | | | | | | | | |
| title | ROCK CORE PH | TOGRAPH ~ CBH* | | | | | | | | |
| project no | GEOTLCOV23462AA | Photo no: CBH 1 of 1 | | | | | | | | |



Screhole No. CBH2

Engineering Log - Borehole

Shoct Project No: 1 of 1 GEOTLCOV23462AA

Client:

Taylor Thomson Whitting

Date started:

10.3.2008

Principal:

Coffey Projects

Date completed:

10.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JΑ

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| ടൻ നാം | | | mour | | | Drit B | 80 | | Easting: 323709.4 | slope: | -90" | | | | K.L. | Surface: | 156.7 |
| role dia | | | | | 100 m | יויז | | | Northing 6265T15.5 | pælet uð. | | | | | cak | <u> 190, </u> | AMD |
| drillir | ng i | nfe | mal | tion | , | | mate | | eonstadu | | | | | | | | |
| 91 | N peretration | noddns | water | notes samples, tests, etc | RL | depin metros | graphic log | c assification symbol | nameria and type: plasticity or parti- colour, secondary and m | cie characieroti | C5, | moisture cariantan | consister con | photogram | 4 | | structure and ional observations |
| ADT | | | NOT OBSERVED | Bs. C | 156 | - | | • | Fill: CLAYEY SAND: Fine g medium plastoty clay, with sor (15mm diarneter) at 1.2cs. | rained, brown, k | o) wc | 6 | | | | FILL | |
| 300 | | | ┯╫ | > 1 - श्रा <u>च</u> र | 155 | <u>-</u> | | | Borohota CBH2 terminated at | 1.3m | | | | ; ; ; ; | | TC on refus | el on controle at 1.3 |
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| nethod us | المدار | toll toll toll toll toll toll toll toll | ges uit gribnii siithor ale likk nd du lube nai ixi | 80. A Se Outr | G M | 1071/9 | | evel | notes, samples, tests Un metallu bed sample 50: Un disturbed sample 60: D disturbed sample N standard none releasile N' SPT - sample relevation V cone snear (FPa) P production of the sample Es bulk sample E anyonemetal sample | nati di ornalitati ki (SPT) | | iption unfisd (| dasenicai | | | constated VS 5 F St VSI P F6 VL L MO | nepliberally kidex very self con self con self con self con self con self con self con self con self con self con self con self con self con self con self con self con self sel |



Screhole No. CBH2A

Engineering Log - Borehole

Sheet Project No 1 of 1 GEOTLCOV23462AA

Client:

Taylor Thomson Whitting

Date started:

10.3.2008

Principal:

Coffey Projects

Date completed.

10.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by.

JA

| NU s | orehote Location: Bullding 1 Ill model and mounting: Nobre Crit 880 Easting: 3/23/6/168 slope: 46° | | | | | | | | | | | B. | SH t.L. Surface: 156.7 | | | | | |
|-----------------------|---|--|---|-----------------|------------------------|---|-------------------|-------------------------|--|---|--------------------------------------|--|---------------------------|-------------------------------|--|---------------|--|--|
| hole diameter. 100 mm | | | | | | _ | | | | | | | | | | | AHD | |
| _ | | | TTELL | | IVU IN | 141 | mate | ortal en | ubstance | 8200114.0 | bearing: | <u> </u> | | | | o a | штк | AID |
| and san | | [당] [편] | | | FIL | depth | phic Egg | classification symbo | \$00 typ | තන්න e: plasticity or po (, secondary and | ಚಿತ್ರಗಳ ಪ್ರಕೃತಿಗಳ | | moisture condison | consistency/ density index | ************************************** | | addit | structure and lonal observations |
| 2 | | П | Æ | _ | _ | | 888 | | 2 | MEN and ROLD | | | • | | П | П | FILC | |
| | | | NOT OBSERVED | | _156 | | | - | TILE: CLAS medium da | YEY SAND: Fine istory clay, with s | i grafned, brown, some medkim gri | iow to ave1. | | | | | TG bit cefe: | al on concrete at 1.0 |
| Ť | ** | Ħ | | | | | VVV | _ | Borehale Ci | BH2A temenated | ian 108m | - | j | | • • | †; | j - | |
| | | | | , | l ∟155 | 2 | | | | | | } |) | | | | } } | |
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| | od loc | | | | 149 | В | | | ricriss, same | nies, Sprin | | ulasolfic | ation syn | nibola en | d | | consiste | rcy/density todax |
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Taylor Thomson Whitting

Engineering Log - Borehole

Borehole No. CBH2B

Sheet Project Not 4 of 4 GEOTLCOV23462AA

vary dense

Date started:

10.3.2008

Coffey Projects Principal:

Date completed:

10.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JΑ

| ΓŊ | model : | ard | mou | nting: | Mobile | Drill B | BC | | Easting: 32371 | 13.4 slope: | -90" | | | | RL | . Swiece: 1: | 56 9 |
|---------------|---------------|----------------------------------|--|----------------------------------|-----------------|----------------|------------|-----------------------|--|---|----------------------|-----------------------|------------------------------|--------|-----|--------------------------------------|--|
| ok | dig mg | ber, | | | 10 0 m | m | | | Monthing 5265/ | /-3 beartn | ng: | _ | _ | | cel | um:_ A | но |
| ďr | illing i | mo | TI))2 | tion | | | mate | नेश्री इ | ubstance | | | | | | | | |
| apriam. | to peretation | Support | water | notes sa uples, tests, etc | Ru. | depih Puyas | Bel oldera | dissertegion symbo | spi type: plestic unknot, second | material Sity or particle character lary and minor composi- | dslice, work | molature condition | consistency density index | | a | | cture and 1 observations |
| Š | | Г. | | | | | 888 | | FILL BITUMEN AND | ROADBASE | | D | | Ξİ | | FILL | |
| | | | | | _*56 | 1. | | | FALL CLAYEY SAN medium plasticky cla grovel. | ID: Fine grained, brown ay, with some medium (| n, kow to grained | | | | | TC 1rt nefusal c | as churechele, al 1 f |
| 7 | 1 | | | | !- | | \sim | | Borenole CBH28 ter | min'ated at 1.8m | · | <u> </u> | i | \top | Ħ | | |
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| | | | | | 150 | L. | | | | | | | | | | - - | |
| | red | | | | 647 | Abou. | L | | ryceles, samples, tests | | classific | | nbols ar | ď | | | density Index |
| 5 D R / T A T | | 60 96 96 96 98 98 | ger d entite ghian ble to no Bu llube inkibi | 전 라. 다 | G | (0/1/94 | | suel | U _{au} undisturbed D disturbed sa Y standard po | rictration test (SPT) Na recovered (Ma) (NPa) Per | W w | umiliae : | :.assifical | llon | | VS S F St VS; H Fn | very sett suff form suff very setf hand hisable very tooke force |



Borehole No. CBH3

1 of 3 Sheet

Project No:

GEOTLCOV23462AA

YBY dense

Olient:

Taylor Thomson Whitting

water couldow

Date started:

10.3.2008

Principal:

Coffey Projects

Engineering Log - Borehole

Date completed:

11.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JΑ

Bosehole Location: Building 3

Checkes hu

SH

| _ | | | | | nting: | | D⁄ill B | 50 | | Checked by: SH Easting: 320710.4 alope: 90° R.C. Surface: 158.0 |
|---|--|----------|------------------|-----------------------------------|---------------------------------------|------------|--|-----------------|-------------------------|--|
| cjie | cien | nete | эг. | | | 100 m | m | _ | | Northing 6265676,35 bearing:AHD |
| drì | ling | ir | fo | ma | tion | | | mate | | ubatance |
| TIME CO. | Denettation | - 1 | aupport | . a;e | edies samples, legis, em | R. | deşdir metres | graphic log | dessification symbol | material structure and additional observations column, sensionly or purious characteristics. |
| | 3 } | Π | Ì | | E | - | _ | | | FILL: SILTY SAND: Topsel, fine grained, brown. D FILL FILL: CLAY: Low to medium plasticity day, pale |
| 1 | | | } | | H _S E H _S | | - - - | *** | | gray and orange, with some sand. |
| | 1 | H | | ĺ | SPT | 157 | 1. | *** | | |
| | | | } | | 2,1,5 N*=G | ! ! | | ※ | | |
| | | | | | | 156 | <u>2</u> | *** | | |
| | | | | ! | SFT 5.5.9 N°=14 | 155 | 3 | | _ - | FICL: SANO: Modum grained, orange, with some D |
| | Produced from the first of the conduction of the | | | | - <u>a</u> pt - | _164 | 4_ | | | |
| | | | } | | 2,3,43 N*-R | | 5 | | | FILL: BANDY CLAY: Medium plosiesty, medium |
| 000000000000000000000000000000000000000 | X X X X X X X X X X X X X X X X X X X | | } | | SPT | 153 | - | | • | Trigg roots at 5.5m-5.7m Organic odour from base of hol |
| Ì | | | 1 | | 9.5.B N°=13 | 152 | <u>6</u> | *** | ! | St/fer clay layer 5.7m-5.9m V-txt zafusat 8.16.26m |
| | | | | | | _161 | - - <u>7</u> | | | Borehole CBH3 constitueed as corred bale |
| | | | | | | | - | | | |
| Affi | \od | <u> </u> | roi roi #2 | ยูดา เ | | C Per | pplori mud casina netratio 2 3 4 | n na reaisti | riñ | noxes, samples, tests Usu Undesturbed somele 50mm diemeter Usu Undesturbed sample 63mm diemeter D described sample 63mm diemeter D described sample 63mm diemeter S soft System S system S SPT - sample 1800vered motstate Classification symbols and vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery demetry lenden vS von tetery lenden vS von tet |
| IA IT | | | 00 V2 V1 | nd A. Bude mk b bk Dt | | | iter 10/1/9 | e chews | level | Mc SPT-with Rold conse D thy II hard Y valie shoat (Affa) M molet to finance P procurementar W was Yi very 1-056 86 but sample W) plasticisted. L foods E environmentar sample W(legal lark) MD engagem ognose R returned |



Borehole No. **CBH3**

Sheet

2 of 3

Project No:

GEOTLCOV23462AA

Client:

Taylor Thomson Whitting

Engineering Log - Cored Borehole

Date started:

10.3.2008

Principal:

Coffey Projects

Date completed:

11.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

CORED BOREHOLE GEOTLOOV234524A GFJ COFFEY.CDT 4.18.08

| r. | m:c | odel (| S. mour | kog: Mo | bile Dr | 71 DBO EA3Ú | np: | 323716.4 | slope: | | -904 | R.U. Surface: 156.0 |
|----------------------------------|---------|----------|---------------------------|--|--------------------------|---|---|--------------------------|--|--|---|--|
| ole | di | ame | ler: | 10 | o mm | Drilling fluid: North | ing. (| 3265676,35 | bearin | 9 | | datum: AHO |
| đ. | ill | ng l | nform | alion | mat | erial substance | | | | r: | ock mass de | efecte |
| meshod | conesit | Welfer | } | depth | graphic og graphic og | meterial rock type: grain characteristics, colour, solucture, minor components | weathering attention | esimátéd strengin | IS _{pen} MIPA O-Blam- elroi A-axiol | ROD % | defect spacing mm | defect description type, inclination, planetry, raughness, oughing, this knows |
| • | ŭ | <i>*</i> | RL | metres | 6 | | 1 6 7 | \$15E\$4 | , E | 4 | | erticular g |
| | | | 157 | | | | | | | | | |
| | | | 156 | <u>2</u> | | | | | | | | |
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| | | | 154 | 4_ | | | | | | | | |
| | | | _153 | 5 | | | | | | | | |
| | | | _152 | 6 | | Continued from nari-corea barehole SANOSTONE: Medium grained urange | HW | l ira | | | | |
| 200 | - | | 151 | 7 7 - | | and pase grey, indistinctly to distinctly bedded. | | | D A 0.180.15 D A 0.380.29 |] | | —РТ, 0° PL, RO, SN —РТ, 15°, P L, SO, CO |
| | | | l 150 | - - 8 | | | | | भूरक्रोत् स | | | SM, 01, PL, SO, sendy day, 50mm SM, 51, PL, SO, sendy day, 3mm SM, 151, PL, SO, sendy day, 3mm |
| UT AS AD RM CB NV | A.C | | დ_დ ონე ტიტ | ibe is sessiva is define difference on blade C core for core | | Consing seed | pinga wat ndata sho siar oftow andistat A woplala da alar jy ess | end loca If find loss | FR No SM SM SM SM SM SM SM SM SM SM SM SM SM | esh ichtiy ichtiy ichtiy seen ishno | y weathered rately meethored weed ered rely we street by woodshered re MAV and HW) | S7 sneared zone St. sheken: SS sheared surface GS creshed soom |



Borehole No. СВНЗ

Sheel

3 of 3

Engineering Log - Cored Borehole Project No:

GEOTLCOV23462AA 10.3.2008

Taylor Thomson Whitting

Date started.

11.3.2008

Principal:

Coffey Projects

Date completed:

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

| | | | - 111004 | 16:50:144 | | | Easting | • | 323716.4 | skape: | | -90* | | L Surface: | 15 B.O | |
|-------|----------|---------------|--------------------------------------|---|------------------------------|--|-----------|--------------------------|----------------------|---|------------------------------------|--|-------------------------------|--|---|-------------|
| | | anti | | | | Daling flaid: | Northin | t (| 205076.35 | bearing | _ | | | anum: | AHD | |
| dr | d)di | ng i | HOFT | attion: | | erial substance | | | | | 70 | ock mass | defects | | | |
| rehea | ¢6'e-H≅ | weter | RL | dephi mobes | graphic log core recovery | material rock type: gmin characteristics, of structure, minor component | dicur. | wealhering alteration | ostmated strength | AS _(A) APS Disam abai Arawad | ROD % | Select spacing mm | tyge. partikasar | ∝achna∜an, gk | soription snarty, roughne: hickness | ss, gene |
| CAMP. | | | 149 | 9 | | SANDSYCINE: Medium grained ora and pate grey, reliatedly to distinct hedded. (continued) | nger V | HW N.W | 88 | л А 0.76 0.66 | Н | | ` | ยN, CN | | g |
| | | | |] - | | | | | | о д 0.57 0.5 | | | - PT. 20*. | PL, RO, SN PL, SO, CO | | |
| | <u> </u> | | 148 | 10 | | | | | | 0.34 0.€ | | | | , P.L. S.O., clay | , 3mm | |
| | | | 197 | 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | | | | | D A | 88 | | SM, 10° SM, 10° SM, 10° | , UN, SO, clay | 3mm, ey sand, 10mm ey sand, 10mm cy sand, 10mm | |
| | | | _146 | 12 | | NO CORE: 0.09m Clay seam, 260mm thick, from 12.6 312.03m | .167- | MV7 | 100 | อี 1 0.1 ย A อี31024ี | | | | PL, SO, clay, : PL, SO, clay, : | | _ |
| | | | 145 | 13 | | MO CORE: 0.00m CBH3 terminated at 12.56m | | | | | | | | | | |
| | | | _144 | 14 <u>-</u> | | | | | | | | | | | | |
| | | | _ t43 | 1b | | | | | | | | | | | | |
| ìΤ | Mo | đ | 142 . | | | Constiti | | DA week | | | - ush | weathered | हता । । । | el cype one paring | rangimes VR vary RO rang | ecueh. |
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CORED BOREHOLF DESTLOOVEMENTS - COF-RMGST



| drawn | MTI |
|-----------------|----------|
| approved | SH |
| date | 4/4/200E |
| scalė | to acaim |
| origina size | A4 |



| client | Taylor Tho | mson Whitting |
|------------|-----------------|-----------------------------|
| project | | OAD, SAN HOSPITAL ROONGA |
| tit e | ROCK CORE PH | DTOGRAPH - CBH3 |
| project no | GEOTLCOV23482A# | Photo no: CBHS 1 of 1 |



Borehole No. CBH4

Sheet 1 of 2

GEOTLCOV23462AA Project No:

Engineering Log - Borehole Taylor Thomson Whitting Client:

Date started:

11.3.2008

Principal:

Goffey Projects

Date completed:

11.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

| Вот | ch | ole | LO | catio | n: Buil | ding | 12 | | | | | | | • | Checke | පේ වැ | y. | SH | |
|----------------------|------|-----------|------------|---------------------------|---------------------------------|-----------------|----------------------------------|--------------------|--------------------------|------------------------------------|---|--|-------------------------------|----------------------------|------------------------------|--------|------------|-----------------------------|---------------------------------|
| driff | at o | del | and | mgu | nting: | Modèle | 9 th Q | 90 | | Easting: | 323070.7 | slope: | -80* | • | | | R.t | L. Surface: | 162.9 |
| hele | | | | | | 100 m | m | | | Northing | 6265857.3 | Searing | : | | | | dat | e m | AHD |
| dri | _ | _ | ari o | rma | tion | <u> </u> | | mat | | ubstance | | | | | - | _ | | | |
| metrod | | onieses a | support | южм | notes samples, iesis, elc | RL | depth metres | graphic tog | Ctassification symbol | color | rpė: plasterty or p ur, secondary an | edef estéle characters d minor compone | strost, nta. | moisture condition | repristency density index | Tookel | | } | ruciule and Pa) obșervalionș |
| è | | П | Π | | E | | | XX | | • | OMEN and ROA | | | 8 | _ | 17 | П | FKL" | |
| ΑÖΥ | | \prod | | | E + 83 | | - - | | <u>ਨਾ</u> - | (se nd. CHAY: Lo | w plassofty, oran | ity, orange, fine gr iqa, kieblo, with so | , | √Wp | Sı | | }} | RESEXUAL S | SOR |
| FQ! | | | | | E | | 1 | | | fine grainer SANDSTO orango. | | dium gravned, pale | , / | | | | } } | SANOSTONI V-bit refusals | |
| 一 | Ť | T | П | _ | | ļ | - | | | Sorehole C | BH4 continues: | as cored hate | - | | | | П | <u> </u> | |
| | | | | | | _181 | - <u>-</u> | | | | | | | | | | | | |
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| ļ | | | | NOT MONITORED | | 160 | 3 | | , | | | | | 1 | I I | | | | |
| | | | | ON | | _159 | 4 | | , | | | | | ' ' | | ! | | | |
| | | | | | | _158 | 5 <u>-</u> | : ! | | | | | | ' ; | | | | | |
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| | | | | | | - -156 | | | | | | | | | | | | } { | |
| meti | hed | | | | | 165 | 8 operat | | | noles, sam | ples, tesis | | cleselfic | etion am | mbols sin | | | constant | y√donslly index |
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| CT HA | | | hş | blo ta nd se | | | 90 7 - | nnging a miusal | 1 | Nr S | SPF - 13mple / 600x SPT with safet case | | | O) | | | | H H 1-8 | very stiff hovel In subte |
| nr B | | | Ç | skub w Lpk, ibi | ì | T | 10/1/2 | å water | | , د | vene shear (kfle) vene shear (kfle) | 1 | W W | iais) Mi Imalia kasi | | | | VL. | very loose lgese |
| 7 | | | TC | bil Bil | | I. | | | l | c | traik szanyés enyaronmantai sam | ş¥e . | | legija kas) gud tarki | • | | | , MO | madem dense |
| 15x1 : 8.g | shor | wn b | tost Al | | | Γ. | Warpin | | | R (| re/vs:p | 1 | | | | | | vo vo | deres vory- dens é |

BOREHOLE GEOTLOW2348244 GPJ COFFEY GDT 4 18 03



Borehola No. CBH4

Engineering Log - Cored Borehole

2 of 2 Sheet

Taylor Thomson Whitting

Project No: GEOTLCOV23462AA

Principal:

Date started:

11.3.2008

Coffey Projects

Date completed.

