Moreton Bay Regional Council
Acid Sulfate Soils —
Toorbul, Meldale and Donnybrook Areas

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Table of Contents

List of Figures

List of Tables

List of Appendices

Summary

In 2000, approximately 4000 ha of acid sulfate soils (ASS) was identified on relatively undisturbed land in the Moreton Bay Regional Council area, southeast Queensland (Smith *et al.* 2000), based on broad scale 1:100 000 maps. Increased development pressure on Moreton Bay Regional Council has resulted in the need for more precise data to guide the Council's processes to be consistent with the *State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils,* and *Integrated Planning Act 1997.*

In 2006, Moreton Bay Regional Council focused on the identification of ASS in priority areas along the Council's coastal zone. The project aim was to develop maps based on medium resolution (1:50 000) ASS sampling undertaken by the Department of Natural Resources and Water (NRW). This report focuses on the acid sulfate soil investigations of three parcels of land encompassing the areas of Toorbul (92 ha), Meldale (73 ha) and Donnybrook (65 ha).

43 borehole sample sites were examined across the three areas. Landscape complexity resulted in the need for more boreholes in the Toorbul and Meldale areas. This meant that these two areas could be mapped at 1:25000 scale. Borehole depths throughout the three study areas ranged from 1.1m to 8.5m with all soil profiles described according to McDonald *et al*. (1990). Field pH tests were carried out at 0.25m intervals according to the *Sampling Guidelines* (Ahern *et al*. 2004). A total of 521 samples were collected, with 243 of those submitted for laboratory analysis using the Suspension Peroxide Oxidation Combined Acidity and Sulfur (SPOCAS) method (Ahern *et al*. 2004) and/or the Chromium Reducible Sulfur (S_{CR}) method (Sullivan *et al*. 2004). All laboratory analyses were carried out in accordance with the *Acid Sulfate Soils Laboratory Methods Guidelines* (Ahern *et al*. 2004).

This assessment detected potential acid sulfate soils (PASS) within each of the three areas. Depth to PASS ranged from 0.3m to greater than 5m, with a maximum of 3.78%S recorded at Site CAB 222, 1.0-1.2m (as measured by the SPOCAS and or Chromium Reducible Sulfur methods). Actual acid sulfate soil (AASS) layers were recorded in one borehole (Site CAB 229), however 5 boreholes were found to have strongly acidic layers present. Minimal natural buffering agents (i.e. shells) were observed in the boreholes described.

These results indicate the need for caution in planning and managing developments in the Toorbul, Meldale and Donnybrook areas so as to avoid costly damage to the environment and local infrastructure. Additional investigations will be required prior to construction or excavation to satisfy the recommendations of the *Sampling Guidelines* (Ahern *et al*. 2004).

1 Introduction

In recent years, increasing development pressures, particularly in coastal areas of southeast Queensland, have resulted in the need for more detailed information about acid sulfate soils. In 2006 a jointly funded project between the Moreton Bay Regional Council and the Department of Natural Resources and Water led to the commencement of medium intensity (1:50 000) acid sulfate soil mapping in low lying areas of Moreton Bay Region i.e. below 5 m Australian Height Datum (AHD). Three general areas were identified by Council representatives (Beachmere, the southern end of Bribie Island and the Toorbul–Meldale–Donnybrook area).

This report details the acid sulfate soil sampling and mapping undertaken by the Department of Natural Resources and Water in the areas of Toorbul, Meldale and Donnybrook (Figure 1). Due to the close proximity of the areas and the relatively small size of each, the three have been combined into the one report and map. The aim of this medium intensity work was to identify the presence, depth and net acidity of acid sulfate soils and present the results as a map along with an accompanying report. This information will enable better management of ASS throughout the study areas.

2 Overview of acid sulfate soils

Acid sulfate soil (ASS) is the name given to naturally occurring sediments (sands, silts, or clays) that commonly occur in low-lying, very poorly drained, coastal land at elevations less than 5 m AHD. These sediments contain sulfides – primarily iron sulfides or pyrite (FeS_2). Excavating soil or sediment, extracting groundwater or filling land may cause disturbance of ASS, resulting in the oxidation of sulfides and the subsequent production of sulfuric acid. This can have major environmental, health, and engineering impacts.

Disturbed land can release acid, aluminium, iron and heavy metals into drainage waters affecting aquatic plants and animals. Concrete and steel infrastructure including pipes, foundations and bridges are susceptible to acidic corrosion leading to accelerated structural failure (Ahern *et al.* 1998, Powell and Martens 2005). Other potential impacts include deoxygenation of waterways (Bush *et al*, 2004) or the movement of iron from ASS areas resulting in the possible stimulation of blooms of cyanobacteria such as *Lyngbya majuscula*, also known as fireweed (Ahern *et al*, 2007).

In an undisturbed, waterlogged state ASS may range from dark grey silty clays to grey sands and peat with pH values close to neutral (6.5–7.5). In this state they are termed potential acid sulfate soils (PASS) because they have the potential to oxidise and produce sulfuric acid. When ASS are exposed to air, the sulfides oxidise and sulfuric acid is produced (for example: one tonne of iron sulfides can produce about 1.5 tonnes of sulfuric acid when oxidised). In this state they are known as actual acid sulfate soils (AASS). AASS are very acidic (pH <4), and often contain a straw yellow-coloured mineral called jarosite. The term ASS includes both AASS and PASS. AASS and PASS are often found in the same soil profile, with AASS generally overlying PASS, as surface layers are more likely to be exposed to oxidation.

In general the sediments in which ASS form were laid down during periods of high sea level, slightly higher than those we know today. These high sea levels (which correlate with interglacial periods) have occurred twice in the last 150 000 years. Although it is generally recognised that the majority of ASS occur in sediments deposited in the last 10 000 years (Holocene epoch), it is useful to look further back in time to gain a better understanding of their deposition. The key features are (i) the limits of sea level inundation and (ii) the conditions for sediment deposition in these areas. These are explored below.

During the previous interglacial period within the Pleistocene epoch (120 000 to 140 000 years B.P), evidence suggests that sea levels rose several metres higher than present (Pickett *et al* 1985). This caused the drowning of river valleys and low lying coastal areas. In general, shorelines and floodplains were pushed many kilometres west and estuaries similar to those of today were formed. After this high, sea level receded and then fluctuated between 80 m and 140 m below present (Hekel and Day 1976). During this time, rivers and creeks cut deep channels through the previously deposited fluvial and estuarine sediments, removing some and isolating others.

The most recent sea level rise (post glacial marine transgression) commenced approximately 18000 -19 000 years ago. At the start of this change, sea level was estimated to be 140m lower than present with the

shoreline up to 40 kilometres east of where it is today (Jones 1992). At the commencement of the Holocene (10 000 years ago), sea level was approximately 25m below present and still rising (Thom 1981) with present sea level being reached around 6500 years ago (Thom and Roy 1985). There is evidence to suggest that minor rises of up to 1.5 metres occurred along the southern Queensland coast sometime after this, with sea level returning to its present position around 4000 years ago (Lang et al 1998).

The rapid rate of sea level rise during the Holocene exceeded the rates of coastal deposition and thus valleys and low lying coastal areas were drowned just as they were during the Pleistocene. Once sea level rise stabilised (termed still stand), coastal deposition processes were able to commence filling the newly formed estuaries (Graham and Larsen 1999). The depth of sediment deposited depended on the size of the local river system and the depth of down-cutting that occurred during the Pleistocene low sea level periods.

3 Survey area

The Toorbul–Meldale–Donnybrook ASS study area occupies 231 ha (Figure 2). As each of the individual study areas of Toorbul (92.6 ha), Meldale (72.4 ha) and Donnybrook (65.2 ha) are relatively small, the results have been combined into a single report and map. The boundary of each of the study areas can be seen in Figure 2.

3.1 Toorbul.

Geological mapping by Cranfield *et al.* (1986) (Figure 3) shows the Toorbul study area to be characterised by an island of slightly elevated (2-3m) coastal plains comprised of undifferentiated Holocene sands and muds (Qh*c*). These are surrounded by lower areas of tidal flats (Qh*ct*) and swampy basins (Qh*cw*) (Figure 2) (Cranfield *et al.* 1986). Hodgkinson *et al*. (2007) identified these unconfined sedimentary deposits in the Toorbul area to be from 6m to 24m thick, and unconformably overlay highly weathered, largely impermeable, sandstone bedrock (Landborough Sandstone). Hodgkinson *et al.* (2007) also identified a paleochannel that crossed from east to west in the north of the Toorbul study area.

The Toorbul study area is dominated by residential housing with some larger areas of cleared land. Remnant vegetation comprises mainly *Eucalyptus*, *Corymbia*, *Melaleuca* and *Casuarina* species. Mangrove species characterise the intertidal zone, while the supratidal zone is dominated by halophytic chenopods (eg *Suaeda australis*), sedges, rushes and grasses (eg *Sporobolis virginicus*).

3.2 Meldale.

The Meldale study area is composed of low-lying undifferentiated alluvial and coastal plains of both Holocene and Pleistocene age. Elevated areas (2-5m) of Pleistocene beach ridge deposits also occur to the south of Elimbah Creek (Figure 3)(Cranfield *et al.* 1986). Vegetation is dominated by *Eucalyptus*, *Corymbia*, *Melaleuca* and *Casuarina* species in the elevated areas, mangrove species characterise the intertidal zone, while the supratidal zone is dominated by sedges, rushes and grasses. Land use in the area consists of both rural and residential development.

3.3 Donnybrook.

The low-lying parts of the Donnybrook study area are composed of Holocene age undifferentiated coastal plains of sand and mud (Qh*c*), and swampy basins (Qh*cw*), however the elevated areas (9-10m) at the southern end of the study area are formed on Landsborough Sandstone (Jl) (Figure 3)(Cranfield *et al.* 1986). Ezzy *et al.* (2002) intercepted sandstone bedrock at various depths ranging from the surface at Donnybrook to approximately 23m on the Meldale plain. A paleochannel identified by Hodgkinson *et al*. (2007) within the Toorbul study area also appears to have been intercepted by Ezzy *et al.* (2002), approximately midway between Bullock Creek and Elimbah Creek (Figure 4).

Local vegetation is dominated by *Eucalyptus* and *Corymbia* species in the more elevated areas with *Melaleuca* and *Casuarina* species in the lower areas. Mangrove species fringe the estuarine areas adjacent to Pumicestone Passage. The primary land use of the Donnybrook study area is a combination of urban and rural residential.

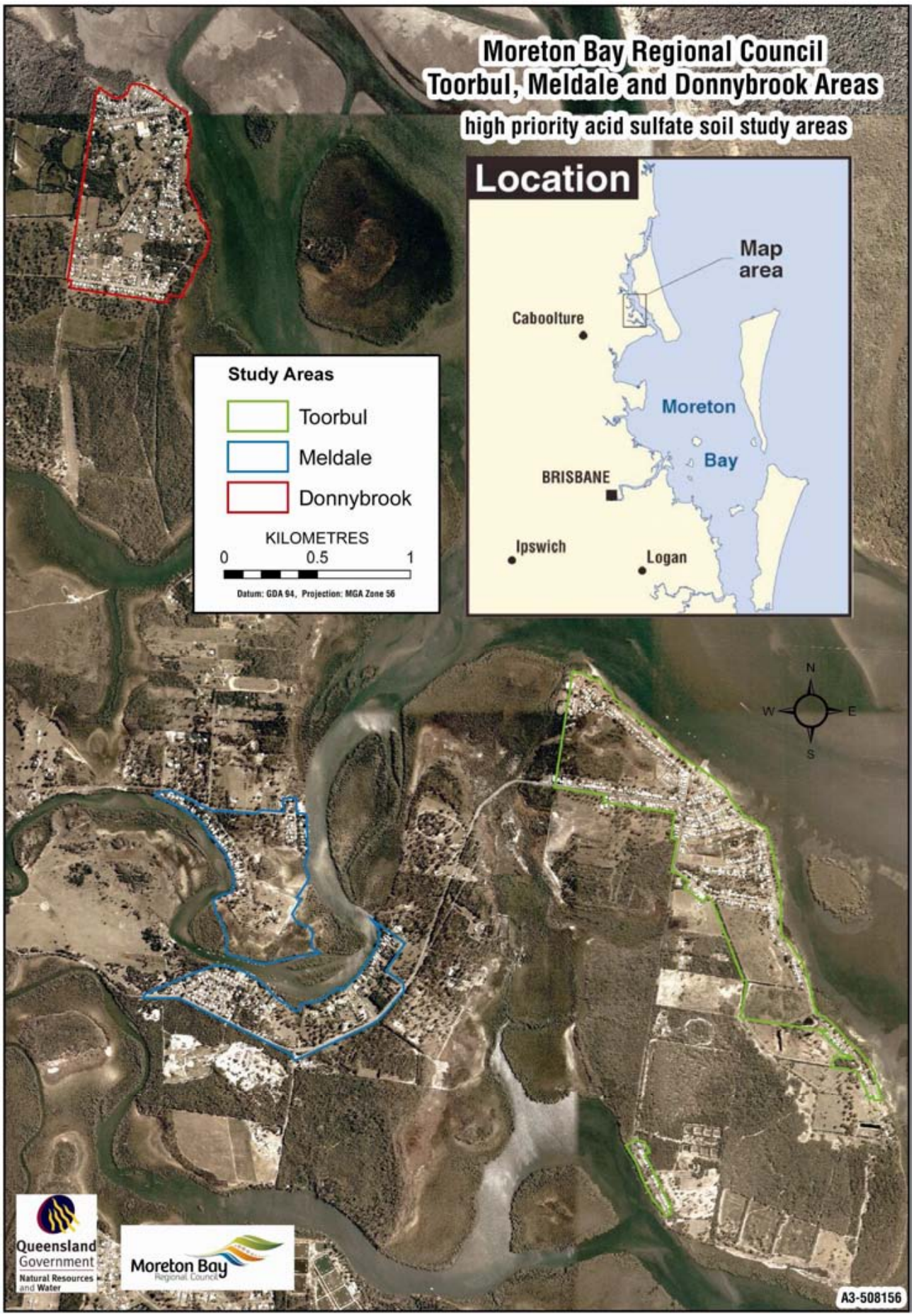

Figure 2 Toorbul–Meldale–Donnybrook acid sulfate soil study area

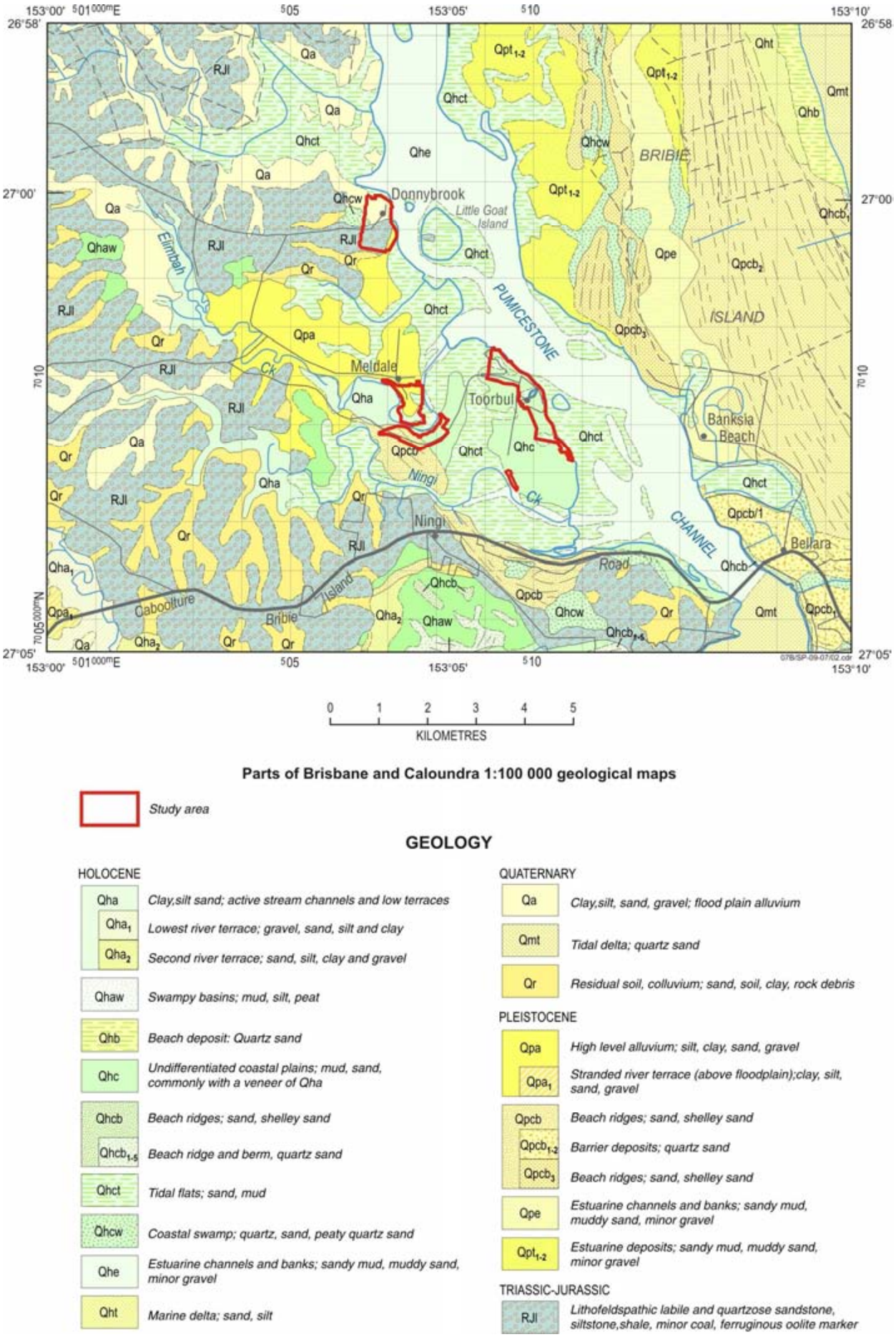

Figure 3 Geology map covering the study area. (after Cranfield *et al.* 1986)

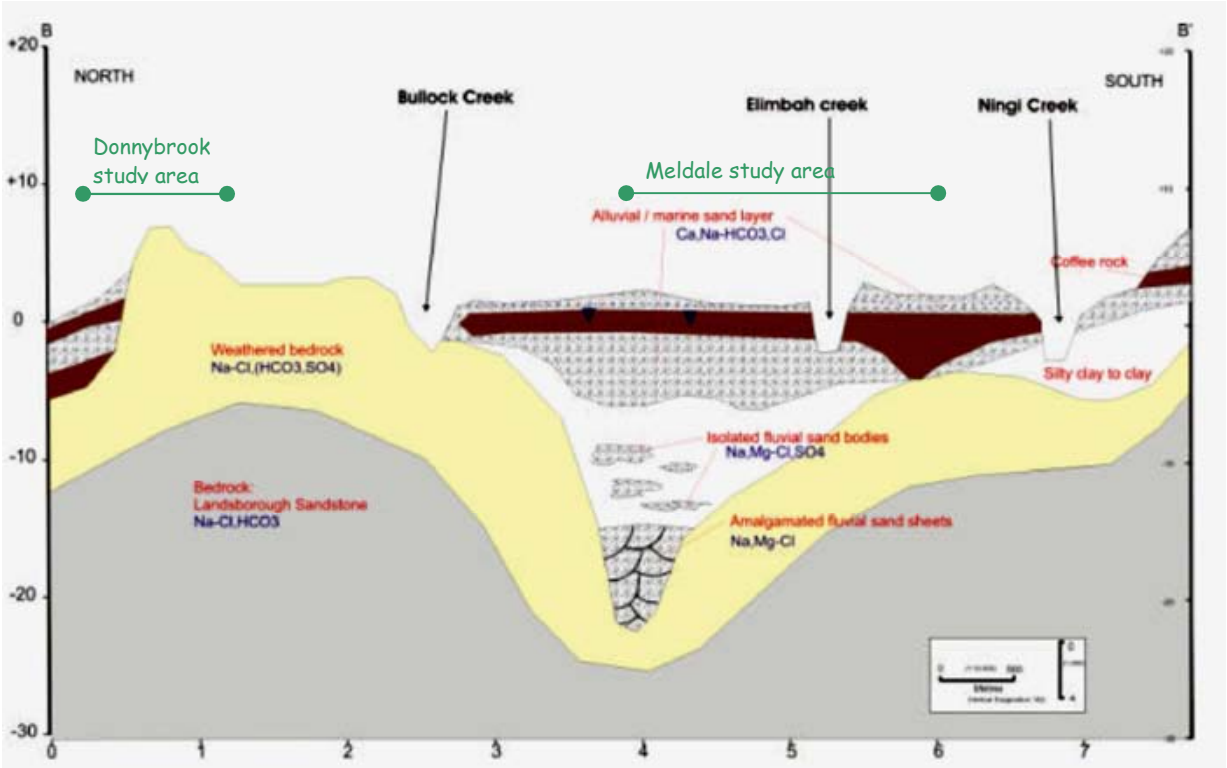

Figure 4 North-south cross-sectional area showing the approximate locations of the Donnybrook-Meldale study areas and the various layers of alluvial deposits, the sandstone basement and the paleochannel midway between Bullock and Elimbah Creeks(from Ezzy *et al.* 2002)

4 Methodology

Prior to the commencement of field work, aerial photographs, geological maps and elevation data were reviewed and used to determine possible borehole locations. During the following field work phase, 43 boreholes were completed. Borehole depth ranged from 1.1m to 8.5m, with borehole depth being determined by factors such as ground surface elevation relative to sea level, soil conditions and depth to ASS and non sulfidic basement materials. In all, 521 soil samples were collected and stored with 243 of these samples submitted for laboratory analysis.

4.1 Sampling equipment

The majority of boreholes were completed using a Geoprobe® model 6610DT coring machine. The Geoprobe (Figure 5) is a track-mounted machine that obtains a 38mm soil core in 1.5m long removable clear PVC liners. The samples were logged immediately after retrieval. Other sampling equipment used included Dormer brand gouge augers and soil augers (Figure 5).

Figure 5 Geoprobe model 6610DT coring machine

Figure 6 Dormer gouge auger (left) and hand augers (right)

4.2 Soil profile recording and sampling

All profiles were described according to the methodology of McDonald *et al.* (1990) and classified by the Australian Soil Classification (Isbell, 1996). Soil properties described included horizon depth, colour, mottles, texture, segregations and coarse fragments (eg. shell). Soil pH was recorded with an electronic meter at 0.25m intervals down the profile at all sites, firstly in a soil : water paste (pH_F), and secondly after oxidation with 30% hydrogen peroxide (pH_{FOX}). The level of effervescence produced during the pH_{FOX} test was also recorded.