11.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

| | | | | ion: <u>E</u> mg: Mo | | ling 2 | Easting | | 23870.7 | | _ | Che | ecked by: SH |
|-----------------------|-----------|---------------|-------------|--|------------------------------|---|--------------------|--------------------------------|-----------------------|--|-----------------------------|--|--|
| | | | | | | | | | | slopo: | | De- | R I Surface 152.9 |
| | | inot na li | | aticл | | Uniting Ruid errat substance | Northwy | 4 | 266867.3 | toarin | · | ock mass | defects AHD |
| | See | .ele. | | depth metres | graphic log core recovery | resteria: rock type; grain characteristics, co structura, minor componenta | | weathering alteration | estrocted strength | IS _{IES} M ^D 3 S-Clarc- strai A-2021 | ROD % | defect specing mm | defect description type, inchaston, planarity, roughness, coating, thickness particular |
| | | | 162 | 1 | | Continued from non-cored baret | | - | | | | | |
| Almir. | | | H81 | | | SANDSTONE: Fine gravined, dark on and pale gray, districtly bedded with imagular weathering partners, | 95:09 | Kalvy | | 0 A 0.98 C.5 | | | SM, 0*, PL, SO, clay, 30mm SM, 0*, PL, SO, clay, 30mm PT, 0*, PL, SO, 4lay, 95mm |
| | | NOT MONITORED | _1613 | 3 | | | | | | O A 0.65 G.5 | 99 | | JT, 82", UN, RQ, CQ, 1mm, fine tree invit. P1, 6", PL, SQ, clay, 1mm SM, 0", PL, SQ, clay, 30mm SM, 25", PL, SP, clay, 10mm |
| | | NOT. | _159 - | 4 | | | | 5W | | Ο Α 0.82077 | _ | | SM 32", PL, SO, sandy clay, 20mm PT, 0", PL, SO, Clay, 3re moes PT, 0", PL, SO, Clay, 1mm PT, 0", PL, SO, Oby, 2mm PT, 5", PL, SO, Co PT, S", PL, SO, CO PT, S", PL, SO, CO SM, 45", IR, SO, Clay, 2mm PT, 45", PL, SO, CO, 1mm PT, 2", PL, SO, CN |
| | | | _158 | 5 . | | SANDSTONE: Modium grained, pare with bands of iron standed change, dis bedded. | e grey stinctly | ън | | T 3n 1 43 | 87 | | PT. 0°. PL. RO. CO PT. 0°. PL. RO. SN PT. 0°. PL. RO. CN |
| | | | 157 | 6, | | CBH/ termesolod at 6.18m | | _ | | D A D6 0 77 | | | — PT 6", PL, SO, CO — PT, 2", PL, RO, CN |
| | | | _155 | 7] - 1. | | | | | | | | | |
| MAT AS | hoo | 1 | aug/ | n quylag ar bereve | 19 | core-ift caseig used bared withdrawn | | 198 wate Ste sale cities | | SW s5 8AN to 8W til | ash ghty oder gliy | emathered assly weathere weathered | SZ sheauedizone St slighens/der |
| RR CB NA NG. | | a, PQ | claw MWE | Macone or \$1509 Cloure and gode | 54 | graphic legic are resovery cons recovered - graphic symbols molicule materia. | → coror | el Creita Piete dat | n fuid loss | DW de commonts vi re la hz | spres sydn hy ta | | CE crushed seam |

CORES BOREMOLE GEOTLCOV23482AA GPJ COFFEY GDT 4 18 08



| drawn | MT |
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| approved | SH |
| date | 4/4/2008 |
| scale | Not to scale |
| originar siza | A4 |



| client | Taylor The | mson Whitting |
|------------|-----------------|-----------------------------|
| project | | OAD, SAN HOSPITAL ROONGA |
| litie | ROCK CORE PH | OTOGRAPH - CBH4 |
| project no | GEOTLCOV23482AA | Photo no: CBH4 1 of 1 |



Borehola No. CBH5

Engineering Log - Borehole

Sheet 1 of 2

Client:

Taylor Thomson Whitting

GEOTLCOV23462AA Date started: 11.3.2008

Principal:

Coffey Projects

Date completed.

12.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by

Project No:

JA

| ra a | mode | el ar | nd IT | IOIL | ihngt | Matile | Duit B | 80 | | Easting: | 323839.1 | 2l 0 ;06; | -90" | | | | R.I | Surface | 162.9 |
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| | diar | | | | | 100 m | m | | | Mort/sing | 6265846.9 | oearing | <u>g:</u> | | | | dal | turn: | AHD |
| dril | lling | _ | for | nat | ion | | | mate | rial si | ubstance | | | | | | _ | | | |
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| ************ | | | | | F + As Rs | | } | | ĞL | grained sand | | | | ≺Wp. | 3: | | | RESIDUAL : | |
| 300000000000000000000000000000000000000 | | | | | \$PT >10 -N*=R | _162 |] 1 | | | heteen, highly | E: Find to media y weathered. M5 communicati | | ngish | | | <u>}</u> | | SANDSTON Insufficient & test. V-hit rehisal | P Fample for PID |
| | | | | | | 161 | | | | Diencia Co | and a contribution of the | COIGO IDIG | | | | | | | |
| | | | | NOT MONITORED | | , 160 | 1. | | | | | | İ | | | | | | |
| | | | } | | | 159 | 4. | | , | | | | i | į | ļ | | | | |
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| | | | | | | _157 | . 15. | | j | | | | | | ! } } | | } - - - - - - | | |
| | | | | | | _156 | 7 | | | | | | į | | | | | | |
| weth w | | | | | ewng" | м | Boot mud | N | nx | | usturbed sample to | | classifica Boil Beach Estredion | ription | | | | consistenc VS 3 | yldenety Index very soft suff |
| 7 7 4 4 | | 1 | ollar vast aldı | Protein Both Hurr Hurr Hurr Hich | i i | 25°2 | ler | o nevelan wiging to viuse woler (c | | D dat N star N' SP No SP V vor P jue | ásuethell sampte di furbed sample ndard pendiraben i T – sample seconer T with sold core to shaar (42°a) samenete k sample | test (SPT) | oyalem | · •sı | | <u> </u> | | 5 75 8 8 8 8 8 8 8 | Son form opti yary syk hard hard hard yary hoose loose |
|) | nact | tay s. | C b | | | - | water o | May | | E env | eal Early Early Early | ' | | xa limit | | | | мо в Vo | medium rigase. Vory dense |

BORÉHOLE GEOTLO 01/246201 GPJ COPPEY CDT # 13:08



Borehole No. CBH5

Sheet

2 of 2

Project No: Date started: GEOTLCOV23462AA

Chent

Taylor Thomson Whitting

Engineering Log - Cored Borehole

11.3.2008

Principal:

Coffey Projects

Date completed:

12.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

14

| | | ect: bole | eluca | | | FOX VALLEY ROAD, SA fing 2 | N HOS | SPITA | IL, WAHI | ROOM | GA | | gged by: JA secked by: SH |
|----------------------------|-------------|------------------|--|-----------------|------------------------------|--|------------------------------|--------------------------------------|---------------------------------|---|--|----------------------------|--|
| dri | K m | odel | 8 mau | ntirug: Alle | sbile Di | NA QGQ | Езви | ng: S | 323830.1 | slope: | | -00* | R.L. Surface 162,9 |
| 79Ci | ie d | lacov | eten | 10 | 0 mm | Drilling fluid: | Nonthi | ing: (| 5265846.0 | bearin | ıg: | | ozium: AHD |
| di | rill | ng | inforn | nation | maf | erial substance | | | | | Ť | ock mass | |
| rethod | core-Lift | W.M.C. | RL | depth metres | graphic tog core recovery | naterial rock type; grain characteristics, c structurs, minor component | colour, ta | meathering alberation | estmated strength ゴ・ン・こちお | IS ₂₀ MPa Firelem- etral A axial | 30D % | Spacing spacing film | type, inclination, planarity, roughness, coaling, trickness |
| | | | 162 | - | - | | | | | | | | |
| | | ŀ | ; | } - | l | . ' Commund from non-cored bare | cha le | | | | 1 | | |
| MMCC | | | _1.81 | 3 | | SANDSTONE: Pint grouned, pole g and prange, distinctly hedded SANDSTONE: Medium primed, or and pale brown, bands of icen stains | ney ange | MW | 200 : | D A 0.01 0.2 | | | = -GM, 0°, PL, SO, clayey sand, 29mm -SM, 10°, PL, SO clayey eand 3mm -SM, 5°, PL, SO, clayey sand 3mm -PT, 5°, PL, SO, clay, 0.5mm |
| | | NCT MCNITORED | _160 | 3_ | | | | | | D A 0.003.02 | 98 | <u>.</u> | PT, 21*, IR, SO, ironstone, Iram PT, 21*, IR, SO, ironstone, Iram PT, 21*, VR, RO, ironstone, Emm PT, 0*, PL, RO, SN PT, 0*, PL, SO, SN PT, 0*, PL, SO, SN |
| | | { } } } | 759 { { { { { { { { { { { { { { { { { { { | 4 | | | | | (*) 3% 3% 66, | D A 0.620.97 D A 0.730.93 | 98 | | PT, 0*, 90, ironstone and clay, brown PT, 0*, PL, 30, ironstone, 8mm PT, 40*, IR, RO, CN PT, 2*, PL, RO, CN PT, 0*, PL, RO, ironstone, 3mm PT, 3*, PL, RO, ironstone, 4mm JT, 50*, PL, SO, clay, 0.5mm |
| | | • | 157 | 6 | | SANDSTONE: Medigan gramest, cra prof pole grey, distinctly bedded. CRH5 terminated at 6 in | – | SW FR | \$00 \$00 | D A 0.630.69 | COL | | <u> </u> |
| | | | 156 | 7_ - | | | | | | | | | |
| | i | | _155 | ' -] *] | | | i | i 1 | !! :. | | | | |
| DT AS AS RR CB | i k i | d 0. PC | arigi içdə Cave MVA | | | contest. ceasing used barrel withdraws graphic log/core recovery 1000 recurvened - questic symbols indepte reserver | → waii → quari → quari | fiel crit 1k npieto priv | MT. | SW sli MW no HW no AtV ex DW de o sprenight VI se L ob | sphily others prity to prity to priestance overs ery ton | | SZ shéairet zoné SL şüekensiyle SS shéarret zurhade OS czushad seam |
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| drawn | MT |
|------------------|--------------|
| approvec | s⊢ |
| data | 4/4/2008 |
| scale | Not to scale |
| origina. Siza | A4 |



| client: | Taylor Tho | mson Whitting |
|-------------|-----------------|-----------------------------|
| project: | | OAD, SAN HOSPITAL. OONGA |
| title | ROCK CORE PHO | OTOGRAPH - CBHE |
| project no: | GEOTLCOV23462AA | Photo no: CBHE 1 of 1 |



Engineering Log - Borehole

Taylor Thomson Whitting

Principal:

Client:

Coffey Projects

Project.

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Copged by

Borehald No.

Project No.

Date started:

Date completed:

Sheet

JA

CBH6

1 of 2

12.3.2008

12.3.2008

GEOTLCOV23462AA

| nll n | lebon | and | mou | nting; | Motile | Dnl O | 00 | | Fasting | 323695 5 | slope: | -90* | | | | R | د. Surface: | 156 | 3.4 | _ |
|--|----------------|-----------------|----------------------------|---------------------------------|-----------------|----------------------|--|--------------------------|-----------------------------------|---|------------------------------------|------------------------|-------------------------|------------------------------|--------------|----------------|----------------------|----------------------|--------------------------|-----|
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| dril | ling | Info | rma | | | | met | eriad ac | ubstance | | | | | | _ | | | | | _ |
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Porehole No. CBH6

Engineering Log - Cored Borehole

Sheet 2 of 2

Project No: Taylor Thomson Whitting

GEOTLCOV23462AA 12.3.2008

Principal:

Coffey Projects

Date started:

Client:

Date completed:

12.3.2008

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| ,} . | } | _ļ | 155] | - | :::: | Continued kum non-cosed burehole SANDSTONE: Medium grained, pala | | łW | | | \vdash | | | |
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| dient | Taylor Thou | nson Whitting |
|------------|-----------------|----------------------------|
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| title | ROCK CORE PHO | TOGRAPH - CBHE |
| project no | GEOTLCOV23462AA | Photo no: CSHE 1 of 1 |



Borehole No CBH7

Sheet

1 of 3

Project No:

GEOTLCOV23462AA

12.3.2008

Date started:

13.3.2008

Principal:

Coffey Projects

Taylor Thomson Whitting

Date completed:

Ollent:

Engineering Log - Borehole

Logged by:

JΑ

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

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| dri | _ | ٠, | D | ma | Lìon | | | mate | erial B | ubstance | | | _ | | | |
| me#r0d | 1 Denetration | - 1 | uodens | water | notes samples tests, etc | RL | oleosth | graphic log | cłassification. syfitbol | material soil type: plasticity or particle character colour secondary and minor compone | wits. [F경 | consistency: density index | l I | THE POTOSTIC | 1 | structure and ional observations |
| 3 | | | | | E(x2) E(x3) + Bs | 157 | | | | FILL: CLAYEY SAND: Topcoil, medium g sand, organics FILL: SANDY CLAY: Low to medium plant crange and pale grey, find sand, with conte sandstone tragments. | | | 1 | | No odoka n | om GW |
| | | | | | SP1 2,9,8 N*=12 | _155 | 2 | | | FILL: CLAYFY SAND: Medium grained, of brown, modium stasbothy obly. Sandstone cobble (weathered): 1 3-1 45m | ark V | | | ! | Í Í Insufficient Test | SPI sample for PID |
| | | | | | SPT <10 N*-유 된 - | 155 | - - - 3 <u>-</u> | | ά. ''' - ' | SANDY CLAY: Low plasticity brange. And Sand. Borehole CBH7 continued as pared holp | grained >Wp | St | | | SPT sampi RESIOUAL V-bit rejusa | sou |
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| erillo S C T A | 90 | | aug rett væs cap han dist | | 리아! 24 | M, C, 1 2 | n Tr | T In Idayshir | | rentes, samples, texts Us, undistribud sample 50mm diameter Us) undistribud sample 63mm diameter Clau undestribud sample 63mm diameter R stamders panetration rest (SPT) N SPT - sample recovered Nt: SPT with smill come V vane 3 hear (KPS) P pressuremator | classification sy abil description based on unified system moteture D thy M motet W wet | | | | Comadalw VS S F 81 VSI H Fb VL | wyklerodły inches wary soft soff fem- piff wary soft hau i habbe wary toos P |



Sorchate No. CBH7

Sheet

2 of 3

Client:

Taylor Thomson Whitting

Engineering Log - Cored Borehole

Project No: Date staned: GEOTLCOV23462AA 12.3,2008

Principet:

Coffey Projects

Date completed:

13.3,2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

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| me:hod | coresit | -aler | | depth | graphic log care recovery | nock type; grain characteristics, colour, structure, minor components | weathering atstacken | estimated offeneda | IS ₍₃₀₎ MPG G-thain- tital A-axial | R20 % | defect spacing ram | } | defect descri type increasion, plans coating, thick | nty, roughness, |
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| Ξļ | Ĺ | j | | 4 | <u> </u> | frands of transione. | | 13 | D A_04062 | | \; \$! | | ሊ 10°, ምህ, SD, GLAY, 1 ሊ 10°, ምህ, SD, GLAY, 3 | |
| -1 | 1 | - 1 | 154 | _} | : : . : | | | | | | :: : | | , 60°, PL, SO, GO | MILL |
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| - 1 | ł | ŀ | 153 | | : ' | NO CORE: U.O/m | _/ SWV | 3 1 | • | | : | | ', 25'PL, RO, CN | |
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| medi | brei | | | 8 | <u>::::</u> | core-lift water | <u> </u> | 1 183 | westlede | | :][] | <u>'</u> | | CALICHER |
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Borehole No CBH7

Sheet

3 of 3

Engineering Log - Cored Borehole Taylor Thomson Whitting

Project No:

GEOTLCOV23462AA

Date started:

12.3.2008

Principal:

Coffey Projects

Date completed:

13.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

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| method | coro-li-i | water | | | depth | graphic log | material rock type: grain characteristics, o structure, minor component | | weathering atteration | estimated strength | is _{ilo:} MPs O-dizm-, easi A-auel | RQC % | | | e, inclination, pl costing, | escription lanarity, roughness thickness | i, |
| | ľ | _ | RL | 4 | net'es | 8 | SANDSTONE: Medium grained, p. | le cro | S OF | 로그르고 통급 ··········· | | <u>"</u> | 85858 | particular | | | gene |
| HM-C | | | _149 | - | [a] | | with occasional bands of red ironate augary, bedded at 25°, (continued) | me. | IMINA | | | 95 | | SM. 20 PT. 20 PT. 20 PT. 20 | PL, HO, CN M, PL, SO, SAM M, PL, SO, CO M, PL, SO, CO M, PL, SO, CO M, PL, SO, CO | NDY CLAY, 5mm | |
| | | | - 148 | | 10_ | | | | | | | .85 | | — "РТ. 10° — "РТ. 10° — SM. 15 | *, PL, SO, CO *, PL, SO, CO *, PL, SO, CU *, PL, SO, CO | NY. 20mm | |
| | | | 197 | } | 11_ | | | | | | | | | JT, 45° 3mm PM, 10 5mm PM, 10 | *, PL, SO, CU *, PL, SO, CLA * PL, SO, CLA * PL, SO, CLA | YEY SAND, | |
| - | | : : : | _1 06 | } | 12 | | Segm at 11,7m contains hooly laming law and very fast sand. CBH7 terminated at 12m | 191ed | | | D A 0.210.10 D A 0.62 0 7 | * | | \`PT, 101 \`SM, 25 \`BROW | N), 100mm 1 PL SO, CLA | NY (HP, DARK NY LAMINATED. | |
| | | | _145 | | 1 <u>9</u> | | , contraction of the contraction | | | | : | | | | ', PL, SO, CLA | Y, 1mm | |
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| drawn | MT |
|------------------|---------------|
| approved | SH |
| date | 26 / 3 / 2008 |
| scale | Not to scale |
| original size | A4 |



| Citem: | Taylor The | mson Whitting |
|------------|-----------------|------------------------------|
| project | | OAD, SAN HOSPITAL. ROONGA |
| fitle | ROCK CORE PH | OTOGRAPH - CBH7 |
| project no | GEOTLCOV23482AA | Photo no: CBH7 1 of |



Borehole No CBH8

Shect

1 of 2

Client:

Taylor Thomson Whitting

Project No: Date started: GEOTLCOV23462AA 13.3.2008

Principal:

Caffey Projects

Engineering Log - Borehole

Date completed:

13.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by

JA

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| A . | | t | iand a Spiide Nack t Sbil Nachi | | <u> </u> | - ##F - 1871/9 | ê waler ê waler | laval | V vd P prv 8s bu | PT with solid come me shala (kPa) osswernøler ra serope wyonmanta samp | i | W we | cisl | | | | Fb VL L MO | riadic verytoose 100se modum dänsä |

BOREHOLS GEO'LCCY/345244 GFJ COFFEY, GCT 4 18 03



Borehole No. CBH8

Sheet

2 of 2

Project No:

GEOTLCOV23462AA

CHERT.

Taylor Thomson Whitting

Engineering Log - Cored Borehole

Date started:

13.3.2008

Principal:

Coffey Projects

Date completed:

13.3,2008

Project:

CORED BOREHOLE SEST. COVSSESPA GF. COFFEY GOT 419 03

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

| | | | | iğing: Ma | | | - | 323603.9 | slope. | | -90* | R.L. Su | dace: 166,4 | |
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| ar | 7(II | กฐ | MOSTS | atl o n" | | erial substance | | | | re | ock mass | | | |
| methy | 海田の | water | RL | depth matres | graphic log core recovery | resteriel rock type; grain characteristics, colour, claudane, minux apenpanents | - delborne a teration | estimated strongth | Is any MPH U-dorn circl A-axed | 200 % | defect spacing mm | type, racina | efect description ston, plananty, roughn opting, thickness | ess gene |
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| NMIC | | | 155 | 1_ | : : : : : : : : : : : : : : : : : : : | SANDSTONE: Medium grained, dark red to pale yellow, i vi stractly bedded. | I I | | 0.6 0.89 D A 0.62 0.52 | | | — P1, 51, 16, 160 — P7, 51, PL, 90 — P7, 161, PL, 80 — P7, 21, PL, 80 | O, CLAY, 4MM O, CLAY, 4MM | |
| | | | _164 | 2 | | SANDSTONE: Medium grained, orange to pate yellow, materinotry bedded. | | | D A. | | | |), SANDY CLAY, 80MI | М |
| | | NOT MONITORED | | 3 | | | | | บี.5 8 0.61 | 32 | | —-P* 10°,2L,R | O, SN | |
| | - - | 2 | _153 | 4 | | SANDSTONE: Medium grained, dark reduce to strong iron staining, indistinctly bedded. Trace of fine pyrite mineralisation | | 0.0 | IO A 0.76 0.05 | | | | O. CLAYEY SAND | |
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| | | : | _151 | 6 | | | | 1 . 6 | U A 0 73 0 87 | | | — 50, 16°, PL, S 10044 | O, GLAYEY SAND, O, OO | |
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| | Д.С. Д.НН | O, PO | | С соле петсия | | pare recovered graphic symbols indicate material | complete de water presa (log enas) fo | ure Sastursult , | Strength VL vo L vo M m H ls | ryko | | glananty Pil planar CU curves UN under Si stappe R imagei | d SN slei along YN vapo 84 CO cos | 084 484 |



| drawn | MT |
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| approved | SH |
| dato | 4/4/2008 |
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| client | Taylor Tho | mson Whitting |
|-------------|-----------------|------------------------------|
| project: | | OAD, SAN HOSPITAL. ROONGA |
| title | ROCK CORE PH | OTOGRAPH - CBHE |
| project no: | GEOTLCOV23462AA | Photo no: CBH8 1 of |



Sareho'e No. CBH9

Engineering Log - Borehole

Sheet 1 of 2 Project No. GEOTLCOV23462AA

Taylor Thomson Whitting

Date started. 13.3.2008

Principal.

Coffey Projects

Date completed.

13.3.2008

Project.

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

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| F penetration | Support | ,448le/ | rotes samples, tests, etc | | rieptio metres | Eoy o quiesto | classification symbol | scil h | ype: plasticity luf, secondary | natari _s ā Or partičta cir ran ā m inor s | en acturistica omponents. | s_ - | moisture condition | consistency/ density index | 200 A DOCKET | en et genelre en chater | | structure end onel abservations |
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coffey peotechnics

Borehole No CBH9

Engineering Log - Cored Borehole

Sheat 2 of 2

Taylor Thomson Whitting

GEOTLCOV23462AA Project No:

Date started:

13.3.2008

Principal:

Coffey Projects

Date completed:

13.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

14

| Proje | ect | | | 185 | FOX VALLEY ROAD, SAN H | (OSPITA | AL, WAHI | ROOM | GΑ | Log | ged by JA | |
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| | | neter | | | | larthing: | 0205888.9 | bearin | - | | datum: AIID | |
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| mathed Blanch | 3 | e Ri | depth metre | | | wealth: ring alteration | Nome 2 E | A- audal | 휥. | 3 2 2 2 2 | particular | 004 |
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| NWC | 1 | 150 | [!_ | | SARDSTONE: Medium grained, pale grey-orange and darkned, indistinctly to | MAN | | 0,330,33 | | | PT, 51, PC, \$0, CO | |
| ž [| | | - | 1:::: | distinctly bedded at 5", occasional bands iron stained sandstone. | · of | | D AT | ≀ I. | | | |
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| | NOW WONTON | 157 | 3_ | i | } | | | D A 0.18 0.2 | : | | | |
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| ļ | | ĺ | i - | | <u> </u> | 7 *** | Segg | 0.210.24 | : | ┊╬┆┆┾ | PT, 51, PL, SO, CLAY, 1mm | |
| i | | | - | | | - | | | | | | |
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| drawn | МТ |
|-------------------|--------------|
| арргочес | SH |
| date | 4/4/2008 |
| acal e | Not to scale |
| origina size | A4 |



| client | Taylor Tho | nson Whitting |
|------------|-------------------|----------------------------|
| project | | OAD, SAN HOSPITAL OONGA |
| title | ROCK CORE PHO | TOGRAPH - CBHS |
| project no | . GEOTLCOV23482AA | Photo no: CBHS 1 of 1 |



Engineering Log - Borehole

Borehole No. CBH10

Sheet

1 of 2 GEOTLCOV23462AA

Project No:

Date completed:

Taylor Thomson Whitting

Date started:

14.3.2008 14.3.2008

Principal.

Client.

Coffey Projects

JΑ

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by.

| Borchole Location: B | uliding 2 | | | Checked by: SH | |
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| dril | model | ១១៤ | (Flou | nting: | Mobile | []n1 & | RU | - | Easting: | 323865 | slope: | 90* | | | _ | R.L | . Surface: 159.3 |
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| dr | iling : | лle | 71112 | tion _ | _ | | mate | rial s | ubstance | | | | | | | | |
| method | penetration | support | - Aligh | notes samples, locals, etc | RI | depth metres | get av detg | cigssification symbol | son typ colour | e; plasticity or pa , secondary and | na) rade characiens minor componer | tics. ats | moisture condition | consistency cereity index | 20) at Socket | ٥ | bos students anditional descriptions |
| ΑDv | | | | | 159 | - | | čt - | Ci AY- Med with some s | and, Medium gre | rk osange end br ened sand. | rewn, | 5 ≺Ŵo | V-St ^{**} | | | FILC RESĪNJĀLĪSÕILĪ |
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BOREMOLE GEOFFCOV23462AA SPU COFFEY SOT 4 19 28



Engineering Log - Cored Borehole

Borehole No.

CBH10

Sheet. Project No: 2 of 2

Taylor Thomson Whitting

Date started:

GEOTLCOV23462AA 14.3.2008

Principal:

Coffey Projects

Date completed:

14.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

| ήl | mx | Me! | S INCUI | ning: Mo | DHO LUI | W B80 East | mg: , | 33885 | £lope: | | 90" | R.L. Surface: | 159.3 |
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| d ri | M | ng í | utom | alion | mət | erial substance | | | | rc | ick mass defer | | |
| DCHJAM | core-life | wa:er | R∟ | depth metres | graphic log zire radovary | material rock type; grain characteristics, colour, atructure, minor components | griestien glæisten | estimated attength | Is _(sc) MPa D-clam- desi A-axia' | % ₫ጋ೬ | defect apacing mm | type, inclination, ps coaling. (| scripthon anarty, roughness, hickness gen |
| | | | 159 | - | | | | | | | | | |
| | Ш | | | | , , | Continued from non-cored borehole | 1 | 1 1 1 1 | <u></u> | Ц | <u> </u> | | |
| MALC | | | 158 | - 1 | | SANDSTONE: Medium grained, orange and pale grey with some dark red iron stained bands. | MW | | <u>Ი 224 9</u> 2 | | 8 8 | M, 5", IR, SO, CLAY M, 10", IR, SO, CLA M, 10", PL SO, CLA T, 15", PL, SO, CLA | Y, 2MM VEY, 2MM |
| | | OT MONITORED | _157 | 3 | | | | | D A 6.430.66 | | - s | M, 101, PL, SQ, CLA T, 151, PL, RO, CN M, \$1, FL, SO, CLA1 T, 501, PL, SO, CLA1 T, 51, UN, SQ, CO | Y, BOMM |
| | | TDN | _166 _165 | 4 | | Trace pyrite mineralisation from seem of 3.81m. | SW | | D A 1.37 1.57 | | s | T, 51, PL, SO, VN M, 01, PL, SO, CLA1 M, 01, PL, EO, CLA1 T, 211, PL, RO, SN | |
| | | | _154 | 5 7 | | | | 5300 | D A 7.24 t.10 | 95 | | M, 20°, PL, SO, GLA | у, томм |
| | | | 153 | 6 | : :: : - : · : | CBH10 Icrminated at 6 19ra | | | 0.36 1.13 | | • | M, 201, PL, \$0, CLA M, 51, PL, \$0, CLA) T, 211, PL, \$0, CO | 1. 2MM |
| | | | 152 | 7 | | | | | | | | | |
| AS AD FR CB | | . | Sug enis clav NM | _ | | graphic legitore recovery | O/1/98 was n dgiş \$ho spier inflow spier inflow spier inflow conysiste ric | wi | SW 6' MW rii HW 51 XW 80 DW di | eah ighty ighty itrem bitne | weekhered alely weekhered weekhered ally weekhered by weekhered by Marchared | defect type JF point PT parting SM searm SZ eneared cone SS cheared surfa- CS crusted seem planarity | coatling |
| NU | J. 14 | ic), iet | . water | mas cure | | | va(ar peass Ugacons) fo | ure teaf redult | M on | aryin Aw Heolur igh | | PL planar CU corved UN undulability ST stapped | CN elean SN stained VN veneer CO cualing |



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| drawn | MT | | client: | | Taylor Thor | nson Whitting | |
|------------------|---------------|----------------------|---------------|-------|---------------|-------------------|------|
| approved | SH | coffey | project | 185 F | | OAD, SAN HOSPITAL | |
| date | 26 / 3 / 2008 | geotechnics | | | WAHR | OONGA | |
| scale | Not to scale | SPECIALISTS MANAGING | tille | K II | ROCK CORE PHO | TOGRAPH - CBH1C | |
| original size | A4 | THE EARTH | project no: 6 | EOTL | COV23462AA | Photo no: CSH10 1 | of - |



Engineering Log - Cored Borehole Sheet Project No.

Sheet 2 of 2 Project No. GEOTLCOV23462AA

CBH10

Client:

Taylor Thomson Whitting

Oate started:

Barehole No.

14.3.2008

Principal:

Coffey Projects

Date completed:

14.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

| | mic | HOGH (| in cour | rthog: Mo | AbNe Dr | #850 185 | Easting: | 323865 | slope: | | -90' | R.L. Surface: 159.3 |
|--------------|-----------|--------------|----------|----------------------------|------------------------------|--|----------------------------------|--|---|----------------|---|--|
| _ | |) (THE | | | | Drilling fluid: | Northing: | 6265901.1 | pearin | r | | datum: A ID |
| Ser i | ĮJė, | 3 <u>0</u> 1 | Morn | atkon . | _ | erial substance material | | | | r | ock mass (| defect description |
| | core-lift | water | RL | depin mehes | graphic log core recovery | rock type; grain chiracteristics, co structure, minor components | | esimpled ebength 로고로 등록 | ly ₍₉₀₎ MPO D-clam- stial A-Aula | 800% | defect spacing mm 유부장은 및 | type, inclination, planarity, roughness, cooling, thickness particular gene |
| 1 | } | | 159 | - | | | | > 3 2 2 3 4 | | | | Paristonia della |
| - - | • | | | - 1 | | Continued from pon-sorred buren SANDSTONE: Medium grained, oran | | | о 6.22 0.32 | | | |
| { | ĺ | | 158 | -1 | : : | and pale grey with some dark red vo. stained bands. | n " ' ' | | 0.22 0.32 | 1 | | |
| | | | | 2 | | | | | : | | | SM, 51, IR, SD, CLAY, 10MM SM, 101, IR, SO, CLAY, 2MM SM, 101, PL, SO, CLAYEY, 2MM |
| Ì | | Ð | _157 | - | | | | | ሁ ለ በ 430 ለቭ | 56 | | SM, 101, PL, SO, CLAY, 39MM PT, 151, PL, RO, CN SM, 51, PL, SO, CLAY, 30MM |
| | ł | MONITORED | | _ | : : | | ľ | | | | | — JT, 601, PL, SO, GLAY, 3MM |
| } | į | 3 | | 3 | : | | } | | 0 A | | | — PT, 5*, ON, SO, CO |
| ş | 1 | 2 ≿ | 186 | - | :::: | | | | 0.420.48 | | | |
| | . { | Ϋ́CΝ | | - 1 | : . : | | ŀ | | | | ٤٠ الله | PT, 5°, PL, SO, VN |
| | } | | | | : : | | ! | | i | | | SM, 0°, PL, SO, OLAY, 60MM SM, 0°, PL, SO, CLAY, 55MM |
| ĺ | { | | | 4_ | : : | Trace pyrte mineralisation from score | וֹבָּר | | | Г | | 3000 1 10, 30, 0001, 3000 |
| | ſ | | 155 | - | | 3.81m | | | D A 1.37 1.57 | | 1, 1, } | - PT, 21*, PL, RO, SN |
| | \ | | | - | | | -sw | ┤┆ ▓┆┆ | | | | |
| | ի 1 | ļ | | j | : : : | | | | | | i | |
| | | | | 5 | ::: | | | | D A | 5 | | |
| ļ | | İ | 154 | | | | | 200 | 7.24 1.18 | _ | | |
| | | | | H | | | } | | | | ╎┊┢┩┊┝ | SM, 20°, PL SO, CLAY, 10MM |
| | ij | | | 1 | | | } | | | | | |
| | | | | <u>6</u> | : : | | ļ | 1 / (88) | , , | | | — SM, 20°, PL, SO, CLAY, 10MM → SM, 5°, PL, 5O, CLAY, 2MM |
| 4 | _ | | 953 | | :: | CBH10 terminated at 6.19m | - \ | | 0 A 5.38 1.11 | H | <mark>╎┊╃┊</mark> ╎├ ┆ | T-PT, 21", PL, SO, GO |
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| RR TH | | | re/lo | Aricane or blade | _{ьк} | · . | ► watericilor — partial dri l | | XW to | drem | wearsplot thy weathered tly weathered | |
| ш | LC | 3. PU | NM | C cats | Í | graphic legitors recovery | — uomplete d | Fil Rud focc | | | s lubro and HVV |) planetty posting |
| 144 | , and | aja Milai | , Mr. 45 | | | graphic symbols | → | | | xy lo | rw. | PL Dianor CN cleans Co. covered SM stansed |
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Borehole No CBH11

Sheet

1 of 2

Engineering Log - Borehole Client:

Taylor Thomson Whitting

Project No: Date started:

GEOTLCOV23462AA 14.3.2008

Principal:

Coffey Projects

Date completed:

14.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by.

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| echod | Kypetjeued 2 | | Suppor | woder | notes samples, tests, etc | RL | ciepán. meves | Eusphic log | clade/fostion symbol | solty | pe: plasticity or c | erial cartole characters d missa compone | rbes. | rocistore condition | consistency censity index | | Service Co. | 1 |
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| drawn | Mil |
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| approvec | SH |
| date | 26/3/2008 |
| scale | Not to scale |
| origina siz a | A4 |



| client: | Taylor Tho | mson Whitting | |
|------------|--------------------------|---------------------------|--------|
| project: | 185 FOX VALLEY R WAHE | OAD, SAN HOSPIT ROONGA | AL |
| titie | ROCK CORE PHO | TOGRAPH - CBH1 | |
| project no | GEOTLCOV23462AA | Photo no: CBH1" | 1 of * |



Borehole No. CBH12

Engineering Log - Borehole

Sheet Project No: 1 of 2 GEOTLCOV23462AA

Charit

Taylor Thomson Whitting

Date started:

17.3.2008

Principat:

Coffey Projects

Date completed:

17.3.2008

Projecti

BOREHOLE GEOYLOOV2346244,GPJ COFFEY 3DT 4,18,39

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by.

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| t IIII | | πio | an e | tion | | _ | FTLAK | | ubstance | _ | | | • | | | _ | | |
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Engineering Log - Cored Borehole

Sheet Project No.

Barehole No.

CBH12

2 of 2 GEOTLCOV23462AA

Client:

Taylor Thomson Whitting

Date started:

17.3.2008

Principal:

Coffey Projects

Date completed:

17.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

Borehole Location. Building 2

Checked by:

SH

| dnii mod | igi & | mour | iting: Mo | o)le Da | 11 880 | Easting | g: 3 | 323931.7 | slope: | | -90* | R.L. Surface: 157.8 |
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| drilling | ց նո | form | noits | | erial substance | | | | | N | ock mass | s defects |
| method spre-lift | water | គឺ1 : | depth l melres | galaye leg Gove recovery | meterial nick type, grain diatasteristics, i structure, in not component | tofror, ts | wsathering alteration | cstimated swength | la _{ger} , MPa D-diam- eral A-aray | Rac % | ! | |
| | SED | 157 158 | 3 | | | | | | | | | |
| MAILC |] | 154 | | | Continued from non-cored bors SANDSTONE: Modum grained, re- gray and yellow, indistinctly to distin- bedded at 10° 20°. Significant 210 on thick seam from 3.65m | d, poic cily | SW. | | D A 1.39 1.35 | * | | |
| method D7 A8 eD RR C8 NMLC | | egi gi cewe | 8 ibe ir similary or dhaha chicane con livetie C core | Ĭ | CBH12 terryinated at 6.2m core-lift | — vat —√) par | SS dru 🕏 | w) | SW at MAN milet his Man at the his M | egn light), lighty ghly stran stran | / weathered failify weather weathered nely weathered by weathered by weathered by weathered by weathered | diefect type. Jourghness If joint VR very rough PT parting RO rough eled SM seam SO amouth SZ shrared zone SL silckmakke al CS crustres seam |



| drawn | MI |
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| approved | SH |
| date | 4/4/2008 |
| scale | Not to scale |
| urigina. size | A4 |



| chent | Taylor Tho | mson Whitting |
|------------|----------------|-----------------------------|
| project | | OAD, SAN HOSPITAL ROONGA |
| tit e | ROCK CORE PHO | TOGRAPH - CBH12 |
| project no | GEOTLCOV23462A | Photo no: CBH12 1 of 1 |



Borehole No. CBH13

Engineering Log - Borehole

Sheet 1 of 2

Client

Taylor Thomson Whitting

GEOTLCOV23462AA 18.3.2008

Principal:

Goffey Projects

Date completed:

18.3,2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Legged by:

Project No:

Date started:

JA

Borchola Location: Building 2

ecked by: SH

| | | | on: Buil | | | | | | | | _ | Check | ed by: | 5 | SH |
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Barchate No. CBH13

Engineering Log - Cored Borehole

Sheet 2 of 2

Taylor Thomson Whitting

GEOTLCOV23462AA 18.3.2008

Date started:

Principal:

Coffey Projects

Date completed:

Project No:

18.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by: JA

| | | | | | | ding 2 | | | | | Checke | orby: SH | |
|--|-----------|---|-------------------------------|--|---|---|-----------------------------|---|---|--|-------------------------|--|--|
| | | ame ame | | Migalin M | | | _ | 323905.94 | stope: | | -90' | R.L. Surface: | 161.0 |
| _ | _ | | | ration | | Drilling fluid: Northi terial substance | ng: t | 6265802.3 | chsed | _ | ock mass dele | datum: | |
| | SOFTE-IN. | Ī | RL. | depth metres | aphic log | | weathering alteration | 로그돌로를 급 Strength | Soppy MP2 D diam- strat A- dwal | % CO8I | Celect spatang mm | defect de type, inclinations, pr cooling, | escription lareatly, roughness, thickness gene |
| | | | _ 1 6D | | | | | | | | | · | |
| 7 | | | _159 | ٧. | | Continued from non-cored borehole SANDSTONE: Modium grained, dark ced at oracing, it instained and and pale guey to ched rock Indistrictly bedded at 20". | HW 1 | 88 | -0 A 0 17 | 22 | | M. 0°. IR. 90. sand; M. 0°, IR. 90, clay, o codirool frangistents M. 0°, PL, 90, clay M. 0°. IR. 90. sand; cooprool frangistents | olay and . 160mm refev + |
| | | NOT MON.TORED | _158 | | | | MW | | 0.3 0.44 0.3 0.44 | 68 | | M, 201, PL, SO, clay M, 201, PL, SO, clay M, 201, PL, SO, clay T, 201, PL, SO, CO T, 201, IR, RO, CO M, 01, PL, SO, clay, M, 01, PL, SO, clay, | , 10mm , 10mm , 10mm |
| | | NOT VIONITORED | _167 | 4 | | SANDSTONE: Medium grained pale grey indistinctly to distinctly bodded. Trace | FR | | 0.370.62 0 A 0.941.36 | - - | - P | T, \$1, PL, RO, CO T, \$1, PL, RO, CO, k | on stained, |
| | | | 156 | 5 | | of pyrite maseralis attorn | | | U A 1.160.96 | 8 | | | |
| | | - | 155. | . <u>6.</u> | <u>: : : : : : : : : : : : : : : : : : : </u> | NO CORE: 0.09m CBH13 terminated at 6m | | | | j | | _ | |
| | • | | _154 | 7 | | | []] | | : | | | | |
|)T 15 10 15 10 16 10 10 10 10 10 10 10 10 10 10 10 10 10 | LC | <u>, </u> | a uge rulle day sava | dime er screwin ar drubhig Masone or blade Coore no core | | Cooking classed | igi ratil fq ipigra rati | ici IVAS 3 fbild \$1945 Ire lest I Hacili | MW MG HW Mg XW ord DW day (co atrength VI vo L kw | Sic Valence Indy V Secret Secret Valence Valen | | defect type JT cont PT parting SM searce S2 sheared sorter S3 sheared sorter S4 constant sham plemarity PL plant CII convect UN sociolating S5 shepped | roughilloss VR Very rough RO rough SC smooth SL strongsder re coating CN cleus SN stained VN votable CO colling |



| drawn | MTI |
|------------------|--------------|
| approvec | S⊢ |
| date | 4/4/2008 |
| scale | Not to scale |
| origina. sıze | A4 |



| dient: | Taylor Tho | mson Whitting |
|------------|-----------------|----------------------------|
| project | | OAD, SAN HOSPITAL OONGA |
| tit ø | ROCK CORE PHO | TOGRAPH - CEH13 |
| project no | GEOTLCOV23482AA | Photo no: CBH13 1 of 1 |



Borehole No. CBH14

Sheet

Project No:

GEOTLCOV23462AA

Client:

Taylor Thomson Whitting

Date started:

18.3.2008

Principal:

Coffey Projects

Engineering Log - Borehole

Date completed:

18.3.2008

Project

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

Borehole Location: Building 2

Checked by:

SH

| ال | en | ole | LO | cat | on: Buile | ding | 7 2 | | | | | | | (| Checke | ed by | : | SH_ | |
|---------------------------|-----|---------------|--|--|---------------------------------|-------------------|---------------|---|--------------------------|--|---|------------------------------------|---|--|----------------------------------|--------------|------|--|---|
| drill (| mox | del | and | moi | inting; | Vlobiře | Onlk 6 | 80 | | Easting: | 323945.6 | slope: | -90° | | | | R.L | . Surface: | 159.7 |
| | | | | | | | | | | Northing | 6265882.3 | bearing: | | | | | dati | um: | AHD |
| dri | | _ | nfo | m | ition | _ | . — | mate | | ubstance | | | | 1 | | -, | _ | | |
| method | | s penetration | support | water | notes samples, tests, etc | RL | depth: | graphic log | classification symbol | | e: plasticity or part r, secondary and n | lic le characterist | | moisture condition | vebni valstency Vensity (ndex | 100 x pocket | a | | ucture and all observations |
| ş | | * | 1 | _ | | | | *** | | FILE: BITUI | MEN and ROADB | ASE | | D | | П | П | FILL | |
| A | | (6) | | | E E(x2) + 8s 8s SPT | 159 | 1 1 | | | FILL: CLAY pale grey, wi | Y: Medium plasti ith some fine grain | city, brown, yelk ed sand. | bns wc | <wp< td=""><td></td><td></td><td></td><td></td><td></td></wp<> | | | | | |
| | | | | | 5,7,10 N*=17 | _158 | 2 | | CL | Totav sadi | ium plasticity, pale | arrance and brin | | | - F | | | RESIDUAL S | DIL (7) |
| | | | | MONITORED | SPT 7,12,13 N°=25 | _157 | - | | CI. | with some fit | ne grained sand. AY: Medium plasting sand with de | city, pale grey, | | | | | | *Insufficient SF test. | PT sample for PID |
| - | | - | - | | | , | 3 | | | SANDSTON | E: Medium grains | ed, orange. | | [ō | | ╟╟ | ₩- | 3.07th | : V-bit refusal @ |
| | | | | TON | | _156 | 4 | | | | | | | | | | | | |
| | | | | | <u> </u> | _155 | 5 | | | | | | | | | | | | |
| | | | | | | 154 | 6 - - | | | | | | | | ! | | | | |
| | | | | | | _153 | 7 | | | | | | | | | | | | |
| | | | | | | 152 | 8 | | <u>.</u> | | plan toots | | اللا معدام | cation sy | I mbole ~ | 201 | | consistenc | yldensity Index |
| AS AD RR W CT HA DT B V T | Sho | | e V C C C C C C C C C C C C C C C C C C | coller/ vashit able land land lank bit bit C bit | tool auger e bli | M C P | oter 10/1/ | no resisti langing t refuse: IB water le show miliow | level | U ₈₅ UII D dr N st NC Si NC Sv P pp Bs bv | ptes, tests indisturbed sample 5/ indisturbed sample 6/ isturbed sample tandard penetration I (PT - sample recover) (PT with solid cone are shear (XPa) ressuremeter uX sample invarionmental sample efusal | 3mm diameter lest (SPT) ed | soli des based o system moistur D d M a W v | n unified | cłassifica | | | VS S F VSI H FD VL L MD O VO | very soft soft soft firm stiff very soff hard triable very toose inose medium dense very dense very dense |



Barehole No. CBH14

Engineering Log - Cored Borehole

Sheet 2 of 2

Taylor Thomson Whitting

Project No: GEOTLCOV23462AA

C(ient: Principal:

Date started: Coffey Projects

18.3.2008

Date completed:

18.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

Borehole Location: Building 2 \$H Checked by,

| | _ | | | | | ing 2 | | _ | | | | | ecked | <u>'</u> | |
|----------------------------------|---|--|---------------------|-----------------------------|-----------------------------|--|--|---|---|--|--|---------------------------------------|------------|-----------------------------------|---|
| | | | | iting: Mo | | | Easting | | 329945.6 | alcoe: | | -90* | | R I Statisce | 159 7 |
| | | ame' | | | _ | Drilling fluid: | Northin | ngr. 6 | 265882.3 | bearing | _ | | | dalam | AHD |
| dr | MIJ1 | ng i | | ation | | eria) substance | | | | | r | ock mass | defect | | |
| пефрод | core-til | Jeje# | NL. | werres qebih | gnachic og core rescveny | material rock type; grain characteristics, co structure, narror components | | weathering attendion | estymuted strongth 対 c a T 点 点 | is _{perj} MPa O-diam- etra) A axial | % 0⊃೬ | eelect spacing smm | panjou | type, inclination, p coasing | lescription planatry, roughness, thickness qua |
| 1 | | | _159 | | | | | | | | | | | | |
| | | ED . | 158 | | | | | | | | | | | | |
| 1 | | VONITORED | -157 | <u>.</u> | | Conjugation of the Conjugation o | | MW | 1 1 10/32 | | | | | | |
| NEALC | | TOM | _ \(\frac{1}{2} \) | 4 | | tronstaintre, prostantly sedded. SANDSTONE: Medium grained, pale leached to a large clay pagm. SANDSTONE. Medium grained, oran dark red. | gtcy, | XW MW | 10074 10074 10074 | O & 0.58 | | | 540 540 | i, 0°, PL, SO, etay Immi | vsandy clay. |
| | | | 185 | 5 | | SANDSTONE: Med um grained, ped | qœy | SW | 7 | D A C.880.78 | 7.0 | | | , 20*, PL. 30. CC | • |
| _ | | | _154 | <u>ē</u> | | CSH14 terminated at 6.05m | | | | _0 A_ | _ | | -23 PT, | .20°, PL, SP, CC, 20°, PL, SO, CC | 3 |
| | \ \ \ \ | | -ta3 | 7 | | Con it was a constitution of the constitution | | | | | | | | | |
| | | | 162 | - - - 8 | | | | | | West file | | | | | |
| Di AS AD BS CI NI | T S H H H H H H H | And claimbe constitution consti | | — on a — was —√] jani | | ₩ n | FR IN SW si NW m NW in XW en DW do (c) strwagth | e të ighti gde gde gde gde gde gde gde gde | y weathened rainly weether westhered any weather any weathere as say! and Si | eri 1 | defect type If pilm T perhap SM source S7 shrated as S5 shared so O5 cruthed so planarly P1 planar | face im coeffing CN clear | | | |
| | | | | | | - graphic symboth bruktare material no corp seconated | water pressure test result | | | L IOM CO Europeo AN sis | | AN stained UN veneer CO conting | | | |



| drawn | MT |
|-----------------|--------------|
| approved | SH |
| date | 4/4/200E |
| scale | Not to scale |
| origina siza | A4 |



| client: | Taylor Tho | Taylor Thomson Whitting | | | | | | | |
|--------------------|-----------------|----------------------------|------|--|--|--|--|--|--|
| oro ect: | | OAD, SAN HOSPITAL OONGA | , | | | | | | |
| titl e- | ROCK CORE PHO | TOGRAPH - CBH14 | | | | | | | |
| project no | GEOTLCOV23482AA | Photo no: CBH14 1 | at - | | | | | | |



Engineering Log - Borehole

Principali

Project:

Burehole No. CBH15

Sheet

Logged by:

1 of 2

18.3.2008

18.3.2008

JA

Project No:

GEOTLCOV23462AA

very dease

Taylor Thomson Whitting Date started:

Coffey Projects Date completed:

Borehole Location: Building 1

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Checked by: SH dál model ard mounting: Mobile Onli **8**80 Easting 323697 slope: R.L. Surface: 156.5 100 mm hore diameter. Northina 6268706.3 beams: datum: AHU drilling information material substance classification symbo pocher peretro-meter salaq den. Structure and g eta moisture condition additional observations Graphici tests, elc kPasoil type: plasticity or particle characteristics, depth RL Imetre Didner, secondary and minor components. 8888 123 LL: BITUMEN and ROADBASE α₩p ਵਿਕਤੀ ਜ਼ਿਲ**ੀ** FILL: SANDY CLAY: Low to medium plasticity. 156 brown, yellow and pale grey, fine grained semi 8s + 0 SPT 5.5.7 N = 12 155 Brick / formscotta debris Ą V-bit refusal at 2 00m TC-bit refusal at 2,49m. MO-470RED Roretrote CSH15 communities cored halo 7 SUDUCT classification symbols and ensay Index undellurded sample 50mm diameter N ne soil description auger scremne mud NEFW SOR auger drifting" C caurig undatorbod sample 63mm diameter U_e based on unified dissisfication sež NR W CT ro.lo: timenos 0 ರಾಜಾ ಕಾರ್ಕ್ ಕರ್ನಾಗಿಗ senegation washbore standard ceneration test (SPT) SIMI cable lock SPT - sample recovered YSI molatura vere std hand suger ones tags (the TP2 dry haid ÐΤ Grah. be vaice shear (CPa) númi fh břána bil 16/1/98 with leve B prostavomajer ΥL чегу Юсае **ም** ይባ tow sample placks New MOSS TC of enyaltanmentalis ampér MD water soften euffic rofugal dense

901 COFFEY GCCH COV23462AA

AGI



Engineering Log - Cored Borehole

Sheet 2 of 2

Project No:

GEOTLCOV23462AA

Taylor Thomson Whitting

Date started:

Borehole No

18.3.2008

Principal:

Coffey Projects

Date completed:

18.3.2008

JΔ

CBH15

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

| | | | | inn: <u>e</u> ling: Mo | | ling 1 | Fasting | , 1 | 373697 | slope: | _ | -96° | R.L. Surface: 199.5 |
|---|-----------------------|---------------|---------------|------------------------------------|------------------------------|---|--------------|--------------------------|----------------|------------------|--------------|---|---|
| cle d | | | | - | | Drilling Build | Morthán | • | 3785706 9 | bears | | • | datum: AHD |
| drilling information material substance | | | | | | | | - | ock mass | | | | |
| T | Ť | | | | , ery | material | | _ | estimated | ISus. | T | defect | delect description |
| . | Į | - } | | | graphic log core recovery | mok type, grain characteristics, co | doer. | wastraring siteration | strength | MPa MPa | 82 | spacking min | type, arctination, planarity, roughness, |
| BOCYGE FAVOR | | ¥8le∙ | | depth | g de K | situativa, minor components | . | 1884. | | C-diam- | 800 | i | coating, thickness |
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| | | | 154 i | -, | | Continued John Subscored basels | Ole | | | A G | | | |
| 3 | Ť | | | | :::: | SANDSTONE: Medium grained, orac pale yetow and pale grey with leache | | MW | 200 | 0.28 0.32 | | | |
| - | | 밁 | | 3 | :::: | seams. Indistinctly to dishoctly bedde 26". | d at | | WAY KIND | | | , | 9M, 0° PL, SO, clay, 70mm |
| : | | Š | | Ĭ. | | 20. | | | | | | | PT 25', PL RO, CN |
| 1 | | MOT MCNITORES | |] | | | | ı | | l | 36 | ╎ᡶ | H1, 251, PL, \$0, day, 3mm |
| 1 | | - | _153 | - | :::: | | | i | | D A 0.420.41 | | h . | . SM, 6° PL, SO, clay, 50mm РТ, 3°, РL, SO, CO |
| 1 | | | | _,- | . : : : | | | | | | | ' | PT, 20°, PL, SO, clay, Smm |
| L | ļ | | Ì | 4_ | | SANDSTONE: Medium grained, das | 2 5 6 7 | | | | Ц | | ,— PT, 5*, IR, RO, CN |
| j | | | | | :::: | xiad unange; with page grey leached so | | | | D A_ 1.69 2.4 | l | <u> </u> | PT. 251, PL. RO, CN |
| 1 | | ŀ | _152 |] -i | | Trace of pyrite mineralisation. | | ı | | 1.09 2.4 | П | 7 | PT, 25', PL, RO, CN PT, 25', PL, RO, CO |
| | | | | _ | | | | | | | | · [7] | PT, 251, PL, RO, CO |
| | | | | 5_ | | | | | | | 6 | .: <u>]</u> | ,— PT, 25", PL, RO, dayey sand, fümm |
| | 1 | |) | | | | - 1 | | | | 0 | | |
| | | | 151 | | | | | | 1 | D A 0.76 1.08 | i | :: ∏::: | } PT, 25", PL, RO, SN |
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| İ | | | ! | 6_ | :::: | SANDSTONE: Medium grained, pak | grcy | FR | | D A. | | | |
| + | t | | | | | with minor pale orange CSH15 terminated at 8.2m | <u></u> ∤ | | 1 2 2 | 1.55,11.0 | | 1111 | |
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| | ı | | | _ | . ' | | | | | | ŀ | | |
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| meth | 1 | | j | 8 | - + | core-IV: | water [| | <u>: :.</u> | weatherin | 13 | 1::1. | defect type soughners |
| DT AS | | | ស៊ីតស ១បង្ | ba r Bergyan | ., | coseg used | | li\$8 wald Jale shor | | SW a | ath Ighty | woathered | AT joint VR very rough PT partra RO rough |
| A9 RH | | | asige | r dalling Vicene | <i>^</i> | hansi vijhdrawn | | த வியோ | | HOY N | dily | Stely wwo Pro- wood in oresi | (60) SM Searn SO smooth SZ sherred znow SI sliprenside |
| ÇB | _ | | Qi a W | oy bisto | t).t | graphic logicom recovery | ⊸d pan | al doll fi | | OW o | stre | ely weathern by wealtherne o XMN and HV | 5 [CS szushod scam |
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CORED BOREHOLE GEOTLOOV/2462AA GPJ CGFFEY.GDT 4.18.08



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| арргочас | SH |
| date | 4 / 4 / 2008 |
| scale | Not to scale |
| origina siza | A4 |



| client: | Taylor Tho | mson Whitting |
|------------|-----------------|-----------------------------|
| project: | | OAD, SAN HOSPITAL ROONGA |
| title | ROCK CORE PHO | OTOGRAPH - CBH15 |
| project no | GEOTLCOV23462AA | Photo no: CBH15 1 of 1 |



Engineering Log - Borehole

Client:

Borehole No. CBH16

Sheet t for r

Project No: GEOTLCOV23462AA

Taylor Thomson Whitting 19.3.2008 Date started:

Coffey Projects Principal: 19.3.2008 Date completed:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA Project: JA Logged by:

| Boreh | nole | Loc | eti: | m Buil | ding | 73 | | | | | | | (| Check | ed uy: | SH | |
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| ani ma | xael i | arq | паы | nting: | Mobile | O/W B | 80 | | Easting: | 323761.9 | siope: | -90* | , | - | A. | L. Surface: | 161.1 |
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| d/ilbi | | rrfox T | LLUTE, | tion | _ | _ | mate | | ubstance | | | | | | | , | |
| re e | oojevaoed 3 | poddos | mater | roles samples, tesis, etc | | nestes | Sej a ,yd auS | symbo' | colour | mater e: plasticity or pa r, secondary and | rticle staracter miner compore | MIE. | masture condition | xəpu Aysusp Asusystadə | A pocket | addi | structure and tionef observations |
| ADV ADV | | | MONTCREC | E(x3) + Bs + D Bs SPT 5,5,3 N'=8 | 159 | 3 | | | FILL: CLAY brown, with | Y SAND: Topoolis unds and ingar to: Said The fo crate rubble and o FEY SAND: Medi some concreta ru DY DLAY: Media to some sandsto | rics. I medium grand diganic frangmo um grained, rec Abble. m diasticin, bio | ed, trace ents. | √wp | | | V-bit re/us. | al on fit cobbles at in |
| | | | JW AGE | SPT 4,6,25 N°=R | ∟157 | | | | FILL: CLAY higwn, wide F L.: GRAV greenish yol | h: Med om plastic f: Medium plastic some fine grahec VFLLY CLAY-Me low, cobbles of in | city, black and disand. edium plasificity, onstance. | cale , | · · · · · · · | - : | · | Unknown todourless. tor PID (4.0 | visck substance. Insufficient SPT sam 95-4.25m} |
| | | ! | | | _165 _ _154 | - - - - | | | | | | | | | | | |
| method AS AD HOX CT HA OT T T Dil show | | etch cat from dis bla V L IC | generation systems standard standard substandard systems syste | gen Sen | > 0 2 3 3 0 € 1 | COP | o messeum enging to eluse ! water k ! s'iDwit | | U ₄₁ Un D de 10 55 MC SF V VA P 000 BS bu E 60 | Hea, Keste Misikutsed sampin Skidelutsed sampie 67 Misikutsed sampie 67 Misikutsed sampie 67 Misikut sampie recover Trivally solid udire ma sinear (kiPa) assuremeter ilk semale wifonmeniph sample fussi: | 3-mm dumeter losi (SPT) and | acti description of the control of t | urmed c | | | COMMUNICATION VS 5 F S1 VSI H Fe VC L MID D VO | vory sef. soft firm seff very seff herd needs vory loose kode medum dense very dense |



Engineering Log - Cored Borehole Client: Taylor Thomson Whitting

Borehole No. CBH16

Sheet 2 of 3

Project No. GEOTLCOV23452AA

Date slarted

19.3.2008

Coffey Projects

Date completed:

19.3.2008

Principal: Project

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

| lul I t | 100 | (e) 5 | RIQUE | ting: Mo | Di ile Dii | F) G B0 | Easting | : : | 323761.9 | 61000 | | -90* | R.L. Surface: | 161.1 | |
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| | | mete | _ | 4 | | Driving fluid: | Northing | g. 6 | 265669.7 | () Depth | ~ | | datum | AHD | |
| drli | lin | գ հո | form | rtion | \vdash | erlat substance | | | | | " | xxk mass | | | |
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| | ŀ | Ī | | 7 | | SANDSTONE: Medium grained, s | ale g/ey | | 33.6 | 0.3 0.0 | 4 | Ę | PT, ST. PL. RO. VN | | |
| 1 | - | | | - | 11.5 | and pale orange. | | | | | l | | 1 | | |
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Borehole No. **CBH16**

Sleeet

3 of 3

Engineering Log - Cored Borehole Project No:

GEOTLCOV23462AA

Taylor Thomson Whitting

Date started:

19.3.2008

Principal:

CORED BOREHOLE SECTION/23462A4 GPJ COFFEM GCT 4:1848

Coffey Projects

Date completed: Logged by:

19.3.2008 JA

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA Project:

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| NMLC | | | _153 _153 | - - | | SANDSTONE; Medium grained, p and pale orange, (con(l/pled) | ako grey | IVW. | | D A 0.24 0.4 | 88 | | == PT, 20 == SM, 19 == Clay, 1 == NPT, 18 | P. PL. NO. CO 5'. PL. RO, san Orom 1'. PL. SO, CO 1'. PL. SO, CO 1'. PL. SO, CO | g mga some | |
| | | ED. | _152 | 9 <u></u> | | CLAY SEAM: Low plasticity, pale s hower laminations. 5.ANDSTONE: Medium gramed, p. | | MW | 371 33 5 | | 67 | | | | | |
| | <u> </u> | NOT MONTORED | ,151 | 10_ | | orange and prey. NO DÖRE: 0.08m SANDSTONE: Fine grained, pake with brown terminations. Distinctly b 0° - 5°. | Urey pedded 31 | MW | | { | | | | L Sandycley 6 . Pt . PtO. SN | 0mm | |
| | | 2 | _150 | 114 | ::::: | SANDSTONE: Medium grained, di crange and pale yallow, motted st. staining. Indistinctly to distinctly be- 10*-15*. | nonairen (| | | A d 0.850.88 | 98 | | P1.0* | , \$1, RO, \$N | | |
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| | | | _ 148 - | 12_ | :- '' | CBH16 terminated at 12.05m | | · | | 1.1A 1 D2 | | | P1. '3 | * PL, RO, SN | | |
| | į | | 148 | 13 | | | | | | | | | | | | |
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| approved | SH |
| date | 4/4/200E |
| scale: | Not to scale |
| original size | A4 |



client:

| project | 185 FOX VALLEY R | OAD, SAN HOSPITAL ROONGA |
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| litte | ROCK CORE PHO | OTOGRAPH - CBH1E |
| project no | GEOTLCQV23462AA | Photo no: CBH16 1 of * |



Sprehole No. CBH17

Engineering Log - Borehole

Sheet Project No: 1 of 2 GEOTLCOV23462AA

Client:

Taylor Thomson Whitting

Date started:

19.3.2008

Principal:

Coffey Projects

Date completed:

19.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JAMT

| Bore | hole | La | catio | n: Bull | ding | 2 | | | | | | | | Checke | ed by: | S | H | | |
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| dnii n | n005) | á nd | mov | nting: / | Mobile | Dnll B | BD | | Easting: | 323889.1 | Skipe | -90* | | | R | L Surte | ¢ o : | 158.0 | |
| | digare | | | | OU M | m | | | Northing | 62859113 | bен <i>т</i> ед. | | | | d. | iluni: | | AHD | |
| drif | ling | into | тпа | tion | | | mate | - | ubstance | | | | | | | | | | |
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| | | | NOT MON TO | 8,11,16 N°-26 | _155 | - - | | | and yellow, sandstone; | | d sand, with some kes | | | | | V-811. | re:us <u>al</u> a | al 3,14m | - |
| | | | | | J. 163 | - - - - - - - - | | | | | | | | | | | | | |
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Borehole No CBH17

Engineering Log - Cored Borehole

Sheet Project No: 2 of 2 GEOTLCOV23462AA

Client:

Taylor Thomson Whitting

Date started:

19.3.2008

Principal:

Coffey Projects

Date completed:

19.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA/MT

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| dri | illi | ng i | ntom | ation | mat | erial Substance | | | | 11 | ock mass (| |
| met rou | core-lift | water | Rt . | cepin metres | graphic log Cove recovery | metertet monk typen, grain objekt feresties, notenn, structure, minor oomponants | wastrering alteration | estimated strangth | Is _{teo} , MP3 D-dam- aliai A-axai | Rap % | 29 | defect description type: indication, planarity, roughwess, costing, thekness particular gener |
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| | | | ,1 54 | 4 - | | | FR | | D A 10.191.08 | | | — PT, IZ1, PL, SO, CO — PT, 151, PL, SO, CO — PT, 151, PL, SO, CO — JT, 851 UN, SO, clay and rootiets. |
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| | <u> </u> - | _ | _152 | 6 | | Recoming distinctly hedded at 10°-15°. CBH17 terminated at 6.12m | - FR | | 0.8 0.8 ⁷ | - | | |
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| client: | Taylor Thomson Whitting |
|---------|---|
| project | 185 FOX VALLEY ROAD, SAN HOSPITAL. WAHROONGA |
| tit e | ROCK CORE PHOTOGRAPH - CBH17 |

project no: GEOTLCOV23482A#

Photo no: CBH17

1 of "



Sprehold No. CBH18

Sheet

1 of 3

Project No:

GEOTLCOV23462AA

Client:

Taylor Thomson Whitting

Date started:

19.3.2008

Principal:

Coffey Projects

Engineering Log - Borehole

Date completed:

20.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by

MT

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Borehole No. ÇBH18

Sheet

2 of 3

Project No:

GEOTLCOV23462AA

Taylor Thomson Whitting

Engineering Log - Cored Borehole

Date started:

19.3.2008

Principal:

Coffey Projects

Uate completed:

20.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

MT

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| 3 | П | ŀ | 152 |] . | | SANDSTONE: Fine to gred; mage- oration-brown and bale grey, Indist bedded at 0*-26*. | inolly | MW | | D A 1.47 1.43 | (∣ | | |
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| | ĺ | } |] | | | - | | | | ĺ | Į Į | | |
| , L | ethio. | í H | | 8 | 1 | coee+lift | Water | | <u> </u> | westbeck | lg. | | defect type sociativess |
| ÞΤ | Г | - | dial | | | []] cated namo | 9 10/1/ | 95 wate Na after | er lgogi | | egh (glufy | wealthried | JT port VR very rose): Pt parting RD rough |
| VS VD | | | | er screw er diffing | | [! * ! | · · · · · | | TRIP | ARV III | vaden | zaky weather woodsered | led SAS seam 50 probable |
| ٩P | ł | | rolk | กให้ดอกจ | | j banski withdrawn | → water → water | | rid less | XW ± | X. TEM | ich wealhers | G SS sheareo surface |
| CE. | t ,∎¢ | | | or Made LC core | , mr | graphic (ag/core recovery | | | il fluidiaes | 10 | even. | thy weeklines and s NRW 2010 HV | A) [|
| | | G . PC | | line gare | | CONTRIBUTION AND | 1 | | | strength VL 10 | eny ko | ter . | planarity coating fit plans GN clean |
| | | | | | | - graphic symbols - galesta material | T water | r pogasia | ure feet result | L ka | er, a. M | | Off consect SM standed UN undesting VN venter |
| | | | | | | no come recoveredo | (Auge | ons) to | r docto | н ь | DΛ | | 61 stepped CO coping R -regular |
| | | | | | | [] | -inter- | val ghes | An . | LCH ↔ | ory bi | gh ro'y hegil | I to a response |

coffey peotechnics

Engineering Log - Cored Borehole

Serchale No. CBH18

Sheer

3 of 3

Project No:

GEOTLCOV23462AA

ient: Taylor Thomson Whitting

Date started:

19.3.2008

Principal:

Coffey Projects

Date completed:

20.3,2008

Project*

COREC BOREMOLS GEOM COVEREZAR GPU COFFEY.GOT 4 16 26

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

MŢ

| | | | | tion. j nting: Ni | | fing 3 | attmo: | 323738.3 | Slope: | | -90° | necked by: SH |
|---------------|--|-----|--|----------------------|---|--|---|---|---|---|---|--|
| | | ame | | • | | | | | | | -34 | R.L. Surface: 169.1 |
| | | | | ration | | eriał substance | Northing: | 628564B.5 | boarin | <i>i</i> | ock mass | datum AHD |
| | Core-IAL | Ť | Fil. | dapth metres | graphic log core recevery | | entradas. | estimated aboutgith | Is _{us} , MPa C-ocan- etal A oxial | FCD % | defect spacing man | defect description: hype, including, sharasity, roughness, coating, shickness |
| MMEG | | _ | 751 | - - | | SANDSTONE: Fine to medium graned, orange-brown and pate grey Inchains thy bedded at 0°-20° (continued) | ATA | | D 435 | | | |
| | | | 150 | 9 - - | | Becoming distinctly bedded at 0°-20°. | 599 | | 0 A 0.730 a2 | 43 | | FT. 15*. PL. SO. CN |
| | | | 149 |) U | | | | | O A _ 0.98 I 22 | | | PT, 10°, UN, RO, SN |
| | | | _!4R | 1 <u>1</u> | | | | | D A 0.111.09 | 60 | J. | SM 0°, PL, SO, clay, 5mm PT, 0° UN, RO, CN |
| | | | _14/ | 12_ | | | | | LD A | } | | |
| | | | _148 | 13 | | СВН 18 (arminated a) 12 15m | | | | | | |
| | | | 145 | 14_ | | | | | : | | | |
| | | | _144 | 15 | | | | | | | | |
| OT SOUR BRIDE | ethod Control Species anthring Suger anthring Nuger lancarp Nuger lancarp Control Cont | | Sandre Degree activiting Sugger activiting Degree activities Degre | | | | 10/1/98 w: - on dale sr - water mice pertar dale | 104 1 11 | SW sli MW m KW N XW cx DW dx | ish ghily odec griy v trem sheet | weat revail andy weathers weathered sky weathered above and the | \$Z shippined some SL skickenside \$S shippined surface CS crushed seam Will |
| | | | | | core recovered - graphic synkods indicatio material no opre recovered | | isure tesi resulf for depth | Strength VI. 109 L Con M no. H in VIII 109 | ry io o aden gh ry hk | n | ptenantly coating PL planer CN deep CU curved SN stained HN unitdating VN veneer S1 stepper CO coating IR imagellar | |



| drawn | МП |
|------------------|--------------|
| approvec | S1- |
| date | 26/3/2008 |
| scale | Not to scale |
| origina. sıza | A4 |



| client: | Taylor Tho | mson Whitting |
|------------|-----------------|-----------------------------|
| project: | | OAD, SAN HOSPITAL ROONGA |
| title | ROCK CORE PHO | TOGRAPH - CBH16 |
| project no | GEOTLCOV23482AA | Photo no: CBH1E 1 of 1 |



Sorehole No. CBH19

Engineering Log - Borehole

Sheet Project No

1 of 2 GEOTLCOV23462AA

defice

very dease

Taylor Thomson Whitting

Date started:

20.3,2008

Principal:

Coffey Projects

Date completed:

20.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

MT

Borehole Location: Building 1

Checked by

SH

drill model and expensing Mobile Orlli 880 323587.6 Easting: slape: R L. Surface: 156.5 (60 mm tide dameter Northing 6265736.9 bearing: riæleja: AHD drilling information material substance pcokel pcolotio male: pereiratio notes bns erutarite enoithyrectic (arrollibbs samples. clessificati symbol mosture condition support water leste, etc кРа pok type: plasticily or particle characteristics. RL colour, secondary and mixture exemperatedly 8888 123 FILL: CLAYEY SAND: Fine to medium grained, red E + 88 and orange-brown with some sandstone gravel 88 **SPT** 5.7.0 N=15 V-hit nelosalist 1,73m. Samhole CBH19 continued as cored hate **VOY MONITORED** 159 5 constriency/density inch M XXVIII M Mud U_m undiaturbed sample 50mm diameter noite hazarb float very soft auger screwing' AD. augar soling C casing undishinded sample \$3mm diameter hased on winhed classification U_e KK coner/tricone panetration 1 2 3 1 D N alsiikrbea samale 3 PS SQ IP firm W ajift washbole standard genetration test (SPT) gable (00) SPI sample recovered very site hend Juge Me SPT with solid cover DT dalube vano shoor (kPa) moist Fδ frieble ٧L B Mank bit 10/1/93 water fevel on riste shown **Ordet a resultation** w WOL DEFY RO ٧a٤ nick szonjak Ψp тоы environmenta sample Fraud Smill ΙĐ സഞ്ച് ഹേർബ**ടെ** warez inflow

refugati

🛋 water outflow

COFFEY COT GEOTLCOV23462AA GPU



Boreligie No. CBH19

Engineering Log - Cored Borehole

Sheet 2 of 2

Client: Tayı

Project No.

GEOTLCOV23462AA

O III III

Taylor Thomson Whitting

Date started:

20.3.2008

Principal:

Coffey Projects

Oate completed:

20.3.2008

Project:

CCRESISCREPOLE SEOTLCOVZ3482÷× GF. COFFEY GD 14 18 08

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

MT

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| • | mati | tion | - | | icrial substance | _ | | | 1 | ock mass d | | |
| | de | depth evler | h | graphic ag core recevary | matérial tock type: grain characteristics, calcur, structure, minor components | weathering alteration | estrated strangth | IS-so) MP3 D diam- etral A- autat | RG0 % | defect specing mm | !урн, incitrution, pt coating, t | escription avarity, roughness, thickness |
| | ╁ | | † | | | + | 11311 | ├ | ╀ | 100000 | PAI GOLDE | qend |
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| | } | | ┨ | | | | | ŀ | l | | | |
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| | i | |] | | | | | | | | | |
| | | | ł | | Continued from con-cored benchale | | | • | 1 | ta id | | |
| - | ┿╸ | | † | | SANDSTONE: I'me to medium grained. | SW | *** | O A | ┢ | - 1 | — — — — — — — SM, 10°, PL, 5mm | |
| į | } | 2_ | 1 | | orange-brown and pale grey. Indistinctly to distinctly bedded at 0"-15". | | | D A 0.436.37 | ខ្ទ | ╎╶┋┩╵╞ | SM, 0", PL, 15mm | |
| | } | - | 1 | :: | 1 | | | | ľ | | | |
| l | - | |] | · · · · | i | | | 0 A 0.12 0.1 | ┨ | } % ;} | — SM, C1, PL, 5mn) | |
| | } | | 1 | :::: | l | | | | ļ | | | |
| | } | 3_ | 4 | . : : : | | {} | 800 : : 100 : : : | | l | | — SM, C1, PL, 20mm | |
| | } | - | ┨ | : : | Becoming red and mange-brown | I HWY I | | | |] [| SIM. C. INC. ZUININ | |
| İ | ĺ | • | 1 | : . | | } } | | 0.53046 | | | | |
| | ł | |] | Ξ. | | ! | | |] | | | |
| | | 4_ | 1 | : : | | 1 | | | | | | |
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| | | | 1 | | and red. | | <i>.</i> | | | | | |
| ĺ | İ | | 1 | : : | |) ¦ | | D A 05.048 | 4 | | PT, 10", PL, SO, VN | |
| | İ | 5_ | - | | Becoming oale grey. | (। । | | | 8 | ' | | |
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| | | - | ┨ | : : | | } ! | | _D ^_ | | | | |
| | | - | 1 | : : | Secoming red and prange-brown stained | [FW] | | 0 220 77 | 1 | | | |
| | | <u>6</u> | 1 | <u>: :</u> | pale grey. | <u>{</u> | 355 | | <u> </u> _ | | . <u> –</u> – | |
| | | - | ł | | CBM19 terminated at 8m | } } | | | | | | |
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| | ŀ | | + | | | ! { | | | | }::'; | | |
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| J | | 8 | 1 | | <u> </u> | <u> </u> | <u> </u> | | L | | | |
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| S suger strewing D suger driving | | | ģ . | ۱ ۲ | <i>ii</i> | n date show | en . | IAW n | DOKY | , westwored otely westhered weethered | | HO rough SO smooth |
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| L | AC 4 | | | | graphic top/core recovery ours recovered graphic symbols indicate maxers no core recovered or core recovered | ompiale dri | iffud k ire lest deplh | X6-1 | oca (() strength VL w L k recult M m H h | sea (cover strength) VL very lot L kav M mediu H high VII very lo | stempth VL very law L knv M maximum H high VII very high | stempth planetty planetty VL very law CU curved L kew CU curved M madewit UN unbulating H high ST stepped VI very high R irreguer |



| drawn | MT |
|-----------------|--------------|
| approvec | SH |
| date | 26/3/2008 |
| scale | Not to scale |
| origina aize | A4 |



| client | Taylor Thomson Whitting |
|---------|---|
| project | 185 FOX VALLEY ROAD, SAN HOSPITAL. WAHROONGA |
| tihe | BOCK CORE PHOTOGRAPH CRH15 |

Photo no: CBM16

1 of 1

projectino: GEOTLCOV23462AA



Engineering Log - Borehole

Taylor Thomson Whitting

Principal: Project:

Client:

Coffey Projects

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Project No.

Sheet

Borehole No.

1 of 1 GEOTLCOV23462AA

Date started:

20.3.2008

CBH20

Date completed: 20.3.2008

MTLogged by.

| _ | | | | on: E ening: | | | 9f0 B | 90 | - | Easting: | 323723 4 | slope: | 9/)" | ` | Checke | - | ~— | SH Surface: | 158.6 | - |
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| | | | | Sp 2.3 N'= | 5 | _154 | 4 | | | PILL: SAN orange-tag pad ironsto | (DY CLAY: Pagn pi wan and red, with so ne gravel. | astroiÿ, palé gréy. An e sandstone gi | ave! | ≅₩o ' | | | | | | |
| | 2011 12888 1 2000 Y 2018 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | | 5F 7,6 N'= | 13 | _153 _152 | <u>6</u> | | | FX1: \$41 | EY Ct AY: Hagla jool | Nicity, dark Srowt | | | | | | esi Rsufficient i | SPT sample fo SPT sample fo | |
| | | - - - - | <u> </u> | <u>58</u> 14/11/ N'= |)rinti | _151 | 3 | 2000 | <u> </u> | Sorehole C | CBH20 term inated i | si 6.85m | _ | -· | | | ************************************** | 961 <u> </u> | | |
| AS AD BR OT BA OT F | hod | b _T : | auger rgilar/ wysta cable leand dann benk V be TC be | too puger e: eit | | ラロ &- 🟥 🕏 📂 🗼 | pport mand 539×14 mercaring 2 3 4 mercaring 3 4 mercaring 2 4 mercaring 2 4 merc | an no rened rangung Y renusar renusar id winter rullow | va Ikre | U., U., D., N., N., V., P., S., | ngres reste undes vided sample S underlinde sample for disjurges sample sjendprågenstren in SPI - tampte resover SPT with sold come vene ahear (EPa) gressuremeter anspannentar sample anspannentar sample | Juan dismeter (SPT) | Wp pf | eription summed to y orst | easeites | | | Completed VS 5 C SI VS: II L UD D VD | confidentity inde- way soft only from suff yeary soft hard- trable yeary fouser loose medican as dense, yeary donce | nr <a< td=""></a<> |

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Barehole No. CBH21

Sheet Project No: 1 of 1 GEOTLCOV23462AA

Client:

Taylor Thomson Whitting

Date sladed:

25.3.2008

Principal:

Coffey Projects

Engineering Log - Borehole

Date completed:

25.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

| H (| រសេជមា | 374 | meu | nikog | \$MODAS | Den B | 5 0 | | Easting: | 323757 8 | stope: | -80, | | | R. | L. Surface; | 160 7 |
|-----------|---|------------------|-----------|---------------------------------|----------------|---|-------------|--------------------------|--|---|------------------------------------|---------------|----------------------|-------------------------------|---|--|--|
|) (K | dspmi | eter. | | | 10 0 ni | TSN . | | | Northing | 6265655.63 | beering: | ! | | | da | เรียกก | AHD |
| ri | lling | tafe | OF ITYZ | tion | | | mate | eríal 90 | ibstance | | | | | | | | |
| | 2 penetration | Subsett | water | notes sambles, tosts, etc | | degth metres | graphic leg | olassalication symbol | eol: ty colox | materia pe: plasticity or part vr. secondery and to | icia engracionis | RCS, 115. | moisture condrice | consistency/ density incex | 100 y pocket 200 y pocket 200 y penetro- mener | | structure and tional observations |
| 1 | <u> </u> | N | 1 | Ľ | | | XXX | | | SILTYSANO: Fir | æ grained, dar | k | 6 | | ΠŢ | FQL | |
| | # 40 m 10 m 40 m 10 m 10 m 10 m 10 m 10 m | | | E SPT 2.3.3 | 160 | - 1. | | | FILL: SAN clay and gr FILL: SAN | paoil and grass ND: = Fine grained raves NDY GLAY: Medium ge and brown, medi ret and coobles | olasticity, red. | oale | <u>-₩₽</u> | | | Inculticion | t SPT sample for PID |
| | | | MON.TORED | 1.5.5 N°=8 | 1.159 | 2 | | | | | | | | | | [#N] | |
| | | | NOT MON. | 8PT 4.3,4 NF=7 | | - <u>3</u> _ | | | , mediym gr FILL∵ CLA | NOY CLAY: Medicin rained send. SY: Medium plesicity of and coboles. | | - 4 | | | | | |
| | | - | | SPT 224 to 56 | _157 | | | SM | | ND: Fine grained, è ONE. Fine grained, c | - | e grey. | ·-o | MD | | rneußii ies Loot RESIQUA V-bit refus SANOSTI | alet 47m |
| | | ↓_ | <u> </u> | E | ॏ - | (<u>5</u> : ← | . : | . , | | GBI-921 terminated a | FS 1m | | . — | | ╌┼┼┼ | <u> </u> | |
| | | | | | 155 | 6_ | | | aniemole C | asariza remina:eo a | CS, 140 | | | | | | |
| | | | ! | | 754 | - <u>-</u> <u>7</u> - | | | | | | <u> </u> | | | | | |
| mai | hod | | | - | _153 | e pport | | | | npies, leafé | 1 | of as sifting | | ntels e | | | ency/decaty index |
| SUPERITOR | - | 4 4 4 1 | (Mgar | ool :vger : | 2 C P- | estrice estrice 2 3 9 eller 0/1/5 | | (8+E' | G _E D N NC V P | undickurbed samole 50 undickushed samole 50 staurbad sample 22 zandara samazouon u SPT - s sugde necureur SPT with solid cone varie steor (NPO) prossuremejer sutraunitarie samazonmental sample samazonmental sample | franc channeter est (SPI) ed | | 0.74f.0c3 r | | 14114 | V9 \$ \$: Y6L # F0 V L 10 | very soft coft form sidf very sidf notice very toose loose medium deside |



Engineering Log - Borehole

Taylor Thomson Whitting Client:

Coffey Projects Principal:

Project

BOREHOLE GEOMICOVENSAM SPJ CUFFEY GDT 4 18 28

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

Bosehole No

Project No:

Date storted:

Date completed:

Sheet

25.3.2008 25.3.2008

GEOTLCOV23462AA

CBH22

1 at 1

JA

| \$¢r | eh | oía | Lo | catio | ∞: Bull | ding | 1 | | | | | | , | Checke | ed by | Į: | SH |
|-----------------------------|--|-----------------|----------------------|----------------------------------|----------------------------------|----------------|------------------|-------------|--------------------------|--|--|---|--------------------|--------------|------------------|-------|---|
| drill r | mo | dø) | ənd | mou | inting; | Mobile | Colle | AU | | Basting: 323689. | 5 skoos: | -90° | | | | R.c | . Surface: 186.5 |
| hole | | | | | | 100 m | (S) | | | Northing 6285750 | 2 bearing | g: | | | | dat | MW. VHD |
| | | pereration G | | | notes samples, tests, etc. | | - | graphic log | dassirioston m symbol | | muterial | | mostue conditor | consistercy. | Pocket period | meler | etructure and skiditional observations |
| method | | 23 | Pupper | water | | Fil | urşili metros | deuc | # # K | colour, speondair | or particle character y and minor componi | islics, enjs. | ! | 6000 6300 | #P 건설(| | |
| ADT | | | | (VED | E - | 156 | - - - | | | FILE: BITUMEN and RE FILE CLAYEY SAND- nate grey and old, send sandstone copples. | Medium grained, o | renge. M some | | | | | FIEL |
| AT A SECURE AT A TOP OF THE | 10 Caron 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | | NO_CBSBRVED | SP1 7,7,7 N*-1 | 155 | 1 1 - | | হন ! | FILL: SILTY SAND: FI | olybies (Summ) | | | ₩Đ | | | Insufficient SPT cample, for PID test. TOPSOIL ? [AFSWILLAL SOIL |
| 30000 | | | | | E | 154 | 2 | | 3 | SAND: Medium grants SANDSTONE: Medium gray SANDSTONE: Medium | grained, yellow end | Граје — | | | | | GANDSTONE - |
| | | | | | | | 31 | | | जिल्लोको दिस्ति है शिल्लो | aled at 2.4m | | | | | | |
| } | } | | | | | 153 | 4-1 | · | | | | | | | | | |
| | | | | | | 152 | 5 | | | | | | | | | | |
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| Í | | | ' | | | 150 | 6 | | | | | | \ | | | | |
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| neth | | | | | | _1491 #U\$ | 7 8 7000 | | | 110046, Bampies, tosts | , | olatanic | | niyelg an | | | consistency/density index |
| S G H Y T IA | | | 80 46 63 63 | | 6 6 | D POY | æ . , | | iiil Ma | U _E undisturbed samp 19 dustorbed samp | erecenter (ECL) | soil desc based or system morstuni D dr M mo | uriffed a | dasselsen | ,on | | VS very soft S soft F firm St off VS very st/4 H lead Fb impile |
| i ' | אינול | n by | V To | anik Eri ikt 3 bill iga | · į | <u>↓</u> • | | ιžοw | ove: | P pressurameter Bs bulk amighe F; environmenter R: retygar | | W wi Wµ da | | | | | VI vary cose L tubes WD medium dense U dense VO vary dense |