Profiles were sampled for laboratory analysis according to the *Sampling Guidelines* (Ahern *et al*. 1998) at the following intervals (except where these crossed horizon boundaries): 0–0.1m, 0.2–0.3m, 0.5–0.6m, 0.8–1.0m and then at intervals of 0.5m. Samples of approximately 500 grams were placed in sealed plastic bags and refrigerated immediately. Upon returning to the laboratory, all samples were air-dried at 80°C and fine-ground to 0.5mm. Due to budget restrictions, not all of these soil samples were submitted for laboratory analysis—with sample selection based on field pH test results and soil morphological descriptions. The remaining soil samples have been kept for long term storage in the event that further analysis is required.

4.3 Database recording

All field and laboratory data was entered into the Soil and Land Information (SALI) database, designed specifically for land resource surveys conducted by the Department of Natural Resources and Water. Terminology and codes in SALI are fully compliant with the *Australian Soil and Land Survey Field Handbook* (McDonald *et al.* 1990).

4.4 Laboratory analysis

4.4.1 Chromium Reducible Sulfur (S_{CR})

The Chromium Reducible Sulfur (S_{CR}) method (Method 22B) is described by Sullivan *et al*. (2004). This method measures reduced inorganic sulfur compounds including pyrite (and other iron disulfides), acid volatile sulfides (AVS) and elemental sulfur. The method can be made specific to the iron disulfide fraction with appropriate pre-treatments to remove AVS and elemental sulfur fractions. The Chromium Reducible Sulfur method is the preferred method for low analysis sands and for highly organic or peaty soil because of its specificity to reduced inorganic sulfur, while not determining organic sulfur. The method does not measure existing acidity. A total of 204 samples were analysed using this method.

4.4.2 Suspension Peroxide Oxidation Combined Acidity and Sulfur method (SPOCAS)

The Suspension Peroxide Oxidation Combined Acidity and Sulfur (SPOCAS) method (Method 23) is described by Ahern *et al*. (2004). This method measures both the 'acid trail' and the 'sulfur trail' providing data on pH, retained acidity (S_{RAS}), actual acidity (TAA) and potential acidity (S_{POS}, TPA). The method also provides a measure of neutralising capacity (Ca_A, Mg_A). A total of 13 samples were analysed using this method.

4.4.3 Peroxide Residual Acid Soluble Sulfur (S_{RAS})

The Peroxide Residual Acid Soluble Sulfur (S_{RAS}) method (Method 23R) is described by Ahern *et al*. (2004). After peroxide digest and TPA titration the soil residue may contain insoluble sulfur (eg. in jarosite or similar relatively insoluble iron and aluminium hydroxy sulfate compounds) which was either present initially in the soil or formed during peroxide oxidation. This sulfur represents a store of retained acidity (not measured in the TPA titration) that may be estimated after overnight (16 hrs) 4M HCl extraction of the washed soil residue. On soil where the presence of jarosite is suspected (eg. if pH_{KCl} <4.5 or jarosite has been noted in accompanying field sampling notes), it is strongly recommended that residue analysis for sulfur is performed.

4.4.4 Determination of PASS or AASS

The determination of which horizons constitute an actual acid sulfate soil (AASS) or potential acid sulfate soil (PASS) was based on an assessment of field morphological properties (eg. texture, soil colour, mottles and coarse fragments such as shell), field pH test results and laboratory results. The texture-based action criteria of Ahern *et al*. (1998) were used to identify ASS based on laboratory results. The action criteria are based on soil texture and the sum of existing acidity plus potential acidity less any neutralising capacity (ie.

net acidity) (Table 1). PASS were assessed using S_{CR} and S_{POS} analytical results. If these values met or exceeded the action criteria, the soil was deemed as PASS. AASS were determined by the presence of jarosite, TAA results as well as field pH (pH_F) and/or laboratory (pH_{KCl}) values of 4 or less. Neutralising capacity was assessed using a combination of ANC_E, Ca_A, Mg_A, TPA, ANC_{BT} and pH results.
Analytical results are displayed in **Appendix 2** with net acidity values shown in moles of hydrogen (H^+) per tonne. For simplicity, %S figures have been used throughout the report and have been calculated by dividing the Moles of H^+ per tonne by 623.7.

Table 1 Texture based action criteria (after Ahern *et al.* 1998)

Soil Texture (clay content %)	Equivalent sulfur (%S)	Equivalent acidity (moles H^+/tonne soil)
Sands to loamy sands (≤ 5)	0.03	18
Loams to light clays (5–40)	0.06	36
Medium to heavy clays (≥ 40)	0.1	62

4.5 Description of soil map units

The mapping process is a way of presenting complex 3-dimensional data in a 2-dimensional format, so that it can be input to management decisions. At 1:50 000 scale, it is broadly possible to identify areas of high hazard. The map units identify areas delineated by:

- The depth of soil at which actual or potential acidity is first encountered; "A" refers to an actual acid sulfate soil layer (pH ≤4), "a" refers to strongly acidic soil layer (pH between 4 and 5), while "S" refers to a potential acid sulfate soil layer. The numeric component of the map code refers to the depth at which these layers occur [0 = (0 to 0.5 m), 1 = (>0.5 to 1.0 m), 2 = (>1 to 2 m), 3 = (>2 to 3 m), 4 = (>3 to 4 m), 5 = (>4 to 5 m)];
- The codes can be used separately (eg. A0, S0, S1); but where a map unit contains both AASS and PASS layers then the codes are combined (eg. A0S0, A0S1);
- Where major disturbance such as that from development has taken place the suffix $_{DL}$ is used.
- Where an area is likely to have ASS but access is restricted the suffix $_{LA}$ is used.

5 Map units of the study areas

The special acid sulfate soils map (Attachment 1) displays the map units identified in the study area.

Table 2 shows the area of individual mapping units within each of the three mapping areas – Toorbul, Meldale and Donnybrook.

Table 2 Areas of individual map units with each of the three mapping areas

Map Unit	Toorbul (ha)	Meldale (ha)	Donnybrook (ha)	Total area of map unit	% of total area mapped
A0S3	-	-	5	5	2.2
S0	16.5	16	-	32.5	14.1
S1	2.8	6.5	-	9.3	4
S2	26.1	20.3	-	46.4	20.1
S3	13.5	-	6.4	19.9	8.6
S4	30.8	-	-	30.8	13.3
S5	2.9	30.6	10.5	44	19
LP	-	-	15.8	15.8	6.8
LP5	-	-	27.5	27.5	11.9
TOTAL	**92.6**	**73.4**	**65.2**	**231.2**	**100**

5.1 Toorbul Mapping Area

The Toorbul mapping area covered 92.6 ha with 16 boreholes undertaken. Acid sulfate soils were identified at various depths ranging from less than 0.5m to 5m. Sulfidic materials ranged from sands to loams and silty clays with maximum oxidisable sulfur levels up to **0.33% S** for sands**, 0.33% S** for loams and **0.85% S** for clays. One site (**CAB 222**), located just outside the council delineated Toorbul mapping, returned **3.8% S** in silty clay at 1.0-1.2m depth. This result highlights the variability that exists in these landscapes.

5.1.1 S0 – Land with PASS within 0.5m of the soil surface

16.5 ha of S0 land was identified in the Toorbul area with 6 boreholes undertaken (**CAB 206, 207, 209, 212, 213 and 218**). All units were associated with supratidal flats, extratidal flats and drainage lines. Elevations were estimated to be <1m, with vegetation dominated by mangrove species, seablite and samphire in lower areas and marine couch (*Sporobolis virginicus*) and C*asuarina glauca*. Sulfide levels measured across the unit were up to 0.28% S for sands; 0.05% S for loams and 0.85% S for clays. Due to wetness, sampling could only take place using gouge or hand augers.

CAB 206 (Figure 7) was classified as a Sulfidic Supratidal Hydrosol and was sampled to a depth of 2.0m. The soil profile consisted of a sulfidic (0.08% S) dark, fibric clay loam surface to 0.15m (Figure 8) over mottled brownish-grey, sulfidic (0.12% S), sandy light clay to 0.7m over sulfidic (0.28% S) dark brown loamy sands to 1.5m over mottled yellowish-brown sandy light clay to 1.6m (Figure 9) and brown loamy sand to 2.0m.

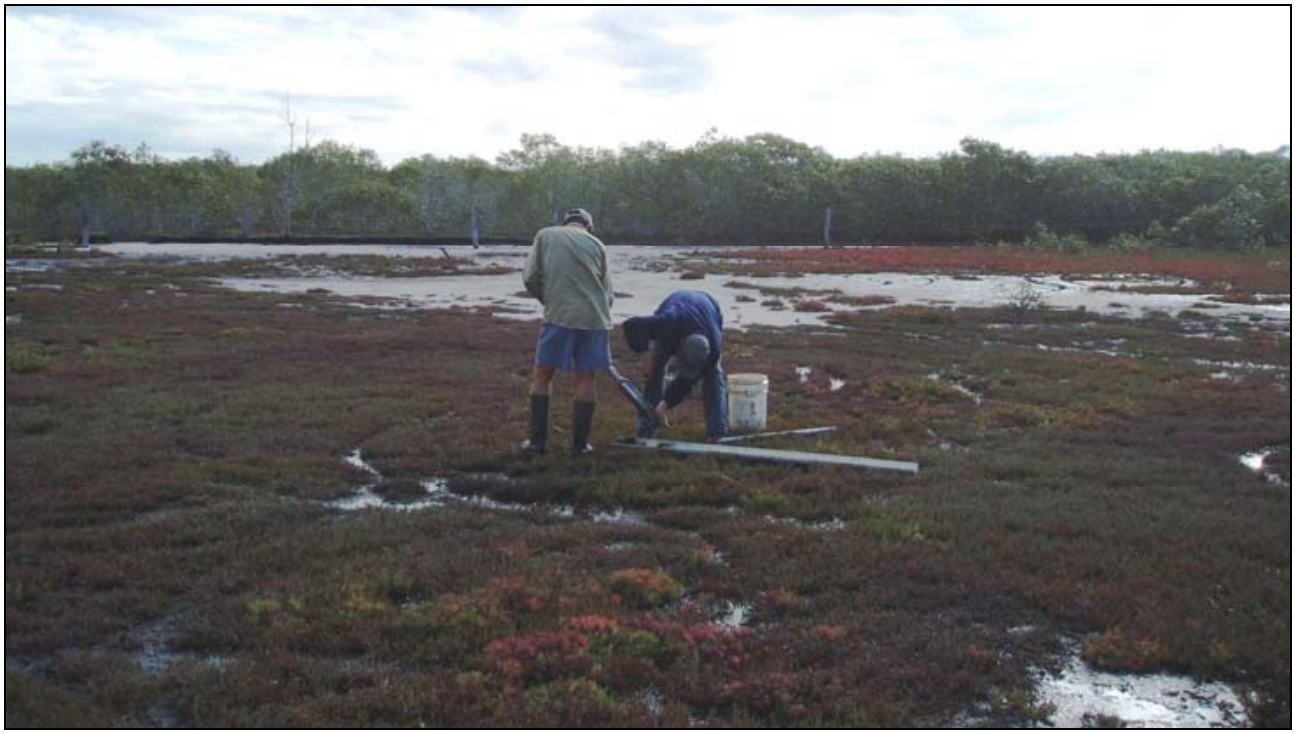

Figure 7 CAB 206 location on a supratidal flat at Toorbul

Figure 8 Section of core from CAB 206 showing sulfidic (0.08% S) dark grey surface horizon.

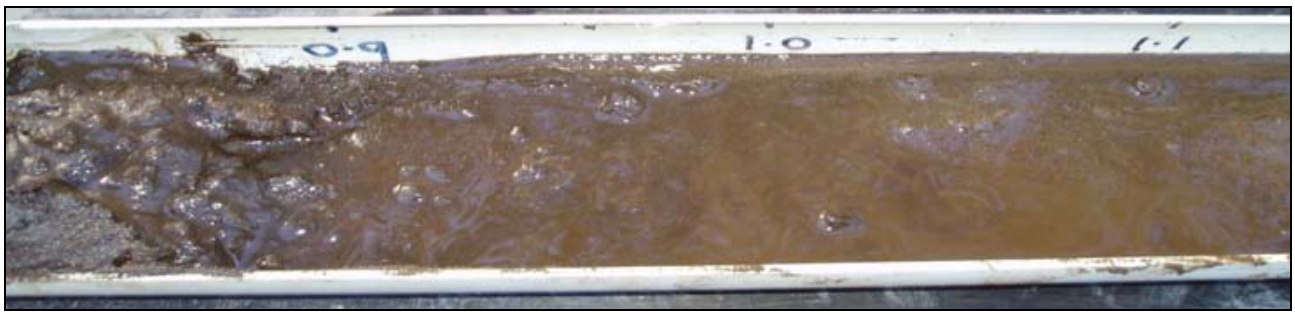

Figure 9 CAB 206 showing brown sulfidic loamy sands with up to 0.28% S.

CAB 213 was located on a slightly more elevated extratidal marine plain (Figure 10) vegetated with marine couch (*Sporobolis virginicus*) and *Casuarina glauca.* The soil profile was sampled to 6m and consisted of a dark fine sandy clay surface to 0.1m over mottled grey clay to 0.45m over sulfidic (0.04% S) pale sand to 0.7m over sulfidic (0.05% S) dark and brown indurated loamy sands to 3.0m over sulfidic (up to 0.12% S) grey/brown sands to 6m (Figure 11).

Figure 10 CAB 213 location

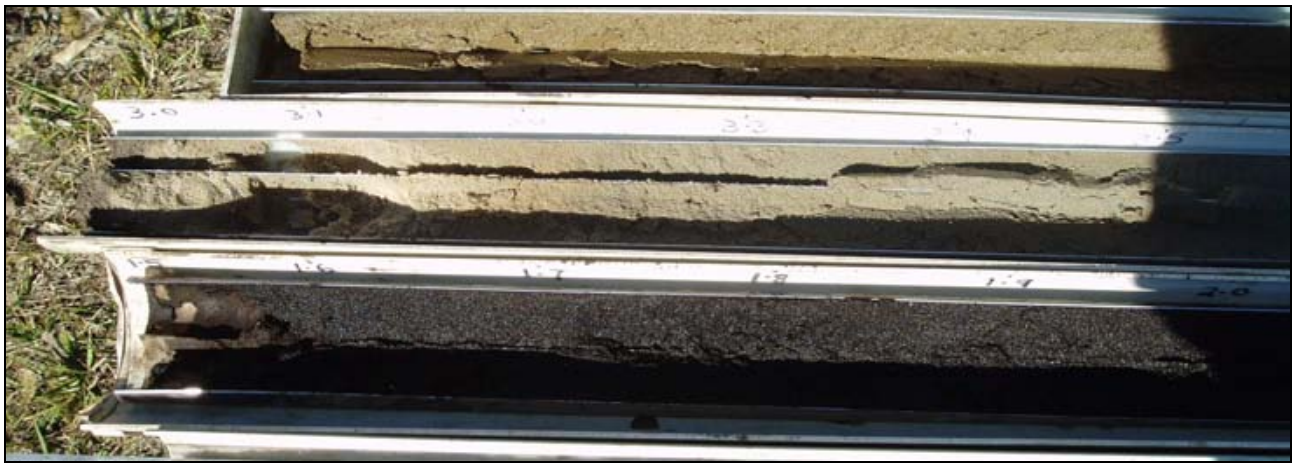

Figure 11 CAB 213 profile section

5.1.2 S1 – Land with PASS between 0.5m and 1.0m of the soil surface

One small S1 unit totalling 2.8 ha was identified in the Toorbul study area. This unit consists of a disturbed beach foredune with elevations of approximately 1.0m. **CAB 208** was sampled in a council park adjacent to Pumicestone Passage (Figure 12). The soil described here was classified as a Sulfidic Oxyaquic Hydrosol. The profile (Figure 13) was comprised of a grey sandy surface to 0.4m over a white sandy subsurface to 0.9m over sulfidic grey sandy clay loams and grey loamy sand with up to 0.31% S to 1.6m and sulfidic (0.05% S) indurated black loamy sand to 2.7m. Below this mottled brownish-grey and grey sand with up to 0.33% S extended to 5.6m.

Figure 12 CAB 208 location

Figure 13 CAB 208 soil profile

5.1.3 S2 – Land with PASS between 1m and 2m of the soil surface

One S2 unit totalling approximately 26.1 ha was mapped in the Toorbul study area. The unit is located on a slightly elevated (1-2m) coastal plain with vegetation commonly paper barked tea tree (*Melaleuca quinquenervia)* and Blue gum (*Eucalyptus tereticornis)*. The unit stretches from the north to the south of the study area, parallel to the coast line and following some lower drainage sections. Two boreholes were located in the unit – **CAB 211** and **CAB 214**.

CAB 214 (Figure 14) was located on a property midway between Delisser Avenue and Willmer Road in Toorbul. The soil profile was classified as a Grey Dermosol over an Humic Aquic Podosol and displayed a dark sandy clay loam surface to 0.3m over mottled grey-brown sandy light clay to 0.5m over yellow brown loamy sands to 1.8m. Dark brown indurated loamy sands with up to 0.05%S extended to 8.5m (Figure 15).

Figure 14 CAB 214 location

Figure 15 Section of soil core from site CAB 214 showing sulfidic (0.05 %S) dark humic horizon

CAB 211 was located in a vacant block adjacent to Toorbul Esplanade, opposite the boat ramp (Figure 16). The site had little native vegetation remaining apart from some *Eucalyptus* regrowth and a few *Casuarina*

glauca trees. The soil profile was classified as a Humic Aquic Podosol with dark sandy clay loam to 0.3m (fill material), over black clay loam to 0.5m over orange mottled grey brown light medium clay to 1.1m over grey sandy light clay to 1.4m. Sulfidic (0.32% S) brown sandy loam and sulfidic (0.18% S) indurated dark brown sandy loam continued to 1.8m (Figure 17). Layers of white sand and grey-brown loamy sands with no measurable sulfides occurred to 3.8m. Another sulfidic layer (0.42% S) of grey loamy sand was then encountered to 4.5m.

Figure 16 CAB 211 location on a vacant house block opposite the boat ramp at Toorbul

Figure 17 Section of soil core from CAB 211 showing a sulfidic (0.18% S) horizon between 1.6 and 1.8m

5.1.4 S3 – Land with PASS between 2 and 3m of the soil surface

Two S3 units totalling 13.5 ha were mapped at Toorbul with elevations between 1.5-2m. Vegetation was comprised of *Eucalyptus, Corymbia, Melaleuca* and *Acacia* species. Two boreholes were undertaken – **CAB 216** and **CAB 217**.

CAB 216 was located at the southern end of the Toorbul study area, adjacent Pumicestone Passage (Figure 18). The profile (Figure 19) was classified as a Humic Aquic Podosol with grey loamy sand and sand surface horizons to 0.9m over mottled white sands to 1.3m over mottled grey-brown loamy sands to 1.5m, and black loamy sands to 2.2m. Grey, brown and black sulfidic loamy sand with up to 0.1% S were encountered between 2.2 and 5.3m.

Figure 18 CAB 216 location at the southern end of the Toorbul study area

Figure 19 Section of soil core CAB 216 showing sulfidic horizon (0.1% S at 2.2-2.4m)

5.1.5 S4 – Land with PASS between 3 and 4m of the soil surface

One S4 unit of 30.8 ha with elevations of around 2-3m was mapped in the Toorbul area. Three boreholes – **CAB 210**, **CAB 215** and **CAB 221** were undertaken.

CAB 210 was located on the northern side of Pumicestone Road, with vegetation dominated by *Melaleuca quinquenervia* and *Eucalyptus tereticornis* (Figure 20). The soil profile was classified as a Humic Aquic Podosol and consisted of a dark sandy light clay surface to 0.1m over grey light medium clay to 0.4m over mottled light grey and dark loamy sands to 3.1m. Sulfidic layers of grey-brown sandy clay loam with up to 0.2% S (Figure 21), then extended to 4.3m and overlayed sulfidic (0.14% S) olive grey sands to 7.5m.

Figure 20 CAB 210 location on the northern side of Pumicestone Road, Toorbul

Figure 21 Section of the soil core CAB 210 showing sulfidic (0.2 % S) saturated brown sandy clay loam

CAB 221 was situated on a vacant block on the south side of Pumicestone road, Toorbul (Figure 22). The soil profile was classified as a Grey Dermosol over a Humic Aquic Podosol and consisted of a dark clay

loam surface to 0.2m over mottled dark grey light medium clay to 0.5 m. Mottled white, grey and black loamy sands continued to 3.1m. Sulfidic (0.2% S @ 3.8-4.0m) brown and grey-brown sandy clay loam and grey sands with up to 0.14% S extended to 7.5m (Figure 23).

Figure 22 CAB 221 location

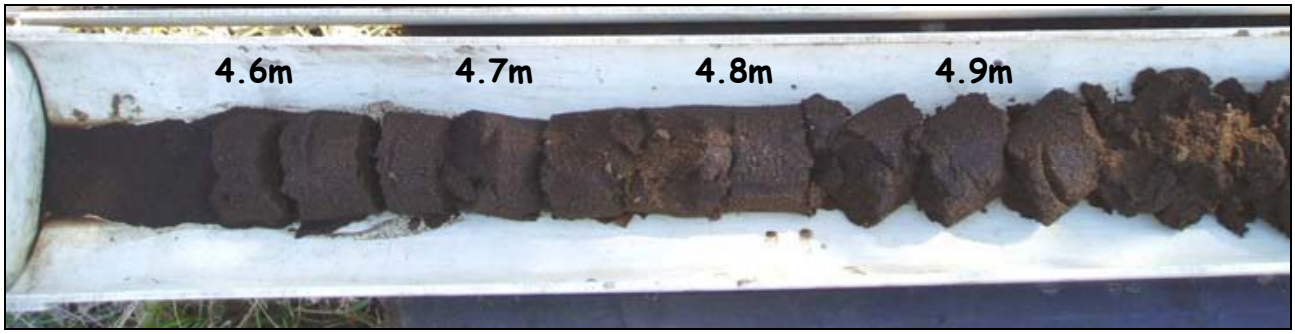

Figure 23 Section of soil core CAB 221 showing sulfidic brown organic horizon with 0.03% S

5.1.6 S5 – Land with PASS between 4 and 5m of the soil surface

One S5 unit of 2.9 ha was identified in the Toorbul area. Elevations were generally >2m. The unit was formed on Holocene coastal plain deposits (Cranfield *et al.* 1986).