Borehale No CBH23

Sheet <u>Project No:</u> 1 of 1

Client:

Engineering Log - Borehole Taylor Thomson Whitting

GEOTLCOV23462AA 25.3.2008

Principal:

Coffey Projects

Date completed:

25,3,2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

Date started:

JΑ

Borchole Location: Building 2

SH

| | Location: B 4 | Mobile Diff 6 | 180 | Gasting, 3 | 23B50 slope | -901 | Checked by: | SH . Surface: 159.0 |
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| hole duambi | _ | 100 mm | | | 2658068 bçan | | | um, A XO |
| | nternation | | material s | | | | (180 | on. Ano |
| nethod - N penetration | noties sample tests, et | » | graph citog dassification symbo | soil type: pl colour, sec | meterial eshipity or sanicle characte condeny and minor compo | espes. Signate. | density nden density nden to pocket. | structure and additional observations |
| ADT | NOT CBSERVER | 158 | | FILL: CLAYEY'S medium plasticity SANDSTONE: Figure 9 page | and RUADBASE AND: Fine grained, orang y clay, with some gravel. Fine to meaning grained, or the maintained at 1 time. | 1 | | SANDSTONE |
| | | 168 2 | | <u> </u> | | ļ ļ | | |
| * | | 197 | | | | | | |
| | | 1545 4] | | | | | | |
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| INTEROS AS AS AS AS | auger scenarg" auger drillin;" rote/Aidenc cable tool hand auger drawbe Usank bir V bir TC nit | water water | ic Shows or removement ranging to or removement | Out oncision Outside No. Sector No. Sector No. Sector No. Sector No. Sector Volume of Processor No. Sector Outside No. Sector No. Se | iden sample Pomm diameini infediamigle 60mm diameter ad sample idiper eliativi teal (SPT) idimple lecovared thisold cone linar IPPsii remeter impelalissamble | erassification is soil description based on unifer bystem constant or dry Microus: William passe in William passe in William is well with the well with passe in William is well with passe in William is well with the well wi | u d classification | CONSISTANCY/Horsely Indian VS 1004 S 504 F 500 SI 546 VS 100 House Co theole VL very Mose L Deser J/D region dense |



Boretrole No. CBH24

Sheet Project No:

GEOTLCOV23462AA

Olient:

Taylor Thomson Whitting

Date started:

25.3.2008

Principal:

Coffey Projects

Engineering Log - Borehole

Date completed:

25.3.2008

Project:

RORENCIE GEOTLOOVZS-62A+ OPJ COFFEY GOT 418.08

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

Logged by:

JA

| | | _ | | on: Buil | | | | | | | | Check | ed by | ŗ. | SH | |
|---|---------------------------|----------|----------|--------------------------------------|-------------------------|--|------------|--------------------------|---|-----------------------------------|--|------------------------------|---|----------|--|--|
| | | | | • | | :Dá∎ßi | RI) | | Fasting 323832.3 | skipe: | - 9 :0" | | | | | 161.2 |
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| (MI) | | II TETA | жилы | пол | 1 | | mare | | ubstance | | | -1 · J | Τ' / | - | ,· | |
| mernod | nographene of the control | poochs | weter | notes somples, tesis, etc | RL | dopih metras | gradkio og | skassification symbol | suit type: plastuky or pa colour, ascondary and | rkde characteristics | i. graftere | consistency density index | S PODKet | 2 | | ucture and nai observations |
| 100000000000000000000000000000000000000 | | | OBSERVED | Ę. | 181 | - - { - | XX | | FILL: SAND: Fire to median brown, with some slit, gravel sandstone: Medium gravel | m grained, grayish and cubbles | | | | | SANDS TONE | |
| - | | | ρž | E . | <u>.</u> | | :::: | | girry Borehole CBH24 terminated | | | <u> </u> | Щ | <u> </u> | | |
| | | | | | _160 | - | | | account Course (Survey) | a. III | Ì | | | | | |
| | | | | | 159 | 2 | | | | | | | \$ | | | |
| | | - | | | - -158 - |) <u>.</u> | | | | | } | | | | | |
| | | | | | 157 | - - | | | | | | | { | | | |
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| | | | } | <u> </u> | 100 | <u>c</u> | | | | | \ | | | | | |
| | | | | | 154 | \\ \frac{7}{2}\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | | | | | ; ; ; | | | , | } | |
| | hox1 | <u>U</u> | <u> </u> | | | 8 reed | | | notes, servoles, tests | | dustification | | <u> </u> | 11 | | y/derraily index |
| SORVITATION | | 1 | | 91 6 091 09281 5 | C p ∎ | 104.6 | | level | U _{si} undictioned service (U _{si} undistinited service (C closs/feel aemple N spiroted service NC SPT vertical (RPs) P vertical (RPs) P presentations D bulk particle E spirotements service | Glovet ulameter C best (SPT) | ned descriptions of the control of t | ied dassific | ation | | VS S F SI VSI K FU VI I MD D | very soft soft form stiff very still hans thetele very loose kxxxx medium dease |



Borehale No. CBH25

Engineering Log - Borehole

Sheet 1 of 1

Client

Taylor Thomson Whitting

Project No: GEOTLCOV23462AA Date started: 25.3.2008

Principal:

Coffey Projects

Date completed.

25.3.2008

Project:

185 FOX VALLEY ROAD, SAN HOSPITAL, WAHROONGA

JA

Logged by:

| ill F | 70del | FI INC | mou | nitug: | Modik | Data | B0 | | Easing | 323857.4 | słope: | 90" | | Checke | | _ | SH Surface | 161 | 4 | - |
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| | ling | | ana | | | _ | mat | erial s | ubstance | | | | | | | 041 | rw.i. | AHE | ' | |
| | notevation | suepore | water | notes samples, tests, etc | | j Çepih mudrus | getailetag | classification symbo | soil typ | rester ex plasticity or pa | rticle characters | ħφ\$, 20×. | monstene condition | consistency! Ochsity index | 1 11 | State of the state | 1 | | ire and beenvetions | s |
| 100 | ĦŤ | } -} | 밁 | | ╁┈ | | XXX | | | MEN and ROAD | | | 5 | | 11 | ΪÏ | FILL | | | _ |
| 200717171000 | | . } | NOT OBSERVED | | 161 | ; - - | | | greyssh brou | VECLY SAXOS: M MA, MODIUM 10 CQ SE: Medium gras | ars¢ sandatone | | | | | | SANDST | ONE | - | |
| ť | f | ╁┪ | | | | } <u>-</u> | - | _ | Borehule CE | 3H25 terminated | at 1m | ~ | | | ++ | i l | | - | | |
| | | | } | | 150 | 2 | | | } } | | | | | | | { | { | | | |
| | | | | | 159 | | | | | | | | | | | | | | | |
| | | 1 1 | | | - 158 | (*) | | | | | |] ; | | | | | | | | |
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| | | | - | | 154 | <u>7</u> | | | | | | | | | | | | | | |
| NOTE: | <u> []</u> | 95 pro we cal bot | | er Le | M L | ::l | | | U ₀₀ 00 O 66 N 16 N 5F Nc SF | Aca, leats Obsolved sample 5 Infolged cample 6 Stuffed as mote and as deneration PT van adfa core Inc Short (RPa) | Sman diameter text (SPT) | cleasifies soli disso hased on system moisture U dry M me | dpifen unifiet i: | | | <u>:].</u> | SI VSI VSI VSI VSI | 56 81 51 51 71; | TFI . | |
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Appendix B

Laboratory Test Reports

Coffey geotechnics Golfey Geolechnics Phy Ltd ABN 93 056 929 483 BY12 Mars Road SPECIALISTS MANAGING THE EARTH Cove West NSW 2006

Lane Cove West, Sydney Laboratory

Telephone, +61 2 9911 1000 Facsimile: +61 2 001 1 1002

California Bearing Ratio

Coffey Geolechnics Pty Ltd.

8/12 Mars Road

Lane Covo NSW 2066

Principal:

Client:

Job No:

LABTLCOV00268AA

Project:

GEOTLCOV23462AA

Lot No:

TRN:

Result AS 1289.6.1.1

1.970

112

8.0

10.0

11.8 1.956

118

0.0

11.8 4

13.1

4.50

105

99

YES

7.9

Spaked

Report No: CBR:LCOV089-01180

This report represess all previous issues of report no "CBR LC:ON085-01180".

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7/04/2008

LCOV085-01180

Approved Signatory: Marchall Webster WORLD ALGORISMS

(Laboratory Manager)

NATA Accredited Laboratory Number: 431 Date of Issue: 22/04/2008

Sample Details

Product:

Source:

Location:

Test Results

CBR 2.5mm (%)

CBR 5.0mm (%)

Preparation

Swell (%)

Maximum Dry Density (ชาก)

Initial Moisture Content (%)

Achieved Dry Density (t/m²)

Achieved Moisture Contont (%)

Muisture After Pe∩efration (%)

Moisture Content of 1 op 30mm (%)

Moisture of Penetrated End (%)

Laboratory Moisture Ratio After

Laboratory Density Ratio After

Oversize Material Excluded Percent Oversize Excluded

Period of Soaking (days)

Compaction Type

Compaction (%)

Compaction (%)

Surcharge Mass (kg):

Optimum Maisture Content (%)

SAN Hospital, Wahroonga

Client Ref:

Description

Test Method

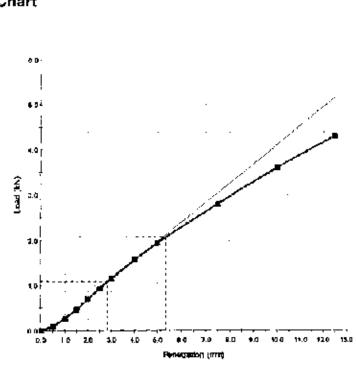
CBH 15

Chart

Date Sampled:

Sample ID:

Sampling Method:



CBR (%): 10.0

Rate of Penetration

Comments

Depth of sample = 0.25 - 1.0m

Coffey Geotechnics Coffey Geotechnics Phy Ltd ABN 93 056 929 493 SPECIALISTS MANAGING THE EARTH Cover West NSW 2006

Lane Cove West, Sydney Laboratory

Talaphone: +61 2 9911 1000 Facsimile: +81 2 9911 1002

California Bearing Ratio

Report No: CBR:LCOV08S-01181 Isaue No: 1 This import regrades an previous issues of report no. CBN:LCOV08S 01181;

Client:

Coffey Geofechnics Phy Ltd.

8/12 Mars Road

Lane Cove NSW 2066

Principal:

Job No:

LABTLCOV00268AA

Project:

GEOTLCOV23462AA

Lat No:

TRN:

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WORLD RECOGNICED
ACCREDITATION

Approved Signatury Marshall Webster

(Laboratory Manager) NATA Accredited Laboratory Number: 431 Date of Issue 27/04/2008

Sample Details

Product:

Source:

Location:

SAN Hospital, Wahroonga

Citent Ref:

CBH 11

Date Sampled: //04/2008

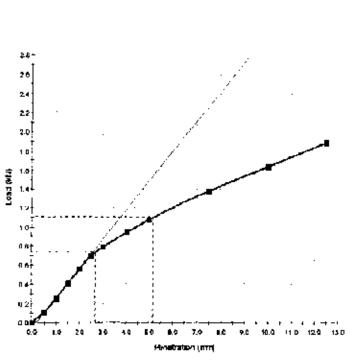
Sampling Method:

Sample ID:

LCOV08S-01181

| Test Results | |
|--|---------------|
| Description | Result |
| Lest Method | AS 1289 6 1.1 |
| Maximum Dry Density (#m²) | 1.890 |
| Optimum Mossture Content (%) | 12.8 |
| CBR 2.5mm (%) | 6.0 |
| CBR 5.9mm (%) | 6. D |
| Preparation | Soaked |
| Initial Moisture Content (%) | 12.9 |
| Achieved Dry Density (Vm²) | 1.882 |
| Achieved Moisture Content (%) | 12.9 |
| Sweli (%) | 3 .5 |
| Moisture After Penetration (%) | 13.8 |
| Period of Soaking (days) | 4 |
| Moisture Content of Top 30mm (%) | 16.0 |
| Moisture of Penetrated End (%) | |
| Compaction Type | |
| Surcharge Mass (kg) | 4.50 |
| Laboratory Moisture Ratio After Compaction (%) | 101 |
| Laboratory Densily Ratio After Compaction (%) | 10 0 |

Chart



CBR (%): 6.0

Rate of Penetration

Depth of sample ~ 0.25 · 1.0m

Oversize Malerial Lxcluded

Percent Oversize Excluded

YES

0.0



Coffey Geotechnics Coffey Geotechnics Pty Ltd ASN 93 956 929 463 ASN 93 956 929 463 ASN 93 956 929 463 ASN 93 956 929 463 ASN 93 956 929 463 ASN 93 956 929 463 ASN 93 956 929 463 ASN 93 956 929 463 ASN 93 956 929 463 ASN 93 956 929 463 ASN 93 956 929 463

Lane Cove West, Sydney Laboratory

Telephone: +61 2 9911 1000 Facsimile: +61 2 9911 1002

California Bearing Ratio

Report No: CBR:LCOV08S-01182

Issue No: 1

This report replaces all premous issues of report no 'CBPLEOVOSS-01102'.

Client:

Coffey Geotechnics Pty Ltd

8/12 Mars Road

Lane Cove NSW 2066

Principal:

Job No:

LABTECOV00268AA

Project:

GEOTLCOV23462AA

Lot No:

TRN:



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Approved Signatory Macstell Webster (Laboratory Manager) NATA Accredited Laboratory Number: 431 Date of Issue 22/04/2008

Sample Details

Product:

Source:

Location:

SAN Hospital, Wahroonga

Client Ref:

CBH 14

Date Sampled: 7/04/2008

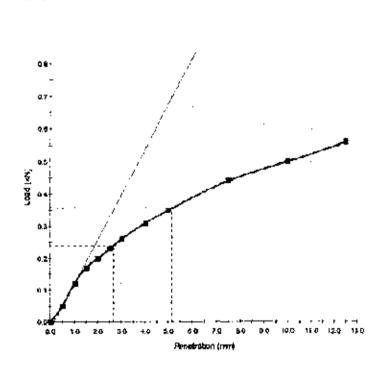
Sampling Method:

Sample ID:

LCOV08S-01182

| Test Results | |
|---|---------------|
| Description | Result |
| Test Method | AS 1289.6.1.1 |
| Maximum Dry Density (Vm²) | 1.690 |
| Optimum Moisture Content (%) | 20.0 |
| CBR 2.5mm (%) | 2.0 |
| CBR 5.0mm (%) | 2.0 |
| Preparation | Spaked |
| Initial Moisture Content (%) | 22.3 |
| Achieved Dry Density (Vm²) | 1.656 |
| Ackleved Moisture Content (%) | 22.3 |
| Swell (%) | 0.0 |
| Moisture After Penetration (%) | 22.3 |
| Period of Soaking (days) | 4 |
| Moisture Content of Top 30mm (%) | 23.2 |
| Moisture of Penetrated End (%) | |
| Compaction Type | |
| Surcharge Mass (kg) | 4.50 |
| Laboratory Moisture Ratio After Compaction (%) | 117 |
| Laboratory Density Ratio After Compaction (%) | 98 |
| Oversize Material Excluded | YE\$ |
| Percent Oversize Excluded | |

Chart



CBR (%): 2.0

Rate of Penetration

Comments

Form No. 10234,V1 00

Depth of sample = 0.25 - 1.0m

coffey geotechnics SPECIALISTS MANAGING THE EARTH

Lane Cove West, Sydney Laboratory

Goffey Geotechnius, Pty Ltd. A9N 93 056 929 483 8/12 Maris Repail Lane Cove West NSW 2066

Telephone; +61 2 9911 1000 Facsimile +81 2 9911 1002

California Bearing Ratio

Client: Coffey Geotechnics Pty Ltd.

8/12 Mars Road

Lane Cover NSW 2066

Principal:

Job No: LABTI COV00268AA

Project: GEOTLCOV23462AA

Lot No:

TRN:

Report No: CBR:LCOV08S-01183

Issue No: 1

This report replaces all previous assues or report no ICBFr/LCOV085-01163".

They document is resulted in accordance with NATAs accreditation requirements recordified for compliance with 130AEC 17025.