CAB 219 (Figure 24) was situated in the small S5 unit on the north bank of Ningi Creek with vegetation dominated by *Callitris*, *Corymbia* and *Eucalypt* species. The soil was classified as an Orthic Tenosol over a Humic Aquic Podosol with a grey sand surface to 0.2m over mottled brown sand to 0.6m over mottled pale brown sand to 1.7m over black and dark grey and brown loamy sands to 4.9m. Sulfidic sands with up to 0.16% S were encountered between 4.9m and 6.0m (Figure 25).

Figure 24 CAB 219 located on the north bank of Ningi Creek

Figure 25 Section of soil core CAB 219 which contained 0.16% S.

5.2 Meldale Mapping Area

The Meldale mapping area covered 73.4 ha with 19 boreholes undertaken. Depth to PASS ranged from less than 0.5m to 5m. Whilst no actual acid sulfate soils (AASS) were identified, some profiles exhibited low pH values between pH 4 and pH 5. Maximum oxidisable sulfur levels were up to **0.77% S** for sands, **1.4% S** for loams and **2.4% S** for clays.

5.2.1 S0 – Land with PASS within 0.5m of the soil surface

Two S0 map units totalling 16 ha were mapped in the Meldale study area associated with supratidal flats, extratidal flats and drainage lines. Elevations were estimated to be <1m, with vegetation dominated by mangrove species, seablite, samphire and marine couch (*Sporobolis virginicus*). Five boreholes (**CAB 192**, **193**, **195**, **196** and **200**) were undertaken in these units however, due to wetness, profiles were sampled with gouge augers or hand augers.

The soil described at site **CAB 200** (Figure 26) was classified as a Sulfidic Extratidal Hydrosol and was sampled to a depth of 2.0m. The soil profile consisted of mottled, grey-brown light clay surface, over sulfidic (0.21% S) grey brown sandy light medium clays to 0.6m (Figure 27), over dark grey clay loam to 0.9m and sulfidic (up to 0.33% S) grey loamy sands to 2.0m.

Figure 26 CAB 200 location on an extratidal flat at Meldale

Figure 27 Section of auger sample CAB 200 showing sulfidic (0.21% S) grey sandy clay and clay loams

CAB 192 was sampled on the fringe of a supratidal zone using a gouge auger (Figure 28). Vegetation was dominated by samphire species. The profile consisted of grey brown sandy clay loam to 0.1m over mottled grey sandy clay to 0.5m over sulfidic dark grey clays with up to 2.4% S (Figure 29).

Figure 28 CAB 192 site location

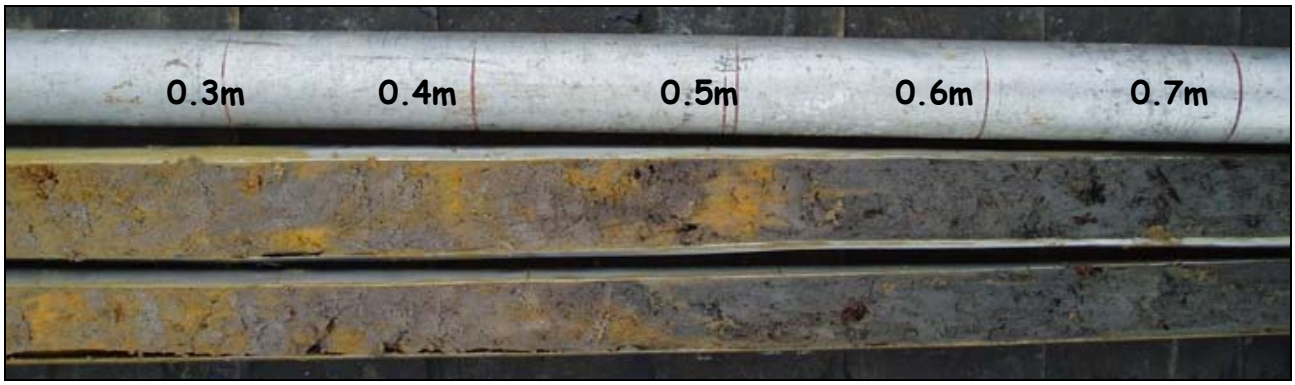

Figure 29 CAB 192 profile section showing mottled grey clays over silty clay PASS with 2.4% S**.**

5.2.2 S1 – Land with PASS between 0.5 m and 1.0 m of the soil surface

One S1 unit of 6.5 ha was mapped in the Meldale area (Figure 30). The unit is situated on slightly elevated Pleistocene alluvium dominated by *Casuarina* and *Melaleuca* vegetation species. **CAB 198** was sampled to 6.0m and displayed dark sandy clay loam to 0.3 m over pale grey sand to 0.6m over sulfidic (0.29% S) grey loamy sands to 2.6m (Figure 30) over sulfidic (0.6% S) grey sandy clay to 3.3m over sulfidic (0.06% S) grey loamy sands and sands to 6.0m.

Figure 30 CAB 198 location

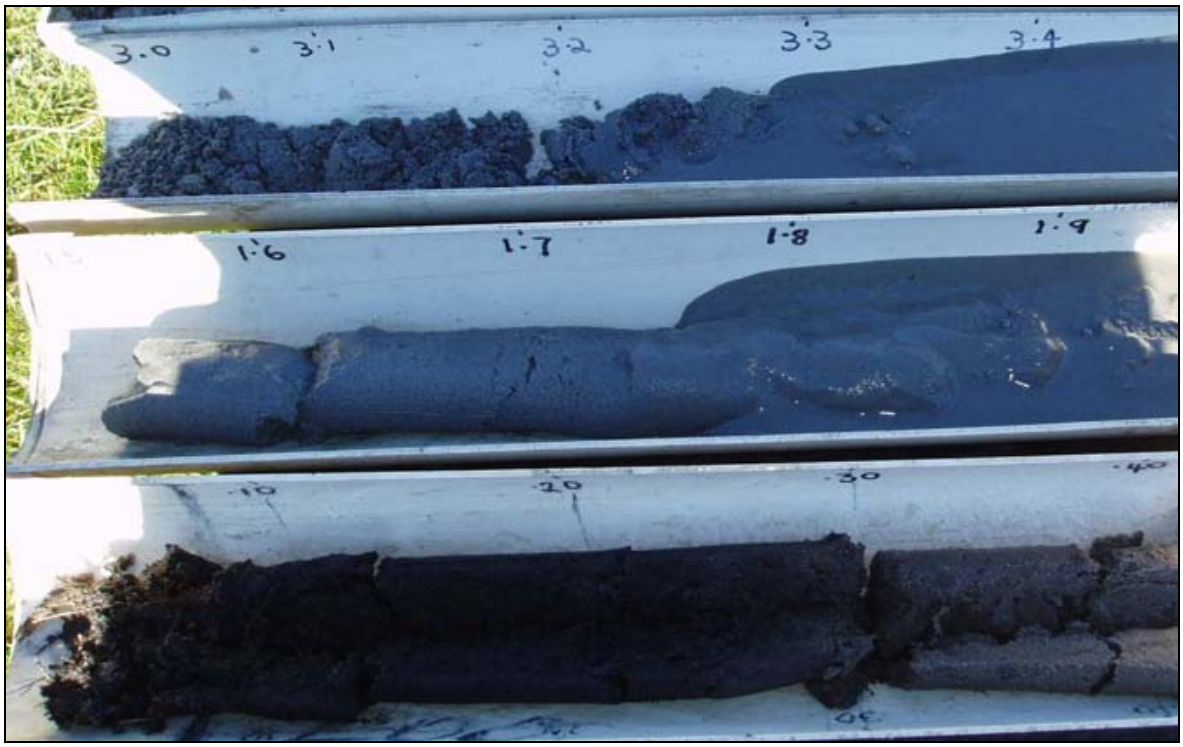

Figure 31 CAB 198 profile section showing sulfidic grey loamy sands and sandy clays

5.2.3 S2 – Land with PASS between 1.0 m and 2.0 m of the soil surface

A single S2 unit of 20.3 ha was identified adjacent to Toorbul Road in the southern section of the Meldale study area. Seven boreholes were undertaken in this unit - **CAB 190, 202 204, 205, 223, 224** and **225.**

CAB 204 (Figure 32) was sampled to 3.8m. The soil was classified as a Tenosolic Oxyaquic Hydrosol over a Sulfidic Oxyaquic Hydrosol. The soil profile consisted of a black light clay surface to 0.25m over strongly acidic (pH 4.8 @ 0.8m,) mottled grey light medium clays to 1.05m (Figure 33) over brown coarse sandy clay loams to 1.9m. Sulfidic dark loamy coarse sands with up to 0.13% S continued to 2.8m and overlayed grey and white light medium clays to 3.8m.

Figure 32 CAB 204 located amongst *Melaleuca quinquenervia* and *Lophostemon suaveolens* vegetation

Figure 33 Section of soil core CAB 204 showing mottled grey horizon with pH 4.8-4.9

CAB 224 was situated on a former pine tree (*pinus elliottii*) plantation however the trees have been subsequently removed upon the purchase of the property by the current owner (Figure 34). The soil was classified as a Grey Kurosol overlying an Oxyaquic Hydrosol with a dark sandy clay loam surface to 0.3m over grey brown sandy clay to 0.7m over yellow-brown sand to 1.7m. The soil material below 1.7m appeared to be the result of marine deposition and consisted of sulfidic (0.4% S) grey loamy sand to 2.3m (Figure 35), over sulfidic (0.7% S) grey sandy clay to 2.5m, over grey sands to 3.6m over sulfidic (1.2% S) grey silty clay to 6.0m. Field tests indicated strongly acid conditions (pH 4.3-5.0) from 1.7m to 3.25m depth and this was confirmed with laboratory results showing TAA equivalent to 0.04% S at 1.8-2.0m.

Figure 34 CAB 224 location

Figure 35 Section of soil core from CAB 224 showing sulfidic grey loamy sands with 0.43 %S

CAB 225 was located in the southern area of the Meldale study area adjacent to Perry Road. Apart from introduced species, native vegetation consisted predominantly of Blue gum (*Eucalyptus tereticornis*), Carbeen (*Corymbia tesselaris)* and Swamp mahogany (*Lophostemon suaveolens)*. The soil was classified as a Grey Kurosol over a Sulfidic Oxyaquic Hydrosol with the soil profile (Figure 37) consisting of dark grey sandy clay loam to 0.3m over mottled grey brown sandy clay to 0.7m over strongly acidic mottled grey sandy clay loam to 1.7m over sulfidic (2.11% S) dark grey silty clay to 2.25m over sulfidic (0.96% S) grey clay to 3.9m and sulfidic (0.09% S) grey sands to 6.0m. Rotted organic material was encountered between 1.7m and 3.9m.

Figure 36 Site CAB 225 located in the front yard of No.37 Perry Road

Figure 37 Section of soil core from CAB 225 showing sulfidic (2.11% S) grey silty clays

5.2.4 S5 – Land with PASS between 4.0m and 5.0m of the soil surface

Two S5 units totalling 30.6 ha were identified in the Meldale area formed on Pleistocene aged alluvium (Cranfield *et al.* 1986) and beach ridge deposits with elevations around 2m AHD. Four boreholes were undertaken in the mapping units - **CAB 189**, **191**, **201** and **203**. Depth to PASS varied from 4.2 to 5.2m however map unit boundaries were determined using a conservative approach (shallowest depth) and all were subsequently classified as S5.

CAB 201 (Figure 38) was located in the northern part of the Meldale study area with vegetation dominated by *Corymbia* and *Eucalypt* species. The soil described at this site was classified as a Spolic Anthroposol over a Humic/Sesquic Semiaquic Podosol with dark grey sandy clay loam to 0.2m over mottled sandy light medium clay subsurface to 0.4m. From 0.4m to 4.2m there were various thin (0.2m) layers of sand and loamy sands ranging in colour from pale to grey and dark brown. Sulfidic grey loamy sands with up to 0.13% S extended to 5.1m and overlayed sulfidic grey sands with up to 0.56% S. (Figure 39).

Figure 38 CAB 201 location adjacent to the corner of Meldale Road and Duke Street, Meldale

Figure 39 Section of soil core CAB 201 showing sulfidic (0.13%S) grey loamy sands

5.3 Donnybrook Mapping Area

65.2 ha of land was mapped in the Donnybrook area with 6 boreholes undertaken. Of the 65.2 ha mapped, 5 ha of AASS and 60.2 ha of PASS were identified at depths ranging from less than 0.5m to 5m. Maximum oxidisable sulfur levels were up to **0.09% S** for sands, **1.17% S** for loams and **1.91% S** for clays.

5.3.1 A0S3 – AASS within 0.5m of the soil surface and PASS commencing between 2 and 3m of the soil surface.

One A0S3 map unit of 5 ha was mapped on the north edge of the Donnybrook study area. This unit coincides with the low lying coastal plain identified by Cranfield *et al.* (1986), and represents the lowest land sampled in the Donnybrook area (<2m). Vegetation is dominated by *Corymbia* and *Melaleuca* species with mangroves on the northern edge (Figure 40).

Figure 40 CAB 229 location

CAB 229 was identified as a Sulfuric Oxyaquic Hydrosol and was sampled to a depth of 6.0m. The soil profile consisted of dark clay loam to 0.3m over pale grey sulfuric (equivalent to 0.25% S, pH 3.9) clays with jarosite mottling to 0.75m (Figure 41). Sulfidic clays and sands with up to 0.05% S, continued to 6.0m.

Figure 41 Surface section of CAB 229 showing grey clay AASS with jarosite mottling with 0.24% S

5.3.2 S3 –land with PASS commencing between 2 and 3m of the soil surface.

One S3 unit covering 6.3 ha was mapped at Donnybrook with elevations generally in the order of 2 to 3m. **CAB 228** (Figure 42) was located in at the lowest part of the bike park off Alice Street in Donnybrook between 2 and 3m elevation. Vegetation was dominated by *Melaleuca quinquenervia*, *Casuarina glauca* and *Eucalyptus* species. The soil was sampled to 4.4m and was classified as a Humic Aquic Podosol. The soil profile consisted of sandy clay loam surface to 0.4m over white sand to 1.0m over black and grey sandy clay loams and clay loams and loamy sands to 2.7m. Sulfidic (0.07% S) grey-brown loamy sands were encountered to 3.3m (Figure 43) over sulfidic (0.03% S) grey sand to 4.0m and sulfidic (0.94% S) dark grey silty light clay to 4.4m (depth of sampling) (Figure 44).

Figure 42 Site CAB 228 was located at the lower end of the bike park in Donnybrook (Alice Street)

Figure 43 Section of core CAB 228 showing sulfidic (0.07% S) grey-brown loamy sand

Figure 44 Sulfidic (0.94% S) grey silty clay horizon between 4.0m and 4.4m

5.3.3 S5 – Land with PASS between 4.0m and 5.0m of the soil surface

One S5 unit covering 10.5 ha was mapped in the Donnybrook area with three boreholes undertaken – **CAB 230**, **231** and **232**. **CAB 230** was located in a densely vegetated *Melaleuca* wetland with elevations between 2 and 3m (Figure 45) and was sampled to 5.8m. The soil profile was classified as an Oxyaquic Hydrosol with dark clay surface to 0.4m over dark sandy clay loams to 0.8m over grey loamy sands to 1.3m over white sands to 1.75m (Figure 46) over pale sandy clays 3m. Between 3m and 4.1m dark silty clays, typical of marine muds occurred, however whilst field pH results indicated the presence of sulfides, laboratory results showed levels were below quantification. Sulfidic sands (0.04% S) did however occur between 4.1 and 4.9m and overlayed dense pale grey residual clays.

Figure 45 CAB 230 location

Figure 46 Section of soil profile from CAB 230

5.3.4 LP and LP5 – Land with low probability of ASS occurrence and land predominantly >5m AHD

These units encompass the elevated section of the Donnybrook study area (approximately 43 ha). The soils in this unit are formed from Landsborough Sandstone (Cranfield *et al.* 1986) and are generally >3m AHD (Figure 47). Two sites were located in the LP unit (**CAB 226** and **CAB 227)** and both were without acid sulfate soil material.

Figure 47 CAB 227 location formed from Landsborough Sandstone

The soils were generally classified as Grey Kurosols with pH acidic to strongly acidic throughout (between pH 6.7-4.6). The profile described at **CAB 227** consisted of a dark coloured sandy clay loam surface horizon to 0.4m, overlying a pale coloured sandy clay loam subsurface to 0.6m, over red and grey mottled sandy light medium clay subsoil to 1.5m (Figure 48).

Figure 48 Section of soil core CAB 227 showing mottled clay subsoil from weathered sandstone

6 Results and Discussion

This survey has identified that acid sulfate soils, both actual and potential, exist at varying depths throughout the study area. Landscape complexity particularly in the Toorbul and Meldale areas meant that more boreholes were needed to the map unit boundaries. This resulted in a final mapping scale in these two areas of approximately 1:25 000 whilst the Donnybrook area was within the proposed 1:50 000 scale mapping.

The major geological units in the study area are;

- Holocene aged undifferentiated coastal plains, swampy basins, tidal flats and stream deposits,
- Pleistocene aged beach ridge formations and high level alluvium, and
- Landsborough Sandstone (Triassic-Jurassic).

The shallowest occurring (<0.5m) acid sulfate soil material was identified in the Holocene aged deposits, with the ASS in the Pleistocene aged deposits generally ≥5m. No acid sulfate soil material was identified in the soils formed on Landsborough Sandstone. Table 3 gives a summary of all boreholes undertaken throughout the Toorbul, Meldale and Donnybrook areas.

The soils of the Toorbul area were predominantly low lying Holocene aged coastal plains and tidal flats, and this in combination with the low elevation results in acid sulfate soil material occurring at 4m or less from the soil surface. Sulfidic materials ranged from sands to loams and silty clays with maximum oxidisable sulfur levels ranging from 0.04 to 0.33% S in sands, 0.06 to 0.33% S for loams and 0.1 to 0.85% S for clays.

The soils of the Meldale area were formed from Holocene aged coastal deposits, Pleistocene aged beach ridges and high level alluvium. Acid sulfate soil material was identified within 2m of the surface in the Holocene deposits, while acid sulfate soil material was considerably deeper (generally 4-5m) in the Pleistocene deposits. Acid sulfate soils with strongly acidic layers (between pH 4 and 5) appeared to be associated with areas of significant prior disturbance (ie. dam and house construction, pine tree stump removal). Maximum oxidisable sulfur levels ranged from 0.13 to 0.77% S in sands, 0.37 to 1.4% S in loams and 0.2 to 2.4% S in clays.

In the Donnybrook study area, actual acid sulfate soil (AASS) was identified in the surface horizons of low lying coastal plains (<2m AHD), with field pH values as low as 3.9 and TAA measurements equivalent to 0.21% S at 0.5-0.6m and 0.19% S at 0.6-0.7m. Potential acid sulfate soil material (PASS) was identified at between 2m and 5m in the remaining areas of coastal plains with oxidisable sulfur values ranging from 0.04 to 0.09% S in sands, 1.17% S for loams and 0.23 to 1.91% S in clays. The soils of the elevated parts (generally >3m) of Donnybrook are formed from Landsborough Sandstone parent material and as such the soils formed do not contain acid sulfate soil material. The soils derived from Landsborough Sandstone are predominantly texture contrast, with sandy clay loam surfaces overlying clay subsoils at depth with acidic pH throughout, and the soils described in this survey have been classified as Kurosols (Isbell 1996). The acidic pH of these soils is the result of a combination of sandstone parent material and high leaching environment.

Whilst PASS are typically identified by their grey to olive colour, with textures ranging from sand to muds, there are a number of indurated sand and loamy sand horizons with sulfide concentrations above threshold levels. Therefore, while the grey and olive sands are the easily identifiable characteristics of sulfidic horizons, elevated sulfide levels should not be discounted from other horizons until laboratory tests have been completed.

Any proposed excavations in the vicinity of any of the sites investigated will require appropriate management in accordance with the *Soil Management Guidelines* (Dear *et al*. 2002). It is recommended that construction techniques limit disturbance of profiles containing potential acid sulfate soil to minimise the risk of oxidation, and also to initiate management of existing acidity.

Additional investigation will be required prior to construction for any excavations that are outside the required limits of the *Sampling Guidelines* (Ahern *et al.* 2004) relative to the sampling already undertaken in this investigation. Any disturbance of soils in these areas needs to be carefully considered due to the close

proximity to the coast (i.e. growth of marine algae such as *Lyngbya majuscula* have been shown to be stimulated by the inclusion of acidic groundwaters from acid sulfate soils of the Pumicestone region).