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Approved Signatory Marshall Webster (Leboratory Menager)

NATA Accredited Laboratory Number: 431 Cate of 'ssue: 22/04/2008

Sample Details

Product: Source:

Location:

SAN Hospita', Wahroonga

Client Ref:

CBH 10

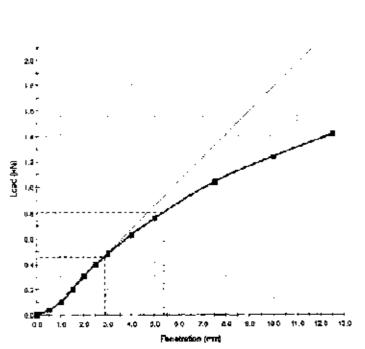
Date Sampled: Sampling Mathod: Sample ID:

7/04/2008

LCOV08S-01183

Test Results Description Result Test Method AS 1289.6 1.1 Maximum Dry Density (t/m³). 1.900 Optimum Mo sture Content (%) 11.4 3.5 CBR 2.5mm (%) CBR 5.0mm (%) 4.0 Soaked **Preparation** Inhial Moisture Content (%) 15.2 1.846 Achieved Dry Donsity (Vm³) 15.2 Achieved Moisture Content (%) 0.0 Swell (%) 15.7 Moisture After Penetration (%) Period of Soaking (days).

Chart Moisture Content of Top 30mm (%) 16.2 4.50 133 97 YES 3.6



CBR (%): 4.0

Rate of Penetration

Comments

Depth of sample = 0.3 - 0.6m

Moisture of Penetrated End (%)

Laboratory Moisture Ratio After

Laboratory Density Ratio After

Oversize Material Excluded

Percent Oversize Excluded

Compaction Type

Compaction (%)

Compaction (%)

Surcharge Mass (kg):

coffey geotechnics JEULEUIIIUS ABN 93 056 929 489 BPECIALISTS MANAGING THE EARTH Care Cove West NSW 2066

Coffey Geatechnics Phy Ltd

Lane Cove West, Sydney Laboratory

Telephone: +61 2 9911 1000 Facsimile: +61 2 9911 1002

California Bearing Ratio

Citent: Coffey Geotechnics Pty Ltd

8/12 Mars Road

Lane Cove NSW 2066

Principal:

Jeb No: LABTLCOV0026BAA

Project:

GEOTLCOV23462AA

Lot No:

TRN:

Result

1.930

11.9

10.0

10.0

11.5 1.935

11.5

0.0 11.9

4

14.1

4.50

97

100

YES

0.0

Soaked

AS 1289.6.1.1

Report No: CBR:LCQV08S-01184

This report replaces of provious issues of report no "CORLCOVORG-91104".

MORED RECORMING ACCRECY FATTON

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Approved Signatory: Marshall Webster

(Laboratory Manager) NATA Accordited Enhantery Nomber 431 Dale of Icaue: 22/04/2008

Sample Details

Product:

Source:

Location:

SAN Hospital, Wahroongs

Cilent Ref:

Test Results Description

CBR 2.5mm (%)

CBR 5.0mm (%)

Compaction Type

Compaction (%)

Compaction (%)

Surcharge Mass (kg)

Preparation

Swell (%)

Maximum Dry Density (t/m²)

Initial Moisture Content (%)

Achieved Dry Density (Um²)

Achieved Moisture Content (%)

Moisture After Penetration (%) Period of Soaking (days)

Moisture of Penetrated End (%)

Laboratory Moisture Ratio After

Laboratory Density Ratio After

Oversize Material i xcluded

Percent Oversize Excluded

Moisture Content of Top 30mm (%)

Optimum Moisture Content (%)

Fest Method

CBH 7

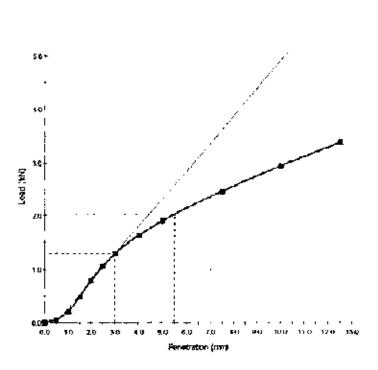
Date Sampled: 7/04/2008

Sampling Method:

Sample ID:

1 COV085-01184

| _ | | - |
|---|----|---|
| | па | ı |
| - | | |



CBR (%): 10.0

Rate of Penetration

Comments

Depth of sample = 0.25 - 1.0m

coffey geotechnics SPECIALISTS MANAGING THE EARTH

Lane Cove West, Sydney Laboratory

Coffey Geotechnics Pty Ltd ABN 93 056 929 483 8/12 Mar's Road Lane Cove West NSW 2068

Telephone: +61 2 9811 1000 Farsimile: +61 2 9911 1002

California Bearing Ratio

Client:

Coffey Geofechnics Ply I ld

8/12 Mars Road

Lane Cove NSW 2066

Principal:

Job No:

LABTLCOV00268AA

Project:

GEOTLCOV23162AA

Lot No:

TRN:

Report No: CBR:LCOV08S-01185

Issue No. 1

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Approved Signatory: Marshall Webster (Lubinetury Manages) NATA Accredited Laboratory Number: 431 Date of Issue 22/04/2008

Sample Details

Product:

Source:

Location:

SAN Hospital, Wahroonga

Client Ref:

CBH 18

Sampling Method:

Samplé ID:

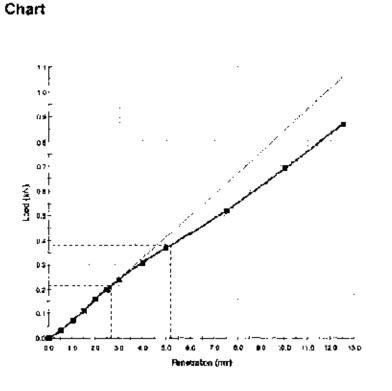
Date Sampled:

LCOV088-01185

7/04/2008

| Ollent Iten. | CBITTO | |
|------------------|-------------------|----------------|
| Test Resul | lts | |
| Description | | Result |
| lest Method | | A\$ 1289.6.1.1 |
| Maximum Dry | Density (t/m²) | 1.B1 0 |
| Optimum Mois | sture Content (%) | 15.8 |
| GBR 2.5mm (| %) | 1.5 |
| ÇBR 5.0mm (| %) | 2.0 |
| Preparation | | Soaked |
| Initial Moisture | Content (%) | 16.7 |
| Achieved Dry | Density (t/m³) | 1.794 |
| Achieved Mols | sture Content (%) | 16.7 |
| Swell (%) | | 0.0 |
| Moisture Atter | Penetration (%) | 16.7 |
| Period of Soal | king (days) | 4 |
| | | |

| reat method | AS 1200.0.1.1 |
|---|---------------|
| Maximum Dry Density (v/m²) | 1.B1 0 |
| Optimum Moisture Content (%) | 15.8 |
| GBR 2.5mm (%) | 1.5 |
| ÇBR 5.0mm (%) | 2.0 |
| Preparation | Soaked |
| Initial Moisture Content (%) | 16.7 |
| Achieved Dry Density (t/m³) | 1.794 |
| Achieved Moisture Content (%) | 16.7 |
| Swell (%) | 0.0 |
| Moisture After Penetration (%) | 16.7 |
| Period of Soaking (days) | 4 |
| Moisture Content of Top 30mm (%) | 19.6 |
| Mosture of Penetrated End (%) | |
| Compaction Type | |
| Surchargo Mass (kg) | 4.50 |
| Laboratory Moisture Ratio After Compaction (%) | 106 |
| Laboratory Density Ratio After Compaction (%) | 99 |
| Oversize Material Excluded | YES |
| Percent Oversize Excluded | 0.0 |
| | |



CBR (%): 2.0

Rate of Penetration

Comments

Depth of sample = 0.2 - 1.0m



2 April 2008

TEST REPORT

Coffey Environments Pty Ltd

8/12 Mars Road LANE COVE WEST NSW 2066

Your Reference:

GL23462AA

Report Number:

59760

Attention:

Richard Moyle

Dear Richard

The following samples were received from you on the date indicated.

Samples:

Qty.

7 Soils

Date of Receipt of Samples:

26/03/08

Date of Receipt of Instructions:

26/03/08

Date Preliminary Report Emailed:

Not Issued

These samples were analysed in accordance with your written instructions.

A copy of the instructions is attached with the analytical report.

The results and associated quality control are contained in the following pages of this report. Unless otherwise stated, solid samples are expressed on a dry weight basis (moisture has

been supplied for your information only), air and liquid samples as received.

Should you have any quenes regarding this report please contact the undersigned.

Yours faithfully

SGS ENVIRONMENTAL SERVICES

Senior Organic Chemist

Edward Ibrahim

Laboratory Services Manager

Tweed mehin.

won_ep recognists BCC **REDITATION**

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Page 1 of 7

PROJECT: GL23462AA REPORT NO: 59760

| Inorganics | | | | | | |
|----------------------------------|--|------------|-------------|-------------|----------------|------------------|
| Our Reference: | UNITS | 59780-1 | 59760-2 | 59760-3 | 59760-4 | 597 60- 6 |
| Your Reference | : | CBH16 | CBH13 | ÇBH15 | C 8 H12 | CBH8 |
| Sample Type | | Soil | . Sail | Soil | Scil | Soit. |
| (Depth | 1 | 0.3-0.5 | i 0,7-1.0 | 0,25-1.0 | 0.2-0.3 | 0.3-0.4 |
| Date Sampled | _i | 19/03/2008 | 18/03/2008 | 18/03/2008 | 17/03/2008 | 13/03/2008 |
| Date Extracted (pH) | | 27/03/2008 | 27/03/2008 | 27/03/2008 | 27/03/2008 | 27/03/2008 |
| Date Analysed (pH) | - | 27/03/2008 | 27/03/2008 | 27/03/2008 | 27/03/2008 | 27/03/2008 |
| pH 1:5 solt:water 1:5 soit:water | pH Units | 7.7 | 4.7 | 8.1 | 5.5 | 7.6 |

| pH 1:5 soil:water 1.5 soil:water | pH Units | 80 |
|----------------------------------|----------|------------|
| Date Analysed (pH) | | 2//03/2008 |
| Date Extracted (pH) | | 27/03/2008 |
| Date Sampled | | 10/03/2006 |
| Deptr | i | 0.1-0.6 |
| Sample Type | : | Soil |
| Your Reference | | CBH1 |
| Our Reference: | UNITS | 59760-7 |
| Inorganics | ' | |

PROJECT: GL23462AA REPORT NO: 59760

| Araions in soil | 1 | | - | | | |
|-----------------------------|---------------|-----------------------|-----------------------|------------------------|-----------------------|-----------------------|
| Our Reference: | UNITS | 59760 1 | 59760-2 | 59760-3 | 59760-4 | 59760-6 |
| Your Reference | ***** | C8H16 | CBH13 | C9H15 | : C8H12 | CSH8 |
| Sample Type | | Soli | Son | Soil | Sod | Soil |
| Depth Date Sampled | | 0 3-0.5 19/03/2008 | 0.7-1.0 18/03/2008 | 0.25-1.0 18/03/2008 | 0.2-0.3 17/03/2008 | 0.3-0.4 13/03/2008 |
| Date Extracted | - | 31.03.08 | 31/09/2008 | 31/03/2008 | 31/03/2008 | 31/03/2008 |
| Date Analysed | | 02.04.08 | 31/03/2008 | 31/03/2008 | 31/03/2008 | 31/03/2008 |
| Chlonde, Cl 1:5 soutwater | mg/xg | 6.2 | 290 | 6.7 | 17 | 2.0 |
| Sulphate, SQ4 1:5 soitwater | mg/vg | 33 | 46 | 33 | 78 | 39 |

| Anions in soil | | |
|------------------------------|--------------|------------|
| Our Reference: | UNITS | 59760-7 |
| Your Reference | | , ÇBH1 |
| Sample Type | , | Soul |
| Depth | ļ | 0.1-0.6 |
| Date Sampled | - | 16/03/2008 |
| Date Extracted | | 31/03/2008 |
| Date Analysed | _ · · · | 31/03/2008 |
| Chloride, Cl 1:5 soil:water | mg/kg | 6.4 |
| Sulphate, 504 1:5 soil water | mg/kg | 38 |

PROJECT: GL23462AA REPORT NO: 59760

| Moisture _ | % | 1 10 | 10 | 10 | 11 | 7 - |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Date Analysed (moisture) | | 27/03/2008 | 27/03/2008 | 27/03/2008 | 27/03/2008 | 27/03/2008 |
| Date Sampled | | 19/03/2008 | 18/03/2008 | 18/03/2008 | 17/03/2008 | 13/03/2008 |
| Depth | | 0.3-0.5 | 0.7-1.0 | 0.25-1.0 | 0.2-0.3 | 0.3-0.4 |
| Sample Type | l | Spit | i Soil | 801 | Sol | , Soil |
| Your Reference | ********** | C8H16 | C8H13 | CBH15 | CaH12 | CBH8 |
| Qur Reference: | i UNITS | 59769-1 | 59780-2 | 59760-3 | 59760-4 | 59760-6 |
| Moisture | | T | | i | | |

| Moisters | 1 | |
|--------------------------|--|-----------------------|
| Our Reference: | UNITS | 59760-7 |
| Your Reference | |) CSH1 |
| Sample Type | 1 | j Seif |
| Oepth Oate Sampled | 1 | 0,1-0,8 10/03/2008 |
| Oate Analysed (moisture) | - - | 27/03/2008 |
| Moisture | | 1/ |



REPORT NO: 59760 PROJECT: GL23462AA

| Method 1D | Methodology Summary |
|-----------|---|
| AN101 | рН - Measured using ipH meter and electrode in accordance with APHA 20th ED, 4500-Н+. |
| SEE-038 | Anions - a range of Anions are determined by Ion Chromatography, in accordance with IAPHA 20th ED. 4130-8. |
| AH002 | Preparation of soits, sediments and skudges undergo analysis by either air drying, compositing, subsampling and 1:5 soil water extraction where required. Moisture content is determined by drying the sample at 105 + 5°C. |

PROJECT: GL23462AA

Date Extracted

Date Analysed

Chloride, C/ 1:5

retewilyda

Moisture

REPORT NO: 59760 QUALITY CONTROL Ouplicate UNITS LOR METHOD Ouplicate Blank Şm# Inorganics Base + Duplicate + WRPO Date Extracted (pfl) [TM] 59760-1 27/03/2008 II 27/03/2008 27/03/2008 [Date Analysed (pH) (NT) 59760-1 27/03/2008 pH 1:5 soiftwater 1:5 gH Units | 0 AN101 (NT) 59760-1 77||77||RPD:0 soil:water QUALITY CONTROL UNITS LOR METHDO Black Duplicate Spike Sm# Matrix Spike % Duplicate Sm# Recovery Base + Duplicate + Anlons in soil Duplicate → %RPD %RPD

31/03/0

31/03/0

<0.5

[NT]

SEI-038

AN002

59760-1

59760-1

59760-1

69760 **1**

31.03.08 | 31.03.08

02.04.08 || 02.04.08

62 | 60 | RPD: 3

33 JJ 28 JF RPD: 16

31/03/08%

31/03/08%

103%

101%

LĊŚ

LÇS

LCS

LCS

| Sulphate, SO4 1:5 soil:water | mg/kg | 1 2 | SEI-038 | <2 |
|--|-------|-----|---------|-------|
| OUALITY CONTROL Hold sample NO test required | UNITS | LOR | METHOD | Blank |
| Sample on HOLD | | | | (NT) |
| OUATITY CONTROL Moisture | UNITS | LOR | METHOD | Blank |
| Date Analysed (moisture) | | | | [NT] |

Mg/kg

0.5



PROJECT: GL23462AA REPORT NO: 59760

Result Codes

|INS| : Insufficient Sample for this test (RPD) : Rolative Percentage Difference | INR] . Not Requested : Not part of NATA Accorditation

[NT] Not tested (N/A) Not Applicable

Report Comments

Date Organics extraction commenced. N/A NATA Corporate Accreditation No. 2562, Site No. 4354.

Note: Test results are not corrected for recovery (excluding Dioxins/Furans* and PAH in XAO and PLF).

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.egs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of kebility, indomnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not expresse to a transaction from exercising all their rights and obligations under the transaction documents.

Quality Control Protocol

Method Blank: An analyte free matrix to which all reagents are added in the same volume or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. A method blank is prepared every 20 samples.

Duplicate: A separate perbon of a sample being analysed that is treated the same as the other samples in the batch. One duplicate is processed at least every 10 samples.

Surrogate Spike: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. Surrogates are added to samples before extraction to monitor extraction efficiency and percent recovery in each sample.

Internal Standard: Added to all samples requiring analysis for organics (where relevant) or metals by ICP after the extraction/digestion process; the compounds/elements serve to give a standard of retention time and/or response, which is invariant from run-to-run with the instruments.

Laboratory Control Sample. A known matrix spiked with compound(s) representative of the target analytes. It is used to document laboratory performance. When the results of the matrix spike analysis indicates a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix.

Matrix Spike: An aliquot of sample spiked with a known concentration of target analyte(s). The apiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Quality Acceptance Criteria

Unless otherwise specified in the test method, the following general acceptance criteria apply:

Method Blanks: <LOR

Duplicates: <5 x LOR: No RPD criteria applied.

>5 x LOR: 0-39% RPD is accepted.

(ICS's: Determined by Control Charls.

Where control charts have not been developed, the Matrix Spikes criteria apply.

Matrix Spikes: 70-130% recovery is accepted for metals / inorganics.

60-140% is accepted for organics.

Surrogates. 60-130% recovery is accepted for BTEX.

70-130% recovery is accepted for other organics.