Table 3 ASS code, Max %S, liming rate and sampling depth for all boreholes

Site	ASS Code	Max. S%	Lime rate (kgCaCO3/Tonne soil)*	Max. sampling Depth (m)	Site locations
189	S5	0.77	36	6.5	Meldale
190	S5	0.37	18	6.8	Meldale
191	Nil	<0.02	-	6.0	Meldale
192	S1	2.44	115	1.5	Meldale
193	S0	1.15	54	1.5	Meldale
194	Nil	<0.02	-	2.5	Meldale
195	S1	0.63	30	1.5	Meldale
196	S1	0.16	8	2.0	Meldale
197	S0	1.87	88	1.7	Meldale
198	S1	0.6	28	6.0	Meldale
199	S0	1.28	60	1.1	Meldale
200	S0	0.33	16	2.0	Meldale
201	S5	0.56	27	6.0	Meldale
202	a1S2	0.31	15	6.0	Meldale
203	a1S5	1.38	65	6.7	Meldale
204	a1S2	0.13	6	3.8	Meldale
205	a0S2	0.91	43	8.1	Meldale
206	S0	0.28	14	2.0	Toorbul
207	S1	0.85	40	1.3	Toorbul
208	S1	0.33	16	5.6	Toorbul
209	S0	0.1	5	1.1	Toorbul
210	S4	0.14	7	7.5	Toorbul
211	S2	0.42	20	4.5	Toorbul
212	S0	0.19	9	4.5	Toorbul
213	S0	0.12	6	6.0	Toorbul
214	S2	0.05	3	8.5	Toorbul
215	S4	0.04	2	6.0	Toorbul
216	S3	0.1	5	5.3	Toorbul
217	S3	0.11	6	6.0	Toorbul
218	S2	0.11	6	4.5	Toorbul
219	S5	0.16	8	6.0	Toorbul
220	S0	0.14	7	1.25	Toorbul
221	S4	0.14	7	8.5	Toorbul
222	S0	3.78	177	1.25	Toorbul
223	S3	2.29	108	4.4	Meldale
224	a2S2	1.18	56	6.0	Meldale
225	S2	2.11	99	6.0	Meldale
226	Nil	<0.02	-	3.0	Donnybrook
227	Nil	<0.02	-	1.5	Donnybrook
228	S3	0.94	44	4.4	Donnybrook
229	A0S3	0.12	6	6.0	Donnybrook
230	S5	0.07	4	5.8	Donnybrook
231	S5	1.17	55	6.0	Donnybrook
232	S5	1.90	89	6.0	Donnybrook

*Liming rate represents the highest sulfur % recorded in the profile multiplied by 46.8027 and includes a 1.5 safety factor)

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8 Glossary

Acid sulfate soils (ASS): Soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (actual ASS) and/or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (potential ASS). This includes:

- non-oxidised and therefore non-acidic soils or sediments with significant amounts of oxidisable iron sulfides (ie. PASS);
- partially oxidised soils or sediments with variable ratios of existing acidity and unoxidised iron sulfides (ie. PASS/AASS); through to
- completely oxidised (no remnant sulfides) soils or sediments with significant existing acidity (ie. AASS).

The term acid sulfate soil generally includes both actual and potential ASS. Actual and potential ASS are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.

Actual acid sulfate soils (AASS): Soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of soil material that are rich in iron sulfides, primarily pyrite. This oxidation produces hydrogen ions in excess of the sediment's capacity to neutralise the acidity, resulting in soils of pH 4 or less. These soils can sometimes be identified by the presence of secondary sulfate salts such as jarosite.

Action criteria: The critical net acidity values (expressed in units of equivalent % pyrite sulfur, or equivalent mol H^+/t) for different soil texture groups and sizes of soil disturbance that trigger the need for ASS management.

Actual acidity: A component of existing acidity. The soluble and exchangeable acidity already present in the soil, often as a consequence of previous oxidation of sulfides. It is this acidity that will be mobilised and discharged following a rainfall event. It is measured in the laboratory using the TAA method. It does not include the less soluble acidity (ie. retained acidity) held in hydroxy-sulfate minerals such as jarosite.

Agricultural lime: A neutralising agent used to treat acidic soils; by composition, it is commonly 95–98% pure calcium carbonate, $CaCO_3$; it is sparingly soluble in pure water, with a pH of ~8.3; application rates will depend on the purity and fineness of the product.

AHD: Australian Height Datum. The datum used for the determination of elevations in Australia. The determination used a national network of benchmarks and tide gauges, and sets mean sea level as zero elevation.

ANC: Acid neutralising capacity. A measure of a soil's inherent ability to buffer acidity and resist the lowering of the soil pH.

ANC_{BT}: Acid neutralising capacity by back titration. Acid neutralising capacity measured by acid digest followed by back titration of the acid that has not been consumed.

Borehole: The actual hole created when an auger, push-tube or similar is inserted into the soil body; the portion removed (the core) will demonstrate the soil profile.

Ca_A: Reacted calcium. The calcium soluble after the peroxide digest and TPA titration that was not soluble following KCl-extraction and TAA titration. ($Ca_P - Ca_{KCl}$). It can be used (in combination with Mg_A) to provide an estimate of the soil carbonate content, but may be an underestimate if the HCl-titration to pH 4 has not been performed as part of the TPA/ANC_E procedure.

Chemical equations: There is a wide range of chemical equations involved in acid sulfate soils. Some of these are detailed below. Further information (especially regarding the intermediate steps involved in pyrite oxidation) can be found in the *Acid Sulfate Soils Laboratory Methods Guidelines* (Ahern *et al*. 2004).

Pyrite formation can be generalised by equation (1):

$4SO_4^{2-} + Fe_2O_3 + 8CH_2O + {}^1/_2O_2 \rightarrow 2FeS_2 + 8HCO_3^- + 4H_2O$ (1)

sulfate ions + iron oxide + organic matter + oxygen → pyrite + bicarbonate ions

The overall reaction for the complete oxidation of pyrite is given by equation (2):

$FeS_2 + {}^{15}/_4O_2 + {}^7/_2H_2O \rightarrow Fe(OH)_3 + 2SO_4^{2-} + 4H^+$ (2)

In moist environments, jarosite slowly decomposes (usually by hydrolysis) releasing iron and acid, as shown in equation (3):

$KFe_3(SO_4)_2(OH)_6 + 3H_2O \rightarrow 3Fe(OH)_3 + 2SO_4^{2-} + 3H^+ + K^+$ (3)

Equation (4) shows the reaction between aglime and the acid produced from pyrite oxidation:

$CaCO_3 + 2H^+ + SO_4^{2-} + H_2O \rightarrow CaSO_4.2H_2O + CO_2$ (4)

Disturbance of ASS: Any activity or action that will or is likely to expose ASS to oxidising conditions eg. movement, excavation or drainage of ASS.

Existing Acidity: The acidity already present in soils, usually as a result of oxidation of sulfides, but which can also be from organic material or acidic cations. It can be further sub-divided into actual and retained acidity, ie. Existing Acidity = Actual Acidity + Retained Acidity.

Fineness factor: A factor applied to the acid neutralising capacity result in the acid base account to allow for the poor reactivity of coarser carbonate or other acid neutralising material. The minimum factor is 1.5 for finely divided pure agricultural lime, but may be as high as 3.0 for coarser shell material.

Holocene: A period of time from about 10 000 years ago to the present, an epoch of the Quaternary time period.

Horizon: A soil layer that differs in physical, chemical or biological properties such as colour, texture, structure, consistency, pH etc from the layers above and below.

Jarosite: An acidic pale yellow (straw or butter coloured) iron sulfate mineral: $KFe_3(SO_4)_2(OH)_6$. Jarosite is a by-product of the acid sulfate soil oxidation process, formed at pH less than 3.7; commonly found precipitated along root channels and other soil surfaces exposed to air.

Mg_A: Reacted magnesium. The magnesium soluble after the peroxide digest and TPA titration that was not soluble following KCl-extraction and TAA titration. ($Mg_P - Mg_{KCl}$). It can be used (in combination with Ca_A) to provide an estimate of the soil carbonate content, but may be an underestimate if the HCl-titration to pH 4 has not been performed as part of the TPA/ANC_E procedure.

Net Acidity: The result obtained when the values for various components of soil acidity and acid neutralising capacity are substituted into the Acid Base Accounting equation. Calculated as: Net Acidity = Potential Acidity + Existing Acidity – (Acid Neutralising Capacity/Fineness Factor).

Neutralisation: The process whereby acid produced (by the oxidation of soil iron sulfides) is counteracted by the addition of an ameliorant such as aglime ($CaCO_3$); there are formulae for calculating the amount of ameliorant needed to bring the soil closer to a pH value of 7.

NR&M: Queensland Department of Natural Resources and Mines.

NRW: Queensland Department of Natural Resources and Water.

pH: A measure of the acidity or alkalinity of a soil or water body on a logarithmic scale of 0 to 14 units. A pH reading less than 7 indicates an acid, pH equal to 7 indicates a neutral substance, while pH more than 7 indicates an alkaline substance. Note that one unit change in pH is equivalent to a ten-fold change in acidity.

pH_F: Field pH. Field determination of pH in a soil:water paste.

pH_{FOX}: Field peroxide pH. Field determination of pH in a soil:water mixture following reaction with hydrogen peroxide. (pH3 test).

pH_{KCl}: Potassium chloride pH. pH in a 1:40 (W/V) suspension of soil in a solution of 1 M potassium chloride measured prior to TAA titration.

pH_{OX}: Peroxide oxidised pH. pH in a suspension of soil in a solution after hydrogen peroxide digestion in the SPOCAS method.

Potential acid sulfate soils (PASS): Soil or sediment containing iron sulfides or sulfidic material that have not been exposed to air and oxidised. The field pH of these soils in their undisturbed state is pH 4 or more, and may be neutral or slightly alkaline.

Potential (sulfidic) acidity: The latent acidity in ASS that will be released if the sulfide minerals they contain (eg. pyrite) are fully oxidised. It can be estimated by titration (ie. TSA) if no acid neutralising material is present, or calculated from S_{POS} or S_{CR} results.

Pyrite: Pale-bronze or brass-yellow, isometric mineral: FeS_2; the most widespread and abundant of the sulfide minerals.

Retained Acidity: The 'less available' fraction of the existing acidity (not measured by the TAA) that may be released slowly into the environment by hydrolysis of relatively insoluble sulfate salts (such as jarosite, natrojarosite, and other iron and aluminium hydroxy-sulfate minerals).

S_{CR}: The symbol given to the result from the Chromium Reducible Sulfur method (Method 22B). The S_{CR} method provides a measure of reduced inorganic sulfide content using iodometric titration after an acidic chromous chloride reduction. This method is not subject to interferences from organic sulfur.

S_{POS}: Peroxide oxidisable sulfur from the SPOCAS method. The sulfur soluble after the peroxide digest and TPA titration that was not soluble following KCl-extraction and TAA titration. ($S_P - S_{KCl}$). It provides an estimate of the soil sulfide content, but is affected by the presence of organic sulfur.

S_{RAS}: Residual acid soluble sulfur. The sulfur measured by 4 M HCl extraction on the soil residue remaining after peroxide digestion and TPA titration of the SPOCAS method. It provides an estimate of the sulfate contained in jarosite and similar low solubility hydroxy-sulfate minerals (and can be used to estimate retained acidity).

Self-neutralising soils: This term is given to ASS where there is sufficient acid neutralising capacity (with the relevant safety factor applied) to neutralise the potential sulfidic acidity held in the soil (ie. the net acidity from the Acid Base Account is zero or negative). Soils may be 'self-neutralising' due to an abundance of naturally occurring calcium or magnesium carbonates (eg. crushed shells, marine animal exoskeletons, coral) or other acid-neutralising material.

SPOCAS: An acronym standing for Suspension Peroxide Oxidation Combined Acidity and Sulfur method (Method Code 23), the peroxide-based method that supersedes the previous POCAS and POCASm methods.

TAA: Titratable actual acidity. The acidity measured by titration with dilute NaOH following extraction with KCl-solution in the SPOCAS method. Previously referred to as Total Actual Acidity in the POCAS and POCASm methods.

TPA: Titratable peroxide acidity. The acidity measured by titration with dilute NaOH following peroxide digestion in the SPOCAS method. Previously referred to as Total Potential Acidity in the POCAS and POCASm methods.

Appendix 1
Decoded Borehole Descriptions

Project: CAB **Site:** 189

Location:	GDA 94	ZONE	56	506927mE	7008863mN	Lat: -27.04243	Long: 153.06984
Location:	AGD 84	ZONE	56	506821mE	7008676mN	Lat: -27.04412	Long: 153.06878
Location:	AGD 66	ZONE	56	506822mE	7008677mN	Lat: -27.0441	Long: 153.06878

Described By: S (Shane) Pointon (POIS) **Date:** 21/FEB/07

Landscape:

Landform Pattern: terrace **Element:** terrace plain

Surface Condition: Loose

Disturbances: Extensive clearing, Highly disturbed e.g. mining, urban

Classifications:

ASC: HUMIC/SESQUIC, SEMIAQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A11	0 to .15	Very dark brown (10YR22) moist; loamy sand; weak structure; moderately moist when sampled; clear to
A12	.15 to .4	Dark grey (10YR41) moist; sand; single grain structure; moderately moist when sampled; gradual to
A2e	.4 to 2.3	White (10YR81) moist; sand; single grain structure; moderately moist when sampled; gradual to
B1	2.3 to 2.5	Very dark grey (10YR31) moist; loamy coarse sand; very few <2% subrounded quartz small pebbles 2-6 mm; single grain structure; moist when sampled; abrupt to
B21h	2.5 to 2.7	Black (10YR21) moist; sandy clay loam; very few <2% subrounded quartz small pebbles 2-6 mm; massive structure; moist when sampled; abrupt to
2B21s	2.7 to 2.8	Very dark brown (7.5YR2.5/2) moist; loamy coarse sand; common 10-20% rounded detrital sedimentary rock (unidentified) large pebbles 20-60 mm; massive structure; moderately cemented continuous massive organic pan; moist when sampled; sharp to
3C	2.8 to 2.95	Black (2.5Y2.5/1) moist; loamy sand; very few <2% rounded quartz medium pebbles 6-20 mm; wet when sampled; clear to
4C1	2.95 to 3.1	Black (7.5YR2.5/1) moist; few 2-10% medium 5-15mm distinct dark mottles; loamy sand; few 2-10% rounded detrital sedimentary rock (unidentified) large pebbles 20-60 mm; massive structure; moist when sampled; clear to
4C2	3.1 to 3.5	Very dark brown (7.5YR2.5/2) moist; few 2-10% coarse 15-30mm distinct dark mottles; very few <2% subrounded quartz small pebbles 2-6 mm; massive structure; gradual to
5C1	3.5 to 3.9	Very dark brown (7.5YR2.5/3) moist; loamy sand; single grain structure; wet when sampled; gradual to
6C1	3.9 to 4.8	Yellowish brown (10YR54) moist; loamy coarse sand; common 10-20% rounded quartz medium pebbles 6-20 mm; single grain structure; wet when sampled
7C	4.8 to 5.1	Grey (2.5Y61) moist; sand; few 2-10% subrounded quartz small pebbles 2-6 mm; single grain structure; wet when sampled
8C	5.1 to 5.5	Very dark grey (5Y31) moist; sandy light clay; massive structure; wet when sampled
9D	5.5 to 6.5	Greenish grey (10Y61) moist; sandy light medium clay; massive structure; moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.0	5.0	3.5		5.2	3.4
.3	1	4.8	3.4	3.75		5.5	3.4
.6		5.0	4.6	4		5.1	3.3
.8		5.6	5.1	4.25		5.5	2.7
1		5.6	4.1	4.5	1	5.6	2.1
1.25		5.6	5.4	4.75	1	5.5	2.9
1.5		5.4	5.2	5	4	5.4	2.0
1.75		5.2	5.3	5.25	4	5.9	2.7
2		5.0	5.1	5.5	4	6.1	1.9
2.25		5.4	4.5	5.75	4	6.5	1.4
2.5		5.1	2.6	6	4	6.6	1.4
2.75		5.1	3.3	6.25	4	6.6	2.9
3		5.6	2.4	6.5	4	6.3	2.7
3.25		5.2	2.7				

Project: CAB **Site:** 190

Location:	GDA 94	ZONE	56	507276mE	7008976mN	Lat: -27.04141	Long: 153.07336
Location:	AGD 84	ZONE	56	507170mE	7008789mN	Lat: -27.04309	Long: 153.0723
Location:	AGD 66	ZONE	56	507171mE	7008790mN	Lat: -27.04308	Long: 153.0723

Described By: S (Shane) Pointon (POIS) **Date:** 21/FEB/07

Landscape:

Landform Pattern: terrace **Element:** terrace flat

Surface Condition: Firm

Disturbances: Extensive clearing, Highly disturbed e.g. mining, urban

Classifications:

ASC: HUMIC, AQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Black (2.5Y21) moist; clay loam, sandy; very few <2% rounded detrital sedimentary rock (unidentified) medium pebbles 6-20 mm; weak structure; moderately moist when sampled; clear to
B2	.3 to .55	Greyish brown (10YR52) moist; few 2-10% fine <5mm distinct orange mottles; sandy light medium clay; very few <2% rounded detrital sedimentary rock (unidentified) medium pebbles 6-20 mm; weak structure; moderately moist when sampled; clear to
2A2	.55 to .75	Light brownish grey (10YR62) moist; loamy sand; very few <2% rounded quartz small pebbles 2-6 mm; single grain structure; moist when sampled; clear to
2B1	.75 to .95	Very dark grey (10YR31) moist; few 2-10% coarse 15-30mm distinct pale mottles; loamy sand; very few <2% rounded detrital sedimentary rock (unidentified) small pebbles 2-6 mm; massive structure; wet when sampled; gradual to
2B21h	.95 to 2	Black (7.5YR2.5/1) moist; loamy sand; few 2-10% rounded detrital sedimentary rock (unidentified) large pebbles 20-60 mm; weakly cemented continuous massive organic pan; wet when sampled; gradual to
2B22h	2 to 3.2	Very dark brown (10YR22) moist; sandy loam; weakly cemented continuous massive organic pan; wet when sampled; clear to
2B23s	3.2 to 3.8	Dark greyish brown (10YR42) moist; sandy loam; single grain structure; wet when sampled; gradual to
3C	3.8 to 5	Grey (10YR51) moist; sandy clay loam; massive structure; wet when sampled; diffuse to
4C	5 to 6.8	Greenish grey (10Y51) moist; sandy light clay; massive structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.7	2.9	3.5	2	5.3	2.9
.3	1	6.1	4.1	3.75	2	5.2	1.9
.6		5.4	4.5	4	2	5.1	1.7
.8		5.1	4.1	4.25	2	5.6	1.7
1		5.4	3.8	4.5	2	6.0	1.8
1.25		5.7	3.1	4.75	2	6.1	1.9
1.5		5.9	2.7	5	4	6.3	1.9
1.75		5.8	3.0	5.25	4	6.2	1.8
2		5.9	3.0	5.5	4	6.4	2.1
2.25		5.8	2.7	5.75	4	6.7	2.2
2.5		5.7	3.3	6	4	7.1	2.4
2.75		5.5	2.9	6.25	4	7.1	6.4
3		5.5	3.5	6.5	4	7.1	6.4
3.25	2	5.5	3.6	6.75	4	7.7	6.1

Observation Notes:

Location End of Harrison's Lane

Vegetation Corymbia tesselaris, Callitris columellaris, Acacia spp, Corymbia intermedia, Euclayptus tereticornis, Melaleuca quinquinervia

Horizon Notes:

Horizon 2B21h pans in thin layers

Horizon 2B22h pans in thin layers

Project: CAB **Site:** 191

Location:	GDA 94	ZONE	56	507112mE	7008914mN	Lat: -27.04197	Long: 153.0717
Location:	AGD 84	ZONE	56	507006mE	7008727mN	Lat: -27.04366	Long: 153.07064
Location:	AGD 66	ZONE	56	507007mE	7008728mN	Lat: -27.04364	Long: 153.07065

Described By: S (Shane) Pointon (POIS) **Date:** 21/FEB/07

Landscape:

Landform Pattern: terrace **Element:** terrace plain

Surface Condition: Loose

Disturbances: Extensive clearing

Classifications:

ASC: HUMIC/SESQUIC, SEMIAQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A11	0 to .2	Very dark grey (10YR31) moist; loamy sand; single grain structure; moderately moist when sampled; gradual to
A12	.2 to .5	Dark grey (10YR41) moist; loamy sand; single grain structure; moderately moist when sampled; gradual to
A2e	.5 to 2.05	White (N80) moist; sand; single grain structure; moderately moist when sampled; sharp to
2B1	2.05 to 2.2	Very dark grey (10YR31) moist; very few <2% coarse 15-30mm distinct dark mottles; sandy clay loam; weakly cemented continuous massive organic pan; sharp to
3B21h	2.2 to 2.35	Black (10YR21) moist; loamy coarse sand; few 2-10% subrounded detrital sedimentary rock (unidentified) small pebbles 2-6 mm; massive structure; weakly cemented continuous massive organic pan; clear to
3B22s	2.35 to 2.6	Black (7.5YR2.5/1) moist; loamy coarse sand; few 2-10% rounded detrital sedimentary rock (unidentified) large pebbles 20-60 mm; massive structure; moderately cemented continuous massive organic pan; gradual to
4B23h	2.6 to 3.4	Black (10YR21) moist; loamy sand; very few <2% rounded detrital sedimentary rock (unidentified) small pebbles 2-6 mm; massive structure; weakly cemented continuous massive organic pan; gradual to
5B21s	3.4 to 3.7	Very dark brown (10YR22) moist; loamy coarse sand; common 10-20% rounded detrital sedimentary rock (unidentified) medium pebbles 6-20 mm; single grain structure; gradual to
5B22s	3.7 to 4.4	Very dark brown (7.5YR2.5/2) moist; loamy coarse sand; few 2-10% rounded detrital sedimentary rock (unidentified) medium pebbles 6-20 mm; single grain structure; clear to
6C	4.4 to 4.7	Grey (2.5Y51) moist; fine sandy clay loam; massive structure; clear to
7C	4.7 to 4.8	Dark grey (2.5Y41) moist; clayey fine sand; massive structure; clear to
8D1	4.8 to 5.4	Light grey (2.5Y72) moist; few 2-10% medium 5-15mm distinct orange mottles, very few <2% medium 5-15mm distinct red mottles; sandy light medium clay; few 2-10% angular ferruginised sandstone cobbles 60-200 mm; massive structure; moist when sampled; gradual to
8D2	5.4 to 5.8	Light grey (5Y72) moist; common 10-20% coarse 15-30mm distinct dark mottles; sandy medium clay; few 2-10% angular ferruginised sandstone cobbles 60-200 mm; massive structure; moist when sampled; clear to
9D	5.8 to 6	White (5Y81) moist; coarse sandy light medium clay; common 10-20% rounded quartz medium pebbles 6-20 mm; massive structure; moist when sampled

Project: CAB **Site:** 191

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	6.3	4.8
.3	1	6.6	4.9
.6		6.7	4.9
.8		6.6	5.2
1		6.2	5.2
1.25		5.5	5.5
1.5		5.6	5.6
1.75		5.7	4.9
2		5.3	4.3
2.25		5.4	3.9
2.5		5.3	4.3
2.75		5.2	4.3
3		6.0	3.3
3.25		5.5	3.5
3.5		5.3	3.3
3.75		5.5	4.0
4		6.4	3.9
4.25		6.6	3.5
4.5	2	6.7	2.8
4.75	4	6.4	2.5
5	4	6.5	3.1
5.25	4	5.5	3.7
5.5	4	5.9	3.3
5.75	4	5.6	3.4
6	4	6.0	3.7

Observation Notes:

Location Vacant house block, Elimbah Ave

Vegetation Eucalyptus tereticornis, Callitris columellaris, Melaleuca quinquinervia, Corymbia tesselaris, Acacia spp, Corymbia intermedia.

Horizon Notes:

Horizon 8D2 purple mottles

Project: CAB **Site:** 192

Location:	GDA 94	ZONE	56	507598mE	7009595mN	Lat: -27.03582	Long: 153.0766
Location:	AGD 84	ZONE	56	507492mE	7009408mN	Lat: -27.0375	Long: 153.07554
Location:	AGD 66	ZONE	56	507493mE	7009409mN	Lat: -27.03749	Long: 153.07554

Described By: S (Shane) Pointon (POIS) **Date:** 05/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** tidal flat

Depth to Water: 1

Surface Condition: Soft, Surface flake

Classifications:

ASC: SULFIDIC, SUPRATIDAL, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .1	Brown (10YR53) moist; very few <2% fine <5mm faint brown mottles; sandy clay loam; weak structure; wet when sampled
B21	.1 to .3	Grey (2.5Y51) moist; many 20-50% coarse 15-30mm prominent orange mottles; sandy medium clay; angular blocky weak 5-10mm structure; very few <2% medium 2-6mm ferruginous root linings; wet when sampled
B22	.3 to .5	Grey (2.5Y51) moist; few 2-10% medium 5-15mm distinct orange mottles; sandy light clay; weak structure; wet when sampled
C1	.5 to .8	Very dark grey (2.5Y31) moist; sandy light clay; weak structure; wet when sampled
C2	.8 to 1	Very dark greyish brown (2.5Y32) moist; silty light clay; massive structure; wet when sampled
2C1	1 to 1.5	Dark grey (2.5Y41) moist; sandy medium clay; massive structure; moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1		7.0	5.4
.3		7.1	5.3
.5		6.6	1.1
.8	4	6.1	1.2
1	1	6.2	1.1
1.25	1	6.2	1.1
1.5	3	6.2	1.3

Observation Notes:

Vegetation Suaeda australis (seablite)

Horizon Notes:

Horizon	C1	Fine organics present.
Horizon	C2	Fine sand lens within horizon.
Horizon	2C1	Some organic matter present.

Project: CAB **Site:** 193

Location:	GDA 94	ZONE	56	507651mE	7009529mN	Lat: -27.03641	Long: 153.07714
Location:	AGD 84	ZONE	56	507545mE	7009342mN	Lat: -27.0381	Long: 153.07607
Location:	AGD 66	ZONE	56	507546mE	7009343mN	Lat: -27.03809	Long: 153.07608

Described By: S (Shane) Pointon (POIS) **Date:** 05/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** tidal flat

Depth to Water: 1

Surface Condition: Soft, Surface flake

Classifications:

ASC: SULFIDIC, INTERTIDAL, Hydrosol

Vegetation:

Community Name: Mid-high closed forest, Avicennia marina

Tallest Stratum: Mid-high closed forest (6.01-12m)

Species: Avicennia marina (Grey Mangrove)

Lower Stratum: Very tall isolated shrubs (3.01-6m)

Species: Rhizophora stylosa (spotted mangrove, red mangrove)

Profile Morphology:

Horizon	Depth (m)	Description
P2	0 to .2	Dark greyish brown (2.5Y42) moist; fibric sandy loam; massive structure; wet when sampled
C1	.2 to .5	Dark greyish brown (2.5Y42) moist; sandy loam; massive structure; wet when sampled
C2	.5 to 1.2	Dark greyish brown (2.5Y42) moist; sandy medium clay; massive structure; wet when sampled
2C3	1.2 to 1.5	Greyish brown (2.5Y52) moist; sand; few 2-10% angular shell small pebbles 2-6 mm; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	6.7	2.1
.3	3	6.9	1.4
.5	4	6.7	1.3
.6	4	6.8	1.2
.8	4	6.8	1.0
1	4	6.8	1.1
1.25	4	6.9	1.3
1.5	2	6.4	0.9

Horizon Notes:

Horizon	P2	Organic matter
Horizon	C1	Organic matter
Horizon	C2	Many clay and sand lenses present in horizon.

Project: CAB **Site:** 194

Location:	GDA 94	ZONE	56	507515mE	7009508mN	Lat: -27.0366	Long: 153.07576
Location:	AGD 84	ZONE	56	507409mE	7009321mN	Lat: -27.03829	Long: 153.0747
Location:	AGD 66	ZONE	56	507410mE	7009322mN	Lat: -27.03828	Long: 153.07471

Described By: S (Shane) Pointon (POIS) **Date:** 05/JUN/07

Landscape:

Landform Pattern: plain **Element:** plain

Depth to Water: .95

Surface Condition: Firm

Disturbances: No effective disturbance

Classifications:

Profile Morphology:

Horizon	Depth (m)	Description
A	0 to .25	Very dark greyish brown (10YR32) moist; loamy sand; single grain structure; dry when sampled
B2	.25 to .4	Brown (10YR53) moist; many 20-50% coarse 15-30mm distinct orange mottles; clayey sand; single grain structure; moist when sampled
A2e	.4 to .55	White (10YR81) moist; sand; single grain structure; moderately moist when sampled
B2	.55 to .75	Pale brown (10YR63) moist; many 20-50% coarse 15-30mm prominent orange mottles; loamy sand; single grain structure; moderately moist when sampled
2Bh	.75 to 1.35	Black (10YR21) moist; loamy sand; weakly cemented discontinuous massive organic pan; wet when sampled
2C1	1.35 to 2	Light brownish grey (10YR62) moist; loamy sand; single grain structure; wet when sampled
2C2	2 to 2.3	Light brownish grey (2.5Y62) moist; clay loam, sandy; massive structure; moderately moist when sampled
3Bh	2.3 to 2.5	Black (10YR20) moist; loamy sand; single grain structure; weakly cemented discontinuous massive organic pan; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	5.1	4.8
.3		4.8	4.2
.5		4.3	3.8
.6		4.1	3.4
.8		4.5	3.0
1		5.3	3.7
1.25		5.6	4.2
1.5		5.7	4.2
1.75		5.8	4.6
2		5.8	5.1
2.25		6.1	4.7
2.5		5.4	4.5

Observation Notes:

Vegetation T = Paperbark, Umbrella Tree, Casuarina. L = Alphitonia excelsa, Soap bush.

Project: CAB **Site:** 195

Location:	GDA 94	ZONE	56	507539mE	7009439mN	Lat: -27.03722	Long: 153.07601
Location:	AGD 84	ZONE	56	507433mE	7009252mN	Lat: -27.03891	Long: 153.07494
Location:	AGD 66	ZONE	56	507434mE	7009253mN	Lat: -27.0389	Long: 153.07495

Described By: S (Shane) Pointon (POIS) **Date:** 05/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** tidal flat

Classifications:

ASC: SULFIDIC, SUPRATIDAL, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .1	Very dark grey (10YR31) moist; sapric light clay; angular blocky moderate 5-10mm structure; moist when sampled; clear to
B2	.1 to .35	Light brownish grey (2.5Y62) moist; many 20-50% medium 5-15mm prominent orange mottles; sandy medium clay; platy weak 5-10mm structure; very few <2% medium 2-6mm ferromanganiferous root linings; moist when sampled; diffuse to
2B2	.35 to .6	Grey (5YR51) moist; very few <2% medium 5-15mm distinct orange mottles; sandy clay loam; weak 2-5mm structure; wet when sampled; diffuse to
2C	.6 to 1.3	Dark grey (5Y41) moist; clay loam, sandy; massive structure; wet when sampled
3Bhb	1.3 to 1.5	Black (10YR20) moist; loamy sand; single grain structure; strongly cemented continuous massive thin ironpan; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1		7.0	5.6
.3		6.6	5.2
.6	4	6.6	1.1
.8	4	6.3	1.2
1	4	6.0	1.0
1.25	4	6.0	1.3
1.5		5.4	4.4

Horizon Notes:

Horizon 2C Silt and sand lenses present in horizon

Project: CAB **Site:** 196

Location:	GDA 94	ZONE	56	507648mE	7009128mN	Lat: -27.04003	Long: 153.07711
Location:	AGD 84	ZONE	56	507542mE	7008941mN	Lat: -27.04172	Long: 153.07605
Location:	AGD 66	ZONE	56	507543mE	7008942mN	Lat: -27.04171	Long: 153.07605

Described By: S (Shane) Pointon (POIS) **Date:** 05/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** tidal flat

Depth to Water: 1

Surface Condition: Soft

Disturbances: No record

Classifications:

ASC: SULFIDIC, SUPRATIDAL, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A2	0 to .2	Greyish brown (2.5Y53) moist; few 2-10% medium 5-15mm distinct dark mottles; medium clay; angular blocky massive 2-5mm structure; wet when sampled
B2	.2 to .4	Dark greyish brown (2.5Y42) moist; common 10-20% coarse 15-30mm prominent orange mottles; sandy medium clay; massive structure; wet when sampled
B3	.4 to .6	Dark greyish brown (2.5Y42) moist; few 2-10% coarse 15-30mm prominent orange mottles; clay loam, sandy; massive structure; wet when sampled
C1	.6 to 2	Dark grey (5Y41) moist; loamy sand; very few <2% subangular quartz small pebbles 2-6 mm; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1		7.6	5.8
.3		6.8	5.4
.5	2	6.9	2.9
.6	4	6.9	1.4
.8	2	7.1	1.1
1	1	7.1	.9
1.25	4	7.2	
1.5	2	7.1	0.9
1.75	2	6.8	1.1
2	1	6.4	1.2

Observation Notes:

Vegetation Sporoblos virginicus (salt couch), Suaeda australis (seablite), mangroves

Horizon Notes:

Horizon	A2	organic matter
Horizon	B2	Organic matter
Horizon	B3	Organic matter
Horizon	C1	Organic matter

Project: CAB **Site:** 197

Location:	GDA 94	ZONE	56	507816mE	7009101mN	Lat: -27.04027	Long: 153.0788
Location:	AGD 84	ZONE	56	507710mE	7008914mN	Lat: -27.04196	Long: 153.07774
Location:	AGD 66	ZONE	56	507711mE	7008915mN	Lat: -27.04195	Long: 153.07774

Described By: S (Shane) Pointon (POIS) **Date:** 05/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** tidal flat

Depth to Water: .1

Surface Condition: Soft

Classifications:

ASC: SULFIDIC, INTERTIDAL, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
B2	0 to .2	Greyish brown (2.5Y52) moist; very few <2% medium 5-15mm prominent brown mottles; sandy clay loam; weak 5-10mm structure; wet when sampled; diffuse to
2A2	.2 to .5	Dark grey (2.5Y41) moist; sapric clay loam; massive structure; wet when sampled; diffuse to
2C1	.5 to 1.2	Dark grey (5Y41) moist; clay loam, sandy; massive structure; wet when sampled
2C2	1.2 to 1.7	Dark grey (5Y41) moist; loamy sand; very few <2% subangular quartz small pebbles 2-6 mm; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	6.8	1.7
.3	4	6.7	1.2
.6	4	6.9	1.0
.8	4	6.6	1.2
1	4	6.6	1.2
1.25	4	6.8	1.2
1.5	4	6.5	1.2
1.7	4	6.4	1.1

Observation Notes:

Vegetation Avicennia marina (10m), Ceriops australis (3m)

Horizon Notes:

Horizon 2A2 Abundant organic matter

Project: CAB **Site:** 198

Location:	GDA 94	ZONE	56	507386mE	7009270mN	Lat: -27.03875	Long: 153.07446
Location:	AGD 84	ZONE	56	507280mE	7009083mN	Lat: -27.04044	Long: 153.0734
Location:	AGD 66	ZONE	56	507281mE	7009084mN	Lat: -27.04043	Long: 153.07341

Described By: S (Shane) Pointon (POIS) **Date:** 12/JUN/07

Landscape:

Landform Pattern: alluvial plain **Element:** plain

Surface Condition: Soft

Disturbances: Limited clearing

Classifications:

ASC: SULFIDIC, OXYAQUIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Black (10YR21) moist; sandy clay loam; subangular blocky weak 5-10mm structure; subangular blocky moderate 5-10mm structure; moderately moist when sampled; clear to
A2	.3 to .6	Greyish brown (10YR52) moist; few 2-10% medium 5-15mm faint orange mottles, few 2-10% medium 5-15mm faint gley mottles; sand; massive structure; moist when sampled; gradual to
2C	.6 to 1.8	Greyish brown (2.5Y52) moist; loamy sand; massive structure; moist when sampled; gradual to
3C	1.8 to 2.6	Grey (5Y51) moist; loamy sand; massive structure; wet when sampled; gradual to
4C	2.6 to 3.3	Grey (5Y51) moist; sandy light clay; massive structure; wet when sampled; gradual to
5C	3.3 to 3.6	Grey (5Y51) moist; loamy sand; massive structure; wet when sampled; gradual to
6C	3.6 to 4.2	Olive grey (5Y52) moist; loamy sand; massive structure; moist when sampled; gradual to
7C	4.2 to 5.2	Light grey (5Y71) moist; sand; single grain structure; moist when sampled; gradual to
8C	5.2 to 6	Grey (5Y61) moist; sand; single grain structure; moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	6.0	3.6	3.25	4	5.8	1.4
.3	1	5.1	3.7	3.5	1	5.7	1.0
.6		4.3	3.7	3.75	1	5.8	0.9
.8		4.1	3.1	4	1	5.8	1.3
1		4.1	2.8	4.25	1	5.8	3.1
1.25	4	4.8	1.4	4.5	1	6.1	2.4
1.5	4	5.0	1.3	4.75	1	5.8	1.5
1.75	3	4.6	1.1	5	1	4.9	2.3
2	3	5.0	1.1	5.25		5.3	2.7
2.25	3	5.2	1.1	5.5		5.3	1.5
2.5	4	5.4	1.5	5.75		5.5	1.5
2.75		5.5	1.4	6		5.7	1.4
3	4	5.6	1.6				

Observation Notes:

Location End of Duke Street.

Vegetation MELQUIN, EUCTESS, CORINTER, IMCYL, CYDAE

Project: CAB **Site:** 199

Location:	GDA 94	ZONE	56	507238mE	7009094mN	Lat: -27.04034	Long: 153.07297
Location:	AGD 84	ZONE	56	507132mE	7008907mN	Lat: -27.04203	Long: 153.07191
Location:	AGD 66	ZONE	56	507133mE	7008908mN	Lat: -27.04202	Long: 153.07192

Described By: S (Shane) Pointon (POIS) **Date:** 12/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** intertidal flat

Surface Condition: Soft

Disturbances: No effective disturbance except grazing by hoofed animals

Classifications:

ASC: SULFIDIC, INTERTIDAL, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .1	Dark greyish brown (2.5Y42) moist; fibric sandy clay loam; massive structure; wet when sampled; gradual to
C	.1 to .5	Dark grey (2.5Y41) moist; sandy clay loam; massive structure; wet when sampled; gradual to
2C	.5 to 1.1	Greenish grey (10Y51) moist; sandy light clay; massive structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	6.2	1.5
.3	4	6.5	0.9
.6	1	6.8	1.2
.8	4	6.8	1.1
1	4	6.8	1.1
1.1	4	6.8	0.9

Observation Notes:

Vegetation Large mangroves, Rhizophora, Avicennia.

Project: CAB **Site:** 200

Location:	GDA 94	ZONE	56	507340mE	7009167mN	Lat: -27.03968	Long: 153.074
Location:	AGD 84	ZONE	56	507234mE	7008980mN	Lat: -27.04137	Long: 153.07294
Location:	AGD 66	ZONE	56	507235mE	7008981mN	Lat: -27.04136	Long: 153.07294

Described By: S (Shane) Pointon (POIS) **Date:** 12/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** supratidal flat

Surface Condition: Soft

Disturbances: No effective disturbance except grazing by hoofed animals

Classifications:

ASC: SULFIDIC, SUPRATIDAL, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .1	Greyish brown (2.5Y52) moist; few 2-10% medium 5-15mm faint red mottles; light clay; subangular blocky weak 5-10mm structure; moist when sampled; clear to
B21	.1 to .3	Greyish brown (2.5Y53) moist; few 2-10% coarse 15-30mm distinct grey mottles; sandy light medium clay; massive structure; moist when sampled; gradual to
B22	.3 to .6	Grey (2.5Y51) moist; few 2-10% coarse 15-30mm prominent orange mottles; sandy light medium clay; massive structure; wet when sampled; clear to
2C	.6 to .9	Dark grey (2.5Y41) moist; clay loam, sandy; massive structure; wet when sampled; gradual to
3C	.9 to 2	Greenish grey (10Y51) moist; loamy sand; few 2-10% angular quartz small pebbles 2-6 mm; massive structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1		5.8	5.5
.3		6.2	5.4
.6	1	6.2	1.0
.8	4	6.4	1.4
1	4	6.2	1.1
1.25	4	6.3	1.5
1.5	4	6.7	1.5
1.75	4	6.2	1.4
2	4	6.1	1.3

Observation Notes:

Vegetation Saufire, salt couch, small mangrove (avicennia?).

Project: CAB **Site:** 201

Location:	GDA 94	ZONE	56	507231mE	7009854mN	Lat: -27.03348	Long: 153.0729
Location:	AGD 84	ZONE	56	507125mE	7009667mN	Lat: -27.03517	Long: 153.07184
Location:	AGD 66	ZONE	56	507126mE	7009668mN	Lat: -27.03516	Long: 153.07184

Described By: S (Shane) Pointon (POIS) **Date:** 12/JUN/07

Landscape:

Landform Pattern: plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing

Classifications:

ASC: SEMIAQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .2	Dark grey (10YR41) moist; clay loam, sandy; granular weak 2-5mm structure; granular moderate 2-5mm structure; moderately moist when sampled; clear to
B2	.2 to .4	Yellowish brown (10YR54) moist; few 2-10% medium 5-15mm faint orange mottles; sandy light medium clay; subangular blocky moderate 5-10mm structure; moderately moist when sampled; abrupt to
2B21	.4 to .6	Pale yellow (2.5Y83) moist; very few <2% fine <5mm faint orange mottles; sand; single grain structure; moderately moist when sampled; clear to
2B22	.6 to .8	Pale yellow (2.5Y84) moist; common 10-20% medium 5-15mm distinct orange mottles; sand; single grain structure; moderately moist when sampled; clear to
2B23	.8 to 1	White (2.5Y82) moist; very few <2% medium 5-15mm distinct orange mottles; sand; single grain structure; moderately moist when sampled; clear to
3B	1 to 1.3	Light yellowish brown (2.5Y64) moist; very few <2% medium 5-15mm distinct orange mottles; loamy sand; massive structure; moderately moist when sampled; clear to
4C	1.3 to 1.6	White (2.5Y82) moist; very few <2% medium 5-15mm faint orange mottles; sand; single grain structure; moderately moist when sampled; clear to
5B21h	1.6 to 2.2	Black (2.5Y2.5/1) moist; loamy sand; massive structure; moderately cemented continuous massive organic pan; moderately moist when sampled; gradual to
5B22h	2.2 to 2.5	Black (10YR21) moist; loamy sand; massive structure; moderately moist when sampled; clear to
5B23h	2.5 to 2.7	Dark grey (2.5Y41) moist; loamy sand; massive structure; weakly cemented continuous massive organic pan; moderately moist when sampled; clear to
5B24h	2.7 to 3.3	Black (10YR21) moist; loamy sand; massive structure; moderately moist when sampled; gradual to
5B25s	3.3 to 3.5	Dark brown (7.5YR32) moist; loamy sand; massive structure; moist when sampled; diffuse to
6C	3.5 to 3.8	Dark greyish brown (2.5Y42) moist; loamy sand; single grain structure; wet when sampled; gradual to
7C	3.8 to 4.2	Light brownish grey (2.5Y62) moist; sand; single grain structure; wet when sampled; abrupt to
8C1	4.2 to 5.1	Grey (2.5Y61) moist; loamy sand; moist when sampled; gradual to
8C2	5.1 to 5.7	Grey (2.5Y51) moist; loamy sand; single grain structure; wet when sampled; gradual to
8C3	5.7 to 6	Grey (2.5Y61) moist; very few <2% medium 5-15mm distinct brown mottles; sand; single grain structure; moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.9	3.9	3		6.1	4.0
.3	1	5.8	4.0	3.25		6.3	5.2
.6		6.0	4.6	3.5		6.3	5.2
.8		5.6	5.0	3.75		6.3	5.0
1		5.4	5.1	4		6.5	5.0
1.25		5.6	4.7	4.25	2	6.3	2.6
1.5		5.7	4.6	4.5	4	6.3	1.4
1.75		5.6	4.4	4.75	4	5.9	1.4
2		5.6	4.2	5	4	6.0	1.6
2.25		5.7	4.5	5.25	4	6.5	1.5
2.5		5.8	5.0	5.5	4	6.3	1.4
2.75		6.1	4.6	5.7	4	6.4	1.7

Project: CAB **Site:** 202

Location:	GDA 94	ZONE	56	507570mE	7008801mN	Lat: -27.04298	Long: 153.07632
Location:	AGD 84	ZONE	56	507464mE	7008614mN	Lat: -27.04467	Long: 153.07526
Location:	AGD 66	ZONE	56	507465mE	7008615mN	Lat: -27.04466	Long: 153.07527

Described By: S (Shane) Pointon (POIS) **Date:** 13/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** supratidal flat

Surface Condition: Hard setting

Disturbances: Highly disturbed e.g. mining, urban

Classifications:

ASC: KANDOSOLIC, REDOXIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .15	Dark grey (10YR41) moist; sandy clay loam; very few <2% subrounded quartz medium pebbles 6-20 mm; weak structure; moderately moist when sampled; clear to
B2	.15 to .8	Grey (10YR61) moist; common 10-20% coarse 15-30mm prominent orange mottles; clay loam, sandy; very few <2% subrounded quartz medium pebbles 6-20 mm; weak structure; moist when sampled
C	.8 to 1.4	Grey (10YR61) moist; very few <2% medium 5-15mm prominent orange mottles; sandy clay loam; very few <2% angular charcoal medium pebbles 6-20 mm; few 2-10% subrounded quartz medium pebbles 6-20 mm; few 2-10% subrounded detrital sedimentary rock (unidentified) medium pebbles 6-20 mm; massive structure; wet when sampled
2C	1.4 to 2.3	Grey (2.5Y51) moist; coarse sand; few 2-10% subrounded quartz medium pebbles 6-20 mm; wet when sampled
3C	2.3 to 2.8	Greyish brown (2.5Y52) moist; loamy sand; massive structure; wet when sampled
4C	2.8 to 3	Grey (2.5Y51) moist; loamy sand; wet when sampled
5C	3 to 3.7	Light grey (2.5Y72) moist; sand; single grain structure; wet when sampled
6C	3.7 to 4.5	Light brownish grey (2.5Y63) moist; sand; single grain structure; wet when sampled
7C	4.5 to 5.8	Light grey (2.5Y72) moist; sand; single grain structure; wet when sampled
8C	5.8 to 6	Grey (2.5Y51) moist; loamy sand; massive structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.7	3.8	3.25	1	5.6	1.3
.3		5.2	4.1	3.5	1	5.6	1.2
.6		4.6	4.4	3.75	1	5.9	1.2
.8		4.6	4.3	4	1	5.9	1.1
1		4.9	3.5	4.25	1	6.1	1.5
1.25		5.8	2.9	4.5	1	6.3	1.2
1.5		5.7	3.4	4.75		6.1	3.9
1.75		5.3	1.6	5		5.9	2.5
2	4	5.3	1.6	5.25		5.5	4.0
2.25	1	5.1	1.0	5.5		5.4	3.7
2.5	1	5.0	1.4	5.75		5.2	1.5
2.75	4	5.1	1.2	6	4	6.2	1.5
3	4	5.6	1.3				

Observation Notes:

Location	Creek side of W. Pepper's property.
Vegetation	CORTESSE, EUCTERET, MELQUINQ, CALCOLUM, Acacia spp

Horizon Notes:

Horizon	3C	Pieces of rotted wood in this horizon.

Project: CAB **Site:** 203

Location:	GDA 94	ZONE	56	507558mE	7008656mN	Lat: -27.04429	Long: 153.0762
Location:	AGD 84	ZONE	56	507452mE	7008469mN	Lat: -27.04598	Long: 153.07514
Location:	AGD 66	ZONE	56	507453mE	7008470mN	Lat: -27.04597	Long: 153.07515

Described By: S (Shane) Pointon (POIS) **Date:** 13/JUN/07

Landscape:

Landform Pattern: stagnant alluvial plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing

Classifications:

ASC: HUMIC/SESQUIC, SEMIAQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .5	Dark grey (10YR41) moist; loamy sand; single grain structure; moderately moist when sampled; gradual to
A2e	.5 to 1.4	White (10YR81) moist; sand; single grain structure; moderately moist when sampled; sharp to
B21h	1.4 to 1.6	Black (10YR21) moist; coarse sandy loam; few 2-10% rounded quartz medium pebbles 6-20 mm; massive structure; moderately cemented continuous massive organic pan; moderately moist when sampled; clear to
B22	1.6 to 1.8	Brown (10YR43) moist; coarse sandy loam; common 10-20% rounded quartz large pebbles 20-60 mm; moist when sampled; clear to
B23h	1.8 to 2.2	Very dark brown (10YR22) moist; loamy coarse sand; massive structure; moist when sampled; clear to
B24h	2.2 to 2.5	Black (10YR21) moist; loamy coarse sand; common 10-20% rounded detrital sedimentary rock (unidentified) medium pebbles 6-20 mm; massive structure; moist when sampled; gradual to
B25s	2.5 to 4.1	Dark brown (7.5YR32) moist; loamy coarse sand; very few <2% rounded quartz medium pebbles 6-20 mm; massive structure; wet when sampled; gradual to
2C	4.1 to 5.2	Brown (10YR43) moist; sand; wet when sampled; clear to
3C	5.2 to 5.7	Dark grey (5Y41) moist; clay loam, sandy; clear to
4C	5.7 to 6	Grey (2.5Y51) moist; sandy light clay; very few <2% angular sandstone large pebbles 20-60 mm; massive structure; wet when sampled; clear to
5D	6 to 6.7	Greyish brown (2.5Y52) moist; common 10-20% medium 5-15mm prominent red mottles; sandy light clay; few 2-10% angular ferruginised sandstone cobbles 60-200 mm; massive structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	4.9	4.3	3.5		5.3	5.0
.3	1	5.0	4.8	3.75		5.4	5.1
.6		5.1	5.1	4		5.4	4.6
.8		5.0	5.4	4.25		5.9	4.0
1		4.8	5.0	4.5		5.6	3.5
1.25		4.7	5.2	4.75		5.5	4.1
1.5		4.7	3.2	5		5.5	4.1
1.75		4.6	4.7	5.25	1	5.5	1.4
2		4.8	4.8	5.5	4	6.1	1.6
2.25		5.6	4.1	5.75	4	6.5	1.8
2.5	1	5.6	3.9	6	4	6.5	1.7
2.75		5.4	4.6	6.25	4	6.3	1.8
3		5.4	4.3	6.5	2	5.8	2.7
3.25		5.5	5.0	6.7	2	5.9	2.9

Observation Notes:

Location Opposite DPI sand quarry, Toorbul.

Vegetation MELQUINQ, CORINTER, EUCTERET, Acacia spp, CYDAC, IMCYL

Project: CAB **Site:** 204

Location:	GDA 94	ZONE	56	507668mE	7008695mN	Lat: -27.04394	Long: 153.07731
Location:	AGD 84	ZONE	56	507562mE	7008508mN	Lat: -27.04563	Long: 153.07625
Location:	AGD 66	ZONE	56	507563mE	7008509mN	Lat: -27.04562	Long: 153.07625

Described By: S (Shane) Pointon (POIS) **Date:** 14/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** supratidal flat

Surface Condition: Firm

Disturbances: Extensive clearing

Classifications:

ASC: HUMIC, SEMIAQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .25	Black (10YR21) moist; light clay; subangular blocky strong 5-10mm structure; moist when sampled; clear to
B21	.25 to .5	Grey (2.5Y51) moist; light medium clay; weak structure; wet when sampled; clear to
B22	.5 to 1.05	Grey (2.5Y51) moist; few 2-10% medium 5-15mm distinct orange mottles; sandy light medium clay; weak structure; moist when sampled; sharp to
2C	1.05 to 1.4	Brown (10YR43) moist; clay loam, coarse sandy; few 2-10% subrounded quartz large pebbles 20-60 mm; weak structure; wet when sampled; clear to
3B21h	1.4 to 1.9	Very dark grey (10YR31) moist; loamy coarse sand; very few <2% rounded detrital sedimentary rock (unidentified) medium pebbles 6-20 mm; very few <2% rounded quartz medium pebbles 6-20 mm; massive structure; wet when sampled; gradual to
3B22h	1.9 to 2.4	Black (10YR21) moist; loamy coarse sand; few 2-10% rounded quartz medium pebbles 6-20 mm; massive structure; weakly cemented continuous massive organic pan; wet when sampled; gradual to
3C	2.4 to 2.6	Dark grey (10YR41) moist; loamy coarse sand; few 2-10% rounded quartz medium pebbles 6-20 mm; massive structure; wet when sampled; gradual to
4B21h	2.6 to 2.8	Black (10YR21) moist; loamy sand; massive structure; wet when sampled; abrupt to
D1	2.8 to 3.2	Grey (2.5Y61) moist; light medium clay; massive structure; moist when sampled; gradual to
D2	3.2 to 3.8	White (2.5Y81) moist; very few <2% coarse 15-30mm prominent yellow mottles, very few <2% coarse 15-30mm prominent red mottles, very few <2% coarse 15-30mm prominent orange mottles; light medium clay; massive structure; moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1		5.5	4.4
.3		5.6	4.5
.6		5.2	4.7
.8		4.8	4.0
1		4.9	3.5
1.25		5.6	4.4
1.5		5.3	4.4
1.75		5.4	4.1
2		5.2	3.5
2.25		5.5	2.7
2.5		6.0	2.9
2.75		6.2	2.5
3		6.3	3.9
3.25		6.1	3.3
3.5		6.1	3.3
3.75	1	6.0	3.7

Project: CAB **Site:** 205

Location:	GDA 94	ZONE	56	507578mE	7008747mN	Lat: -27.04347	Long: 153.0764
Location:	AGD 84	ZONE	56	507472mE	7008560mN	Lat: -27.04516	Long: 153.07534
Location:	AGD 66	ZONE	56	507473mE	7008561mN	Lat: -27.04515	Long: 153.07535

Described By: S (Shane) Pointon (POIS) **Date:** 14/JUN/07

Landscape:

Landform Pattern: alluvial plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing

Classifications:

ASC: SULFIDIC, OXYAQUIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A11	0 to .2	Dark grey (10YR41) moist; clay loam, sandy; granular moderate 2-5mm structure; moderately moist when sampled; clear to
A12	.2 to .4	Black (10YR21) moist; sandy clay loam; granular moderate 2-5mm structure; moist when sampled; clear to
A2	.4 to 1.1	Light brownish grey (10YR62) moist; sand; few 2-10% subrounded quartz small pebbles 2-6 mm; single grain structure; moist when sampled; clear to
A3	1.1 to 1.5	Greyish brown (10YR52) moist; sand; few 2-10% subrounded quartz small pebbles 2-6 mm; single grain structure; moist when sampled; clear to
2C	1.5 to 1.8	Grey (10YR51) moist; loamy sand; massive structure; moist when sampled; gradual to
3C	1.8 to 2.7	Very dark grey (10YR31) moist; sand; few 2-10% subrounded quartz small pebbles 2-6 mm; single grain structure; wet when sampled; clear to
4C	2.7 to 3.9	Dark grey (10YR41) moist; clay loam; massive structure; wet when sampled; gradual to
5C	3.9 to 4.2	Dark greyish brown (10YR42) moist; light clay; massive structure; few 2-10% fine <2mm manganiferous soft segregations; wet when sampled; clear to
6C	4.2 to 4.9	Greyish brown (10YR52) moist; coarse sand; few 2-10% rounded quartz large pebbles 20-60 mm; single grain structure; wet when sampled; clear to
7C	4.9 to 5.8	Greenish grey (10Y51) moist; silty light clay; massive structure; wet when sampled
8D	7.1 to 8.1	Light greenish grey (10Y71) moist; few 2-10% coarse 15-30mm prominent orange mottles, few 2-10% coarse 15-30mm prominent red mottles; light medium clay; common 10-20% angular sandstone large pebbles 20-60 mm; massive structure; moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1		5.3	4.7	3.75	1	5.5	2.4
.3	1	4.5	3.7	4	4	5.9	2.0
.6		4.5	4.3	4.25	1	5.7	1.5
.8		4.5	4.3	4.5	4	6.5	1.6
1		4.6	4.5	4.75	2	6.8	1.0
1.25		4.7	3.3	5	2	6.3	1.2
1.5	1	5.0	2.0	5.25	4	6.7	1.6
1.75		5.4	3.7	5.5	4	7.1	1.6
2	1	5.2	1.6	5.6	4	6.9	1.5
2.25	1	5.2	1.0	7.25	1	6.1	2.3
2.5	1	5.2	1.0	7.5	1	6.4	3.1
2.75	4	5.3	1.5	7.75	1	6.1	5.3
3		5.4	2.5	8	1	7.1	5.0
3.25		5.1	2.9	8.1	1	7.0	4.2
3.5	1	5.2	2.7				

Project: CAB **Site:** 206

Location:	GDA 94	ZONE	56	509117mE	7010244mN	Lat: -27.02995	Long: 153.09191
Location:	AGD 84	ZONE	56	509011mE	7010057mN	Lat: -27.03164	Long: 153.09085
Location:	AGD 66	ZONE	56	509012mE	7010058mN	Lat: -27.03162	Long: 153.09085

Described By: S (Shane) Pointon (POIS) **Date:** 14/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** intertidal flat

Surface Condition: Firm

Disturbances: No effective disturbance except grazing by hoofed animals

Classifications:

ASC: HUMIC, AQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .15	Black (10YR21) moist; fibric clay loam; massive structure; wet when sampled; clear to
B2	.15 to .7	Light brownish grey (2.5Y62) moist; very few <2% medium 5-15mm distinct orange mottles; sandy light clay; massive structure; wet when sampled; sharp to
2B21h	.7 to .9	Very dark greyish brown (10YR32) moist; loamy sand; weakly cemented continuous massive organic pan; wet when sampled; clear to
2B22	.9 to 1.5	Brown (10YR43) moist; loamy sand; massive structure; wet when sampled; sharp to
3C	1.5 to 1.6	Light brownish grey (2.5Y63) moist; very few <2% medium 5-15mm distinct gley mottles; sandy light clay; massive structure; wet when sampled; sharp to
4B21	1.6 to 2	Brown (10YR43) moist; loamy sand; massive structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	6.1	5.1
.3		5.7	4.7
.6		5.4	1.9
.8	1	5.0	2.7
1		4.9	2.9
1.25		5.3	4.2
1.5	4	5.5	1.4
1.75		5.4	4.6
2		5.0	4.5

Observation Notes:

Observation	Waterlogged. Auger and guage sample
Vegetation	Avicennia marina, Bead weed, seablite (2 types)

Project: CAB **Site:** 207

Location:	GDA 94	ZONE	56	509112mE	7010312mN	Lat: -27.02933	Long: 153.09186
Location:	AGD 84	ZONE	56	509006mE	7010125mN	Lat: -27.03102	Long: 153.0908
Location:	AGD 66	ZONE	56	509007mE	7010126mN	Lat: -27.03101	Long: 153.0908

Described By: S (Shane) Pointon (POIS) **Date:** 14/JUN/07

Landscape:

Landform Pattern: tidal flat **Element:** intertidal flat

Surface Condition: Firm

Disturbances: Limited clearing

Classifications:

ASC: SULFIDIC, OXYAQUIC, Hydrosol

ASC: Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Very dark grey (10YR31) moist; light clay; massive structure; wet when sampled; clear to
B2	.3 to .75	Greyish brown (2.5Y52) moist; very few <2% medium 5-15mm distinct orange mottles; clay loam, sandy; massive structure; wet when sampled; clear to
C	.75 to 1.1	Dark grey (2.5Y41) moist; sandy light clay; massive structure; wet when sampled; sharp to
2B2h	1.1 to 1.3	Black (10YR21) moist; loamy sand; massive structure; weakly cemented continuous massive organic pan; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.05	1	6.2	5.1
.1	1	6.2	4.9
.3	1	6.3	5.3
.6	1	6.3	4.7
.8	4	6.2	1.2
1	4	5.8	1.1
1.25		5.5	4.3

Observation Notes:

Location	5m from road edge
Vegetation	Avicennia marina.

Project: CAB **Site:** 208

Location:	GDA 94	ZONE	56	509247mE	7010514mN	Lat: -27.02751	Long: 153.09322
Location:	AGD 84	ZONE	56	509141mE	7010327mN	Lat: -27.0292	Long: 153.09216
Location:	AGD 66	ZONE	56	509142mE	7010328mN	Lat: -27.02919	Long: 153.09216

Described By: S (Shane) Pointon (POIS) **Date:** 02/JUL/07

Landscape:

Landform Pattern: marine plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing

Classifications:

ASC: OXYAQUIC, Hydrosol

ASC: HUMIC, AQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .2	Grey (10YR51) moist; sand; single grain structure; moderately moist when sampled; sharp to
2A1	.2 to .4	Dark grey (10YR41) moist; loamy sand; single grain structure; moist when sampled; clear to
2A2	.4 to .9	Light grey (10YR72) moist; sand; single grain structure; wet when sampled; clear to
3A1	.9 to 1.3	Dark grey (2.5Y41) moist; sandy clay loam; single grain structure; common 2-5mm roots; wet when sampled; gradual to
3C	1.3 to 1.6	Grey (2.5Y61) moist; loamy sand; single grain structure; wet when sampled; abrupt to
4B2h	1.6 to 2.7	Black (10YR21) moist; loamy sand; massive structure; moderately cemented continuous massive organic pan; moist when sampled; clear to
4B3	2.7 to 3.1	Light brownish grey (10YR62) moist; few 2-10% coarse 15-30mm faint dark mottles; sand; single grain structure; wet when sampled; gradual to
5C	3.1 to 4.2	Light grey (10YR72) moist; sand; single grain structure; wet when sampled; clear to
6C	4.2 to 5.6	Grey (2.5Y51) moist; loamy sand; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1		6.3	4.5	3		6.1	4.6
.3		5.8	4.2	3.25		5.7	4.0
.6		4.9	4.4	3.5		5.8	3.4
.8		5.5	4.2	3.75		5.8	3.4
1	1	5.9	1.2	4		6.0	2.1
1.25	4	6.2	1.0	4.25		5.9	0.9
1.5	1	6.0	0.9	4.5	3	6.2	1.4
1.75	1	6.0	3.8	4.75	3	5.8	1.3
2		6.2	4.8	5	3	5.7	1.2
2.25		6.0	4.8	5.25		5.8	1.1
2.5		6.2	4.6	5.5		5.6	1.2
2.75	3	6.4	1.7				

Observation Notes:

Location	Park adjacent Pumicestone Passage.
Vegetation	MELQUINQ, CASGLAUC, CORTESSE.

Horizon Notes:

Horizon	3A1	Clay lenses in horizon.

Project: CAB **Site:** 209

Location:	GDA 94	ZONE	56	509496mE	7010073mN	Lat: -27.03149	Long: 153.09573
Location:	AGD 84	ZONE	56	509390mE	7009886mN	Lat: -27.03318	Long: 153.09467
Location:	AGD 66	ZONE	56	509391mE	7009887mN	Lat: -27.03317	Long: 153.09468

Described By: S (Shane) Pointon (POIS) **Date:** 02/JUL/07

Landscape:

Landform Pattern: tidal flat **Element:** intertidal flat

Depth to Water: .01

Surface Condition: Soft

Disturbances: Limited clearing

Classifications:

ASC: SULFIDIC, INTERTIDAL, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .2	Black (2.5Y2.5/1) moist; light clay; subangular blocky moderate 5-10mm structure; few 1-2mm roots; wet when sampled; clear to
B2	.2 to .7	Dark grey (2.5Y41) moist; few 2-10% fine <5mm faint brown mottles; light medium clay; massive structure; common <1mm roots; wet when sampled; clear to
2C	.7 to 1.1	Dark grey (10YR41) moist; loamy sand; massive structure; common <1mm roots; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	5.3	2.9
.3	1	6.1	3.5
.6	1	5.4	2.9
.8	1	5.7	1.8
1	3	5.7	1.4

Observation Notes:

Location	Surface water; Gouge Auger. Behind caravan park. No profile photos.
Vegetation	AVIMARIN, SPOVIRGI

Project: CAB **Site:** 210

Location:	GDA 94	ZONE	56	509357mE	7009986mN	Lat: -27.03227	Long: 153.09433
Location:	AGD 84	ZONE	56	509251mE	7009799mN	Lat: -27.03396	Long: 153.09327
Location:	AGD 66	ZONE	56	509252mE	7009800mN	Lat: -27.03395	Long: 153.09328

Described By: S (Shane) Pointon (POIS) **Date:** 02/JUL/07

Landscape:

Landform Pattern: marine plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing, Highly disturbed e.g. mining, urban

Classifications:

ASC: GREY, Dermosol

ASC: HUMIC, AQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .1	Very dark greyish brown (10YR32) moist; sandy light clay; subangular blocky strong 5-10mm structure; few 2-5mm roots; moist when sampled; clear to
B2	.1 to .4	Grey (10YR61) moist; common 10-20% medium 5-15mm distinct orange mottles; light medium clay; subangular blocky moderate 10-20mm structure; common 1-2mm roots; moist when sampled; sharp to
2B21	.4 to .85	Light grey (10YR72) moist; few 2-10% coarse 15-30mm distinct orange mottles; sand; single grain structure; wet when sampled; sharp to
2B22	.85 to 1.5	Grey (10YR51) moist; very few <2% medium 5-15mm faint brown mottles; loamy sand; massive structure; wet when sampled; sharp to
3B21h	1.5 to 2.2	Black (10YR21) moist; loamy sand; massive structure; strongly cemented continuous massive organic pan; wet when sampled; clear to
3B22	2.2 to 2.45	Dark grey (10YR41) moist; sand; single grain structure; wet when sampled; clear to
3B23h	2.45 to 3.1	Black (10YR21) moist; loamy sand; massive structure; strongly cemented continuous massive organic pan; wet when sampled; clear to
4C	3.1 to 4.3	Dark greyish brown (10YR42) moist; fine sandy clay loam; massive structure; weakly cemented continuous massive organic pan; wet when sampled; clear to
5C1	4.3 to 7	Olive grey (5Y52) moist; sand; single grain structure; wet when sampled; gradual to
5C2	7 to 7.5	Grey (5Y51) moist; sand; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	7.5	3.5	4	1	6.0	1.4
.3		6.6	4.0	4.25	1	6.1	1.0
.6		5.8	4.3	4.5	1	6.2	1.2
.8		5.9	4.3	4.75		6.1	2.1
1		4.2	3.6	5		5.7	1.9
1.25		5.6	4.0	5.25		5.6	1.9
1.5		6.0	4.4	5.5		5.5	1.9
1.75		6.8	5.3	5.75		6.1	2.5
2		6.7	5.5	6		5.8	2.5
2.25		6.7	5.3	6.25		5.8	2.1
2.5		6.9	4.6	6.5		5.7	4.7
2.75		6.6	5.3	6.75		5.7	2.4
3		6.7	5.3	7		5.7	1.8
3.25		6.3	5.2	7.25		5.7	1.7
3.5		6.2	5.1	7.5		5.7	1.0
3.75	1	5.9	2.2				

Project: CAB **Site:** 211

Location:	GDA 94	ZONE	56	509812mE	7009998mN	Lat: -27.03216	Long: 153.09892
Location:	AGD 84	ZONE	56	509706mE	7009811mN	Lat: -27.03385	Long: 153.09786
Location:	AGD 66	ZONE	56	509707mE	7009812mN	Lat: -27.03384	Long: 153.09786

Described By: S (Shane) Pointon (POIS) **Date:** 02/JUL/07

Landscape:

Landform Pattern: marine plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing

Classifications:

ASC: GREY, Dermosol

ASC: HUMIC, AQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Very dark greyish brown (10YR32) moist; few 2-10% medium 5-15mm distinct orange mottles; sandy clay loam; few 2-10% rounded ironstone medium pebbles 6-20 mm; subangular blocky moderate 2-5mm structure; moderately moist when sampled; clear to
2A1	.3 to .5	Black (10YR21) moist; clay loam; subangular blocky moderate 2-5mm structure; moderately moist when sampled; clear to
2B2	.5 to 1.1	Greyish brown (10YR52) moist; common 10-20% medium 5-15mm prominent orange mottles; light medium clay; subangular blocky weak 5-10mm structure; moist when sampled; clear to
3C	1.1 to 1.4	Dark grey (2.5Y41) moist; sandy light clay; massive structure; wet when sampled; abrupt to
4B21h	1.4 to 1.6	Dark greyish brown (2.5Y43) moist; sandy loam; massive structure; moist when sampled; abrupt to
4B22h	1.6 to 1.8	Very dark greyish brown (10YR32) moist; sandy loam; massive structure; moist when sampled; abrupt to
5A2	1.8 to 1.9	White (10YR81) moist; sand; single grain structure; moist when sampled; abrupt to
5B21h	1.9 to 2.1	Black (10YR21) moist; sandy loam; weakly cemented continuous massive organic pan; moist when sampled; gradual to
6C	2.1 to 3.8	Dark greyish brown (10YR42) moist; loamy sand; single grain structure; wet when sampled; diffuse to
7C	3.8 to 4.5	Grey (2.5Y51) moist; loamy sand; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	6.3	4.4
.3	1	6.9	5.1
.6	1	7.1	5.2
.8		5.5	4.1
1		5.4	3.8
1.25		6.0	5.3
1.5	4	5.3	1.9
1.75	3	5.3	1.0
2	1	5.4	3.0
2.25	1	5.3	2.5
2.5		5.1	2.2
2.75		5.4	2.4
3		5.3	3.4
3.25	1	4.9	3.5
3.5	1	5.2	1.9
3.75	1	5.0	2.1
4	2	5.0	1.7
4.25	4	5.1	1.1
4.5	4	5.1	1.4

Project: CAB **Site:** 212

Location:	GDA 94	ZONE	56	509763mE	7009647mN	Lat: -27.03533	Long: 153.09843
Location:	AGD 84	ZONE	56	509657mE	7009460mN	Lat: -27.03702	Long: 153.09737
Location:	AGD 66	ZONE	56	509658mE	7009461mN	Lat: -27.03701	Long: 153.09737

Described By: S (Shane) Pointon (POIS) **Date:** 03/JUL/07

Landscape:

Landform Pattern: tidal flat **Element:** supratidal flat

Disturbances: Extensive clearing

Classifications:

ASC: GREY, Dermosol

ASC: HUMIC, AQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .1	Very dark grey (10YR31) moist; clay loam, fine sandy; subangular blocky moderate 2-5mm structure; moist when sampled; abrupt to
B2	.1 to .3	Grey (10YR51) moist; common 10-20% medium 5-15mm distinct orange mottles; light medium clay; subangular blocky moderate 5-10mm structure; wet when sampled; sharp to
2A2e	.3 to 1	Light grey (10YR72) moist; sand; single grain structure; wet when sampled; sharp to
2B21h	1 to 2.7	Black (10YR21) moist; sandy loam; massive structure; weakly cemented continuous massive organic pan; wet when sampled; gradual to
2B22	2.7 to 3	Brown (10YR53) moist; loamy sand; massive structure; wet when sampled; gradual to
3C	3 to 3.5	Greyish brown (2.5Y52) moist; sand; single grain structure; wet when sampled; diffuse to
4C	3.5 to 4.5	Grey (5Y61) moist; sand; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1		5.9	4.9	2.25		6.5	4.7
.3		6.1	5.2	2.5		6.0	4.8
.35		4		2.75		5.9	4.6
.4		4.1		3		5.5	4.6
.6		6.0	5.1	3.25	1	5.2	1.3
.8		6.2	5.0	3.5	2	4.8	1.2
1		6.0	5.1	3.75	3	4.6	1.0
1.25		6.2	4.8	4	4	4.5	1.1
1.5		6.3	4.1	4.25	4	4.3	1.3
1.75		6.3	5.0	4.5	2	4.4	1.2
2		6.4	4.8				

Observation Notes:

Location	Council land
Vegetation	CASGLAUC, MELQUINQ, SPOVIRGI

Horizon Notes:

Horizon	2A2e	Thin clay lenses at top of horizon 0.3-0.4m, 2.5Y41, ~0.1m thick.

Project: CAB **Site:** 213

Location:	GDA 94	ZONE	56	509905mE	7009675mN	Lat: -27.03508	Long: 153.09986
Location:	AGD 84	ZONE	56	509799mE	7009488mN	Lat: -27.03677	Long: 153.0988
Location:	AGD 66	ZONE	56	509800mE	7009489mN	Lat: -27.03676	Long: 153.0988

Described By: S (Shane) Pointon (POIS) **Date:** 03/JUL/07

Landscape:

Landform Pattern: tidal flat **Element:** drainage depression

Disturbances: Extensive clearing, Highly disturbed e.g. mining, urban

Classifications:

ASC: GREY, Dermosol

ASC: HUMIC, AQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .1	Very dark grey (10YR31) moist; fine sandy light clay; subangular blocky moderate 2-5mm structure; common 2-5mm roots; moist when sampled; clear to
B2	.1 to .45	Grey (10YR51) moist; common 10-20% medium 5-15mm distinct orange mottles; light medium clay; subangular blocky moderate 5-10mm structure; common 1-2mm roots; moist when sampled; abrupt to
2A2	.45 to .7	Light grey (10YR72) moist; sand; single grain structure; wet when sampled; abrupt to
2B21h	.7 to 2.4	Black (10YR21) moist; sandy loam; massive structure; few 1-2mm roots; moderately cemented continuous massive organic pan; wet when sampled; gradual to
2B22	2.4 to 3	Brown (10YR43) moist; very few <2% coarse 15-30mm faint dark mottles; loamy sand; massive structure; wet when sampled; gradual to
2B3	3 to 3.2	Pale brown (10YR63) moist; sand; single grain structure; wet when sampled; gradual to
3C	3.2 to 4.1	Grey (2.5Y61) moist; sand; single grain structure; wet when sampled; diffuse to
4C	4.1 to 6	Greyish brown (2.5Y53) moist; sand; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1		5.1	4.4	3		5.3	4.5
.3		5.7	4.9	3.25	1	6.7	1.9
.5		5.9	1.0	3.5	3	6.5	1.7
.6		5.5	1.4	3.75	3	6.2	1.8
.8		5.5	1.1	4	3	6.5	1.7
1		5.6	3.9	4.25	3	6.3	1.7
1.25		6.2	4.4	4.5	3	6.5	1.2
1.5		6.0	4.2	4.75	3	5.7	1.6
1.75	1	5.7	3.8	5	3	5.8	1.0
2	1	5.6	3.6	5.25	1	5.5	1.2
2.25		5.5	3.9	5.5	1	5.3	1.2
2.5		5.4	4.6	5.75	1	5.5	1.3
2.75		5.4	4.5	6	1	5.5	1.4

Observation Notes:

Location Council land. Small DDE too wet to cross. Monosulfides on other side of DDE, on surface

Vegetation CASGLAUC, SPOVIRGI, MELQUINQ.

Horizon Notes:

Horizon 2A2 Thin PASS clay lenses, 2.5Y41, 0.1m, 0.05m thick.

Project: CAB **Site:** 214

Location:	GDA 94	ZONE	56	509981mE	7009437mN	Lat: -27.03723	Long: 153.10063
Location:	AGD 84	ZONE	56	509875mE	7009250mN	Lat: -27.03892	Long: 153.09957
Location:	AGD 66	ZONE	56	509876mE	7009251mN	Lat: -27.0389	Long: 153.09957

Described By: S (Shane) Pointon (POIS) **Date:** 03/JUL/07

Landscape:

Landform Pattern: marine plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing

Classifications:

ASC: GREY, Dermosol

ASC: HUMIC, AQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Dark grey (10YR41) moist; sandy clay loam; weak structure; moderately moist when sampled
B21	.3 to .5	Dark greyish brown (10YR42) moist; common 10-20% coarse 15-30mm distinct orange mottles; sandy light clay; subangular blocky moderate 20-50mm structure; moist when sampled
2B22	.5 to 1.1	Light yellowish brown (10YR64) moist; common 10-20% coarse 15-30mm distinct orange mottles; loamy sand; single grain structure; moist when sampled
3A2	1.1 to 1.8	Grey (10YR61) moist; loamy sand; weakly cemented continuous massive organic pan; moist when sampled
3B21h	1.8 to 5.5	Black (10YR21) moist; sandy loam; massive structure; moderately cemented continuous massive organic pan; moist when sampled
3B22h	5.5 to 7	Very dark brown (10YR22) moist; loamy sand
3B23	7 to 8.5	Dark brown (10YR33) moist; loamy sand; massive structure

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.2	2.3	4.5	1	6.4	2.1
.3	1	5.5	2.6	4.75	1	6.3	2.2
.6	1	5.5	3.7	5	1	6.3	2.6
.8	1	5.5	3.3	5.25	1	6.4	3.22
1	1	5.0	3.3	5.5	1	6.5	3.7
1.25	1	5.5	2.7	5.75	1	6.6	3.9
1.5	3	5.6	2.9	6	1	6.7	3.5
1.75	3	6.1	2.3	6.25	1	6.7	3.7
2	3	6.2	3.3	6.5	1	6.7	3.9
2.25	1	6.2	2.4	6.75	1	6.6	3.2
2.5	1	6.4	3.0	7	1	6.7	1.9
2.75	1	6.3	2.0	7.25	1	6.6	2.5
3	1	6.3	3.1	7.5	1	6.6	2.9
3.25	1	6.3	2.6	7.75	1	6.7	2.8
3.5	1	6.4	3.7	8	1	6.5	2.7
3.75	1	6.3	3.8	8.25	1	6.6	1.8
4	1	6.3	2.3	8.5	1	6.2	2.9
4.25	1	6.4	2.1				

Observation Notes:

Observation Quite a difficult site! Appears slightly higher than surroundings.

Vegetation MELQUINQ, CASGALUC, EUCTERET.

Project: CAB **Site:** 215

Location:	GDA 94	ZONE	56	510083mE	7008993mN	Lat: -27.04123	Long: 153.10166
Location:	AGD 84	ZONE	56	509977mE	7008806mN	Lat: -27.04292	Long: 153.1006
Location:	AGD 66	ZONE	56	509978mE	7008807mN	Lat: -27.04291	Long: 153.1006

Described By: S (Shane) Pointon (POIS) **Date:** 09/JUL/07

Landscape:

Landform Pattern: plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing

Classifications:

ASC: HUMIC, SEMIAQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .2	Very dark grey (10YR31) moist; loamy sand; single grain structure; moderately moist when sampled; gradual to
A2	.2 to .6	Pale brown (10YR63) moist; sand; single grain structure; moist when sampled; clear to
B1	.6 to 1.2	Greyish brown (10YR52) moist; sand; single grain structure; moist when sampled; clear to
B21h	1.2 to 1.5	Black (10YR21) moist; loamy sand; massive structure; weakly cemented continuous massive organic pan; moist when sampled; clear to
B22	1.5 to 1.8	Dark greyish brown (10YR42) moist; sand; single grain structure; wet when sampled; clear to
B23h	1.8 to 3	Black (10YR21) moist; loamy sand; massive structure; wet when sampled; gradual to
B24	3 to 3.9	Dark greyish brown (10YR42) moist; loamy sand; single grain structure; wet when sampled; gradual to
C1	3.9 to 5	Olive grey (5Y42) moist; sand; single grain structure; wet when sampled; diffuse to
C2	5 to 6	Greyish brown (2.5Y52) moist; sand; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.8	3.2	3.25		6.7	4.9
.3		5.8	3.9	3.5		6.7	4.9
.6		6.1	4.1	3.75		6.8	4.9
.8	1	5.9	3.6	4		6.6	4.6
1	1	6.6	2.9	4.25		6.7	2.9
1.25	4	6.8	2.8	4.5	1	6.9	1.9
1.5	1	6.6	3.4	4.75	1	6.7	1.5
1.75	1	6.5	4.6	5	2	6.6	1.9
2		6.5	4.4	5.25	2	6.6	1.5
2.25		6.5	4.4	5.5	2	6.5	1.3
2.5		6.5	4.3	5.75	2	6.6	1.4
2.75		6.6	4.6	6	1	6.6	2.3
3		6.6	4.8				

Observation Notes:

Vegetation MELQUINQ, CORTESSE.

Project: CAB **Site:** 216

Location:	GDA 94	ZONE	56	510590mE	7008414mN	Lat: -27.04646	Long: 153.10678
Location:	AGD 84	ZONE	56	510484mE	7008227mN	Lat: -27.04815	Long: 153.10572
Location:	AGD 66	ZONE	56	510485mE	7008228mN	Lat: -27.04814	Long: 153.10572

Described By: S (Shane) Pointon (POIS) **Date:** 09/JUL/07

Landscape:

Landform Pattern: marine plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing

Classifications:

ASC: HUMIC, SEMIAQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A11	0 to .2	Grey (7.5YR51) moist; loamy sand; single grain structure; moderately moist when sampled
A12	.2 to .6	Dark grey (7.5YR41) moist; loamy sand; single grain structure; moderately moist when sampled
A13	.6 to .9	Light brownish grey (10YR62) moist; sand; single grain structure; moderately moist when sampled
A2	.9 to 1.3	White (10YR82) moist; very few <2% medium 5-15mm faint orange mottles; loamy sand; single grain structure; moist when sampled
B1	1.3 to 1.5	Greyish brown (10YR52) moist; few 2-10% medium 5-15mm distinct orange mottles; loamy sand; massive structure; moist when sampled
B21h	1.5 to 2	Black (10YR21) moist; loamy sand; massive structure; wet when sampled
B22h	2 to 2.2	Very dark grey (10YR31) moist; loamy sand; massive structure; wet when sampled
B23h	2.2 to 2.4	Black (10YR21) moist; loamy sand; very few <2% rounded detrital sedimentary rock (unidentified) medium pebbles 6-20 mm; massive structure; wet when sampled
2C	2.4 to 2.6	Dark grey (2.5Y41) moist; sand; single grain structure; wet when sampled
3B21h	2.6 to 3	Black (10YR21) moist; loamy sand; massive structure; wet when sampled
4C	3 to 3.3	Dark grey (2.5Y41) moist; sand; single grain structure; wet when sampled
5B21h	3.3 to 3.9	Black (10YR21) moist; loamy sand; massive structure; moderately cemented continuous massive organic pan; wet when sampled
5B22	3.9 to 4.3	Brown (10YR43) moist; sand; single grain structure; wet when sampled
5B23h	4.3 to 5.3	Black (10YR21) moist; loamy sand; single grain structure; weakly cemented continuous massive organic pan; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1		5.7	4.2	3		5.3	2.6
.3		5.4	4.0	3.25	1	5.7	2.2
.6		5.6	4.4	3.5	1	5.6	2.7
.8		5.7	4.7	3.75	1	5.3	2.7
1		5.6	4.6	4	1	5.7	1.9
1.25		5.5	4.7	4.25	2	5.7	1.3
1.5		5.5	4.0	4.5	2	6.0	1.4
1.75		4.8	3.4	4.75	2	6.1	1.4
2		5.1	3.1	5	2	5.9	1.9
2.25	1	5.1	1.6	5.25	1	5.8	1.9
2.5	1	5.3	1.2	5.3	2	5.9	1.5
2.75		5.2	2.7				

Observation Notes:

Vegetation CORTESSE, EUCTERET, CORINTER, ACCSPP__

Project: CAB **Site:** 217

Location:	GDA 94	ZONE	56	510296mE	7008943mN	Lat: -27.04168	Long: 153.10381
Location:	AGD 84	ZONE	56	510190mE	7008756mN	Lat: -27.04337	Long: 153.10275
Location:	AGD 66	ZONE	56	510191mE	7008757mN	Lat: -27.04336	Long: 153.10275

Described By: S (Shane) Pointon (POIS) **Date:** 09/JUL/07

Landscape:

Landform Pattern: marine plain **Element:** plain

Surface Condition: Firm

Disturbances: Complete clearing - pasture - but never cultivated

Classifications:

ASC: HUMIC, SEMIAQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Dark grey (10YR41) moist; loamy sand; single grain structure; moderately moist when sampled; clear to
B2	.3 to .5	Very dark greyish brown (10YR32) moist; few 2-10% medium 5-15mm distinct orange mottles; sandy loam; weak structure; moderately moist when sampled; clear to
2A2	.5 to 1.2	White (10YR81) moist; sand; single grain structure; moist when sampled; clear to
2B21h	1.2 to 2.4	Black (10YR21) moist; sandy loam; massive structure; strongly cemented continuous massive organic pan; moist when sampled; clear to
2B22h	2.4 to 2.7	Very dark greyish brown (10YR32) moist; loamy sand; massive structure; wet when sampled; clear to
2B23h	2.7 to 3.3	Black (10YR21) moist; sandy loam; massive structure; weakly cemented continuous massive organic pan; wet when sampled; gradual to
2B24	3.3 to 4.5	Very dark brown (7.5YR2.5/2) moist; loamy sand; massive structure; wet when sampled; clear to
3C1	4.5 to 5.2	Brown (10YR43) moist; sand; single grain structure; wet when sampled; diffuse to
3C2	5.2 to 6	Dark greyish brown (10YR42) moist; sand; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.5	3.5	3.25	4	6.5	1.2
.3	1	5.8	3.9	3.5		6.5	4.0
.6		5.7	3.5	3.75		6.6	4.3
.8		5.6	5.0	4		6.5	4.0
1		5.1	5.0	4.25	2	6.4	1.2
1.25	1	5.9	2.1	4.5	2	6.3	1.8
1.5	1	5.6	2.0	4.75	2	6.2	1.3
1.75	1	5.9	1.9	5	3	6.2	1.7
2	1	5.8	2.8	5.25	3	6.1	1.3
2.25	1	6.1	2.8	5.5	3	6.3	1.5
2.5	2	6.1	2.9	5.75	4	6.1	1.5
2.75	2	6.4	3.1	6	4	6.0	1.7
3	1	6.3	3.0				

Observation Notes:

Vegetation CORTESSE, EUCTERET, CORINTER, ACCSPP__, MELQUINQ

Project: CAB **Site:** 218

Location:	GDA 94	ZONE	56	510311mE	7008692mN	Lat: -27.04395	Long: 153.10396
Location:	AGD 84	ZONE	56	510205mE	7008505mN	Lat: -27.04564	Long: 153.1029
Location:	AGD 66	ZONE	56	510206mE	7008506mN	Lat: -27.04563	Long: 153.1029

Described By: S (Shane) Pointon (POIS) **Date:** 09/JUL/07

Landscape:

Landform Pattern: tidal flat **Element:** supratidal flat

Surface Condition: Firm, Soft

Disturbances: Extensive clearing

Classifications:

ASC: TENOSOLIC, OXYAQUIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .1	Black (10YR21) moist; clay loam, sandy; subangular blocky moderate 2-5mm structure; moist when sampled; clear to
B2	.1 to .3	Light brownish grey (10YR62) moist; very few <2% medium 5-15mm faint orange mottles; sandy light clay; weak structure; moist when sampled; clear to
2B21h	.3 to .7	Black (10YR21) moist; loamy sand; massive structure; moderately cemented continuous massive organic pan; moist when sampled; gradual to
2B22	.7 to 1	Very dark brown (10YR22) moist; loamy sand; massive structure; wet when sampled; clear to
2B23	1 to 1.2	Dark greyish brown (10YR42) moist; loamy sand; single grain structure; wet when sampled; clear to
2B24	1.2 to 1.8	Very dark grey (10YR31) moist; loamy sand; single grain structure; wet when sampled; clear to
3C	1.8 to 2.3	Brown (10YR53) moist; sand; single grain structure; wet when sampled; abrupt to
4C	2.3 to 2.7	Light brownish grey (10YR62) moist; sand; single grain structure; wet when sampled; clear to
5C	2.7 to 3.1	Brown (10YR53) moist; sand; single grain structure; wet when sampled; clear to
6C1	3.1 to 4	Olive grey (5Y42) moist; sand; single grain structure; wet when sampled; clear to
6C2	4 to 4.2	Dark greyish brown (2.5Y42) moist; sand; single grain structure; wet when sampled; clear to
6C3	4.2 to 4.5	Olive grey (5Y52) moist; sand; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1		5.7	4.4	2.25		5.4	3.8
.2		5.7	4.5	2.5		5.6	1.2
.3		5.5	4.2	2.75		5.3	3.8
.6		5.6	4.3	3		5.4	4.3
.8		5.6	4.3	3.25	2	5.2	1.6
1		5.2	4.4	3.5	2	5.3	1.3
1.25		5.1	3.8	3.75	2	5.3	1.3
1.5		5.2	3.8	4	2	5.2	1.2
1.75		5.2	3.7	4.25	4	5.3	1.6
2		5.4	3.9	4.5	3	5.2	1.8

Observation Notes:

Vegetation AVIMARIN, SPOVIRGI.

Project: CAB **Site:** 219

Location:	GDA 94	ZONE	56	509510mE	7007885mN	Lat: -27.05124	Long: 153.09589
Location:	AGD 84	ZONE	56	509404mE	7007698mN	Lat: -27.05293	Long: 153.09483
Location:	AGD 66	ZONE	56	509405mE	7007699mN	Lat: -27.05292	Long: 153.09483

Described By: S (Shane) Pointon (POIS) **Date:** 11/JUL/07

Landscape:

Landform Pattern: marine plain **Element:** plain

Surface Condition: Firm, Soft

Disturbances: Extensive clearing

Classifications:

ASC: HUMIC, SEMIAQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Grey (10YR51) moist; sand; single grain structure; clear to
B21	.3 to .6	Brown (10YR53) moist; very few <2% medium 5-15mm faint orange mottles; sand; single grain structure; gradual to
B22	.6 to 1	Very pale brown (10YR74) moist; few 2-10% medium 5-15mm distinct orange mottles; sand; single grain structure; gradual to
2A21	1 to 1.5	White (10YR82) moist; sand; single grain structure; clear to
2A22	1.5 to 1.7	White (10YR81) moist; sand; single grain structure; abrupt to
2B21	1.7 to 1.8	Dark grey (10YR41) moist; few 2-10% coarse 15-30mm distinct orange mottles; sandy clay loam; massive structure; abrupt to
2B22h	1.8 to 3.7	Black (10YR21) moist; loamy sand; massive structure; diffuse to
2B23	3.7 to 4.9	Dark brown (10YR33) moist; sand; massive structure; clear to
3C	4.9 to 6	Grey (2.5Y51) moist; sand; massive structure

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	4.9	3.4	3.25		5.9	4.2
.3		4.9	4.1	3.5		5.9	3.7
.6		5.3	4.3	3.75		5.7	4.0
.8		5.4	4.8	4		5.6	4.1
1		5.5	4.9	4.25		5.3	4.1
1.25		5.4	5.2	4.5		5.3	3.7
1.5		5.4	5.0	4.75		5.5	4.4
1.75		5.0	3.6	5	2	4.9	1.3
2		5.0	3.6	5.25		4.8	1.3
2.25		5.4	3.6	5.5		4.6	1.5
2.5	1	5.7	3.9	5.75		4.9	1.2
2.75	1	5.5	3.1	6		5.1	1.4
3	1	5.6	3.0				

Observation Notes:

Vegetation CORTESSE, EUCTERET, CALCOLUM, ACCSPP__

Project: CAB **Site:** 220

Location:	GDA 94	ZONE	56	509632mE	7009212mN	Lat: -27.03926	Long: 153.09711
Location:	AGD 84	ZONE	56	509526mE	7009025mN	Lat: -27.04095	Long: 153.09605
Location:	AGD 66	ZONE	56	509527mE	7009026mN	Lat: -27.04094	Long: 153.09605

Described By: S (Shane) Pointon (POIS) **Date:** 11/JUL/07

Landscape:

Landform Pattern: No record **Element:** Tidal Flat

Surface Condition: Soft

Disturbances: No record

Classifications:

ASC: SULFIDIC, OXYAQUIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .1	Dark grey (10YR41) moist; silty light clay; massive structure; wet when sampled; clear to
B2	.1 to .4	Very dark grey (10YR31) moist; silty light clay; massive structure; wet when sampled; clear to
2C	.4 to .7	Very dark grey (2.5Y31) moist; clay loam; massive structure; wet when sampled; clear to
3C	.7 to 1.25	Dark greenish grey (10Y41) moist; clay loam, sandy; massive structure

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	5.3	2.8
.3	1	5.3	1.0
.6	2	5.3	1.4
.8	2	5.2	1.6
1	2	5.2	1.6
1.25	4	5.2	1.3

Project: CAB **Site:** 221

Location:	GDA 94	ZONE	56	509511mE	7009845mN	Lat: -27.03355	Long: 153.09589
Location:	AGD 84	ZONE	56	509405mE	7009658mN	Lat: -27.03524	Long: 153.09482
Location:	AGD 66	ZONE	56	509406mE	7009659mN	Lat: -27.03522	Long: 153.09483

Described By: S (Shane) Pointon (POIS) **Date:** 11/JUL/07

Landscape:

Landform Pattern: plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing

Classifications:

ASC: SULFIDIC, REDOXIC, Hydrosol

ASC: Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .2	Very dark grey (10YR31) moist; clay loam, sandy; weak structure; moist when sampled; clear to
B2	.2 to .5	Dark grey (10YR41) moist; common 10-20% medium 5-15mm distinct orange mottles; light medium clay; subangular blocky moderate 10-20mm structure; moist when sampled; abrupt to
2A2	.5 to .9	White (10YR81) moist; very few <2% medium 5-15mm distinct orange mottles; sand; single grain structure; wet when sampled; clear to
2C1	.9 to 1.2	Dark grey (10YR41) moist; sand; single grain structure; wet when sampled; clear to
2C2	1.2 to 2.1	Dark grey (10YR41) moist; sand; single grain structure; wet when sampled; gradual to
3B21h	2.1 to 3.6	Black (10YR21) moist; loamy sand; massive structure; strongly cemented continuous massive organic pan; wet when sampled; diffuse to
3B22h	3.6 to 7.1	Very dark brown (10YR22) moist; sand; single grain structure; wet when sampled; clear to
3B23s	7.1 to 8	Dark yellowish brown (10YR34) moist; sand; single grain structure; wet when sampled; gradual to
4C	8 to 8.4	Grey (2.5Y51) moist; sand; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.5	1.7	4.5	2	5.8	1.3
.3	1	5.4	2.8	4.75	1	5.8	1.5
.6		4.8	3.7	5	1	5.4	1.5
.8		5.6	3.2	5.25	2	5.5	1.8
1	1	5.5	1.5	5.5	1	5.6	1.3
1.25	1	5.9	1.8	5.75	1	5.6	1.1
1.5	1	5.7	1.6	6	1	5.6	1.2
1.75	2	5.7	2.2	6.25	1	5.1	1.3
2	2	5.9	1.6	6.5	1	4.9	1.3
2.25	2	6.0	3.3	6.75	1	4.9	1.3
2.5	2	6.6	3.4	7	1	4.9	1.3
2.75	2	6.6	3.2	7.25	1	5.2	1.5
3	2	6.6	2.9	7.5	1	5.3	1.5
3.25	2	6.8	2.9	7.75	2	5.3	1.8
3.5	2	6.5	3.2	8	4	5.4	1.7
3.75	2	6.6	3.4	8.25	4	5.6	1.3
4	2	6.1	3.3	8.4	4	5.6	1.6
4.25	2	5.8	3.4				

Observation Notes:

Vegetation EUCTERET, MELQUINQ, LOPSUAVE

Project: CAB **Site:** 222

Location:	GDA 94	ZONE	56	508722mE	7009883mN	Lat: -27.03321	Long: 153.08793
Location:	AGD 84	ZONE	56	508616mE	7009696mN	Lat: -27.0349	Long: 153.08687
Location:	AGD 66	ZONE	56	508617mE	7009697mN	Lat: -27.03489	Long: 153.08687

Described By: S (Shane) Pointon (POIS) **Date:** 11/JUL/07

Landscape:

Landform Pattern: tidal flat **Element:** intertidal flat

Disturbances: No effective disturbance except grazing by hoofed animals

Classifications:

ASC: SULFIDIC, OXYAQUIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A11	0 to .2	Black (10YR21) moist; fibric silty light clay; massive structure; gradual to
A12	.2 to .35	Very dark grey (N30) moist; silty light clay; massive structure; clear to
B2	.35 to .6	Dark greenish grey (10Y41) moist; silty light clay; massive structure; clear to
2C	.6 to .9	Dark greenish grey (10Y41) moist; sandy light clay; clear to
3C	.9 to 1.25	Dark grey (2.5Y41) moist; fibric silty light clay; massive structure

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	2	7.0	4.3
.3	3	6.8	1.0
.6	3	7.0	4.6
.8	4	7.0	0.9
1	4	6.4	0.6
1.25	4	6.8	0.6

Observation Notes:

Vegetation AVIMARIN

Project: CAB **Site:** 223

Location:	GDA 94	ZONE	56	507876mE	7008596mN	Lat: -27.04483	Long: 153.07941
Location:	AGD 84	ZONE	56	507770mE	7008409mN	Lat: -27.04652	Long: 153.07835
Location:	AGD 66	ZONE	56	507771mE	7008410mN	Lat: -27.04651	Long: 153.07835

Described By: S (Shane) Pointon (POIS) **Date:** 16/JUL/07

Landscape:

Landform Pattern: plain **Element:** drainage depression

Surface Condition: Firm, Hard setting

Disturbances: Extensive clearing

Classifications:

ASC: OXYAQUIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .35	Very dark grey (10YR31) moist; clay loam, sandy; weak structure; moderately moist when sampled; clear to
B2	.35 to .8	Light brownish grey (10YR62) moist; common 10-20% coarse 15-30mm distinct orange mottles; sandy clay loam; massive structure; moist when sampled; gradual to
2C	.8 to 2	Grey (10YR51) moist; sand; massive structure; wet when sampled; clear to
3C	2 to 2.3	Dark grey (2.5Y41) moist; silty light clay; massive structure; wet when sampled; clear to
4C	2.3 to 2.8	Grey (N50) moist; clay loam, coarse sandy; few 2-10% subrounded quartz medium pebbles 6-20 mm; massive structure; wet when sampled; gradual to
5D1	2.8 to 3.8	Olive brown (2.5Y44) moist; common 10-20% coarse 15-30mm distinct grey mottles; coarse sandy light medium clay; few 2-10% angular ferruginised sandstone cobbles 60-200 mm; massive structure; moist when sampled; diffuse to
5D2	3.8 to 4.4	Light greenish grey (10GY81) moist; common 10-20% coarse 15-30mm distinct brown mottles; light medium clay; massive structure; moderately moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	6.1	3.8
.3		6.0	4.0
.6		5.9	3.8
.8		6.0	4.0
1		6.2	4.0
1.25	1	6.1	3.2
1.5	2	6.2	3.3
1.75	1	6.1	2.8
2	3	6.5	1.2
2.25	3	6.5	0.9
2.5	4	6.4	1.5
2.75	4	6.1	1.8
3	1	5.7	2.8
3.25		6.2	3.4
3.5		6.3	3.8
3.75	1	6.4	3.9
4	1	6.1	4.0
4.25	1	6.0	5.0

Observation Notes:

Location	Toorbul side of Bill Poppers place
Vegetation	slash pine, MELQUINQ, EUCTERET

Project: CAB **Site:** 224

Location:	GDA 94	ZONE	56	508138mE	7008815mN	Lat: -27.04285	Long: 153.08205
Location:	AGD 84	ZONE	56	508032mE	7008628mN	Lat: -27.04454	Long: 153.08099
Location:	AGD 66	ZONE	56	508033mE	7008629mN	Lat: -27.04453	Long: 153.08099

Described By: S (Shane) Pointon (POIS) **Date:** 16/JUL/07

Landscape:

Landform Pattern: plain **Element:** plain

Surface Condition: Firm

Classifications:

ASC: GREY, Kurosol

ASC: OXYAQUIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Dark grey (10YR41) moist; sandy clay loam; weak structure; moderately moist when sampled; clear to
B2	.3 to .7	Dark greyish brown (2.5Y42) moist; few 2-10% coarse 15-30mm distinct orange mottles; sandy light medium clay; weak structure; subangular blocky moderate 10-20mm structure; moist when sampled; clear to
2C	.7 to 1.7	Pale yellow (2.5Y73) moist; common 10-20% very coarse >30mm distinct orange mottles; coarse sand; single grain structure; wet when sampled; abrupt to
3C	1.7 to 2.3	Grey (2.5Y51) moist; loamy sand; massive structure; wet when sampled; clear to
4C	2.3 to 2.5	Dark grey (2.5Y41) moist; sandy light clay; massive structure; wet when sampled; clear to
5C	2.5 to 2.7	Grey (2.5Y51) moist; sand; single grain structure; wet when sampled; clear to
6C	2.7 to 3.6	Light grey (2.5Y71) moist; sand; single grain structure; wet when sampled; clear to
7C	3.6 to 6	Dark greenish grey (10Y41) moist; silty light clay; massive structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.4	3.4	3.25	4	4.7	1.4
.3	1	5.1	3.4	3.5	4	5.3	1.2
.6		5.3	3.9	3.75	4	5.9	1.6
.8		5.4	4.3	4	4	6.1	1.6
1		5.3	4.5	4.25	4	6.2	1.5
1.25		5.2	4.4	4.5	4	5.0	1.7
1.5		4.8	3.4	4.75	4	5.8	1.3
1.75	4	4.5	1.7	5	4	6.2	1.3
2	4	4.9	1.8	5.25	4	6.2	1.6
2.25	4	5.0	1.6	5.5	4	6.3	1.5
2.5	4	4.7	1.5	5.75	4	6.3	1.5
2.75	4	4.4	1.4	6	4	5.8	1.5
3	4	4.9	1.4				

Observation Notes:

Vegetation EUCTERET, CORINTER

Project: CAB **Site:** 225

Location:	GDA 94	ZONE	56	508173mE	7009087mN	Lat: -27.0404	Long: 153.0824
Location:	AGD 84	ZONE	56	508067mE	7008900mN	Lat: -27.04209	Long: 153.08134
Location:	AGD 66	ZONE	56	508068mE	7008901mN	Lat: -27.04208	Long: 153.08134

Described By: S (Shane) Pointon (POIS) **Date:** 16/JUL/07

Landscape:

Landform Pattern: plain **Element:** plain

Disturbances: Highly disturbed e.g. mining, urban

Classifications:

ASC: GREY, Kurosol

ASC: OXYAQUIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Very dark grey (10YR31) moist; sandy clay loam; weak structure; moderately moist when sampled; clear to
B2	.3 to .7	Greyish brown (10YR52) moist; common 10-20% coarse 15-30mm distinct orange mottles; sandy light medium clay; angular blocky moderate 10-20mm structure; moderately moist when sampled; clear to
2C	.7 to 1.7	Grey (10YR61) moist; few 2-10% coarse 15-30mm distinct orange mottles; clay loam, sandy; massive structure; moist when sampled; abrupt to
3C1	1.7 to 2.25	Dark grey (2.5Y41) moist; few 2-10% coarse 15-30mm distinct orange mottles; silty light clay; few 2-10% other medium pebbles 6-20 mm; massive structure; wet when sampled; gradual to
3C2	2.25 to 3.9	Grey (2.5Y51) moist; light medium clay; very few <2% other medium pebbles 6-20 mm; massive structure; wet when sampled; abrupt to
4C1	3.9 to 4.8	Light grey (2.5Y71) moist; sand; single grain structure; wet when sampled; gradual to
4C2	4.8 to 5.2	Grey (2.5Y51) moist; sand; single grain structure; wet when sampled; gradual to
4C3	5.2 to 6	Grey (5Y61) moist; sand; single grain structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.8	3.1	3.25	4	6.1	2.2
.3		5.7	3.5	3.5	4	4.3	2.6
.6		5.2	3.6	3.75	4	3.8	2.6
.8		5.1	3.7	4	4	5.7	1.6
1		5.5	3.8	4.25	4	5.9	2.2
1.25		5.6	3.3	4.5	4	6.1	2.2
1.5		5.4	3.3	4.75	4	5.8	1.7
1.75	4	5.3	1.9	5	4	5.5	1.3
2	4	5.4	1.2	5.25	4	5.0	1.3
2.25	4	5.5	1.5	5.5	4	4.7	1.3
2.5	4	5.5	1.9	5.75	4	4.5	1.4
2.75	4	5.7	1.9	6	4	4.5	1.6
3	4	5.8	2.5				

Observation Notes:

Location In yard of No. 37

Vegetation EUCTERET, CORINTER, LOPSUAVE

Project: CAB **Site:** 226

Location:	GDA 94	ZONE	56	507113mE	7013008mN	Lat: -27.005	Long: 153.07169
Location:	AGD 84	ZONE	56	507007mE	7012821mN	Lat: -27.00669	Long: 153.07063
Location:	AGD 66	ZONE	56	507008mE	7012822mN	Lat: -27.00668	Long: 153.07063

Described By: S (Shane) Pointon (POIS) **Date:** 16/JUL/07

Landscape:

Landform Pattern: alluvial plain **Element:** plain

Classifications:

ASC: SPOLIC, Anthroposol

ASC: OXYAQUIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .25	Dark greyish brown (10YR42) moist; sandy clay loam; few 2-10% rounded ironstone large pebbles 20-60 mm; weak structure; few 2-10% medium 2-6mm ferruginous nodules; moderately moist when sampled; sharp to
2A1	.25 to .75	Black (10YR21) moist; sandy clay loam; weak structure; moist when sampled; gradual to
2A2	.75 to 1.5	Light brownish grey (10YR62) moist; loamy sand; wet when sampled; clear to
3D	1.5 to 3	Light greenish grey (5GY81) moist; few 2-10% medium 5-15mm faint grey mottles, very few <2% coarse 15-30mm prominent red mottles, few 2-10% coarse 15-30mm prominent orange mottles; medium clay; massive structure; moderately moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	6.3	4.5
.3		6.7	3.5
.6		6.3	3.6
.8		6.0	4.3
1		5.0	3.6
1.25		4.4	3.3
1.5		5.3	3.0
1.75		5.7	3.1
2		5.8	2.6
2.25		5.8	2.7
2.5		5.6	2.9
2.75		5.6	2.9
3		5.2	3.5

Observation Notes:

Vegetation EUCTERET, MELQUINQ, CASGLAUC

Project: CAB **Site:** 227

Location:	GDA 94	ZONE	56	506913mE	7013144mN	Lat: -27.00378	Long: 153.06967
Location:	AGD 84	ZONE	56	506807mE	7012957mN	Lat: -27.00547	Long: 153.06861
Location:	AGD 66	ZONE	56	506808mE	7012958mN	Lat: -27.00545	Long: 153.06862

Described By: S (Shane) Pointon (POIS) **Date:** 17/JUL/07

Landscape:

Landform Pattern: rises **Element:** hillslope

Surface Condition: Firm

Disturbances: Extensive clearing, Highly disturbed e.g. mining, urban

Classifications:

ASC: GREY, Kurosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .4	Very dark grey (10YR31) moist; sandy clay loam; weak structure; moderately moist when sampled; gradual to
A2	.4 to .6	Greyish brown (10YR52) moist; sandy clay loam; massive structure; wet when sampled; clear to
B21	.6 to 1.05	Grey (10YR61) moist; few 2-10% very coarse >30mm distinct yellow mottles; sandy light medium clay; weak structure; moist when sampled; diffuse to
B22	1.05 to 1.5	White (10YR81) moist; few 2-10% very coarse >30mm prominent red mottles, common 10-20% very coarse >30mm distinct yellow mottles; sandy light medium clay; subangular blocky weak 10-20mm structure; moderately moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	6.0	3.3
.3	1	6.0	3.9
.6		5.6	4.4
.8		5.3	4.0
1		4.7	3.6
1.25		4.6	3.2
1.5		5.0	3.4

Observation Notes:

Location	Behind community hall, Donnybrook.
Vegetation	MELQUINQ, EUCTERET, CORINTER, LOPSUAVE

Project: CAB **Site:** 228

Location:	GDA 94	ZONE	56	506830mE	7013345mN	Lat: -27.00196	Long: 153.06884
Location:	AGD 84	ZONE	56	506724mE	7013158mN	Lat: -27.00365	Long: 153.06777
Location:	AGD 66	ZONE	56	506725mE	7013159mN	Lat: -27.00364	Long: 153.06778

Described By: S (Shane) Pointon (POIS) **Date:** 17/JUL/07

Landscape:

Landform Pattern: plain **Element:** plain

Surface Condition: Firm

Disturbances: Extensive clearing, Highly disturbed e.g. mining, urban

Classifications:

ASC: AQUIC, Podosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .4	Very dark grey (10YR31) moist; sandy clay loam; weak structure; moderately moist when sampled; clear to
A2	.4 to 1	White (10YR81) moist; sand; single grain structure; moist when sampled; clear to
B21h	1 to 1.7	Very dark brown (7.5YR2.5/2) moist; sandy clay loam; weak structure; weakly cemented continuous massive organic pan; wet when sampled; gradual to
B22h	1.7 to 2.3	Dark grey (7.5YR41) moist; clay loam, sandy; weak structure; wet when sampled; gradual to
B23	2.3 to 2.7	Brown (10YR43) moist; loamy fine sand; massive structure; wet when sampled; gradual to
B3	2.7 to 3.3	Greyish brown (10YR52) moist; loamy fine sand; single grain structure; wet when sampled; gradual to
2C	3.3 to 4	Light grey (10YR71) moist; fine sand; single grain structure; wet when sampled; abrupt to
3C	4 to 4.4	Dark grey (N40) moist; silty light clay; very few <2% angular shell large pebbles 20-60 mm; massive structure; wet when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1	1	5.9	3.6
.3		6.1	4.0
.6		6.0	4.6
.8		6.0	5.1
1		6.2	3.9
1.25	1	5.8	3.9
1.5	1	5.7	2.9
1.75	1	5.7	2.9
2	4	5.6	2.7
2.25	1	5.5	3.3
2.5	1	5.4	2.8
2.75	1	5.1	1.3
3	4	5.2	2.6
3.25	4	4.9	2.3
3.5	4	5.4	1.8
3.75	4	6.0	2.3
4	4	6.1	2.3
4.25	4	6.3	1.8
4.4	4	6.4	1.8

Observation Notes:

Vegetation MELQUINQ, CASGLAUC, EUCTERET, CORINTER

Project: CAB **Site:** 229

Location:	GDA 94	ZONE	56	506768mE	7013655mN	Lat: -26.99916	Long: 153.06821
Location:	AGD 84	ZONE	56	506662mE	7013468mN	Lat: -27.00085	Long: 153.06715
Location:	AGD 66	ZONE	56	506663mE	7013469mN	Lat: -27.00084	Long: 153.06715

Described By: S (Shane) Pointon (POIS) **Date:** 17/JUL/07

Landscape:

Landform Pattern: plain **Element:** plain

Classifications:

ASC: GREY, Kurosol

ASC: OXYAQUIC, Hydrosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Very dark brown (10YR22) moist; clay loam; common 1-2mm roots; moist when sampled; clear to
B21	.3 to .6	Grey (10YR61) moist; common 10-20% medium 5-15mm prominent orange jarosite (from pyrite) mottles, common 10-20% medium 5-15mm prominent yellow jarosite (from pyrite) mottles; light medium clay; weak structure; moist when sampled; clear to
B22	.6 to .75	Grey (10YR51) moist; common 10-20% medium 5-15mm prominent orange jarosite (from pyrite) mottles, common 10-20% medium 5-15mm prominent yellow jarosite (from pyrite) mottles; light medium clay; massive structure; wet when sampled; abrupt to
2C	.75 to 1.1	Dark grey (10YR41) moist; few 2-10% medium 5-15mm distinct dark mottles; loamy sand; massive structure; wet when sampled; abrupt to
3C	1.1 to 1.7	Yellowish brown (10YR54) moist; sandy light clay; few 2-10% subrounded ironstone large pebbles 20-60 mm; massive structure; wet when sampled; abrupt to
4B	1.7 to 2	Grey (2.5Y61) moist; few 2-10% medium 5-15mm distinct gley mottles; sandy light medium clay; massive structure; few 2-10% medium 2-6mm ferromanganiferous nodules; wet when sampled; abrupt to
5C	2 to 3.9	White (10YR81) moist; sand; single grain structure; wet when sampled; abrupt to
6C	3.9 to 5.2	Dark grey (2.5Y41) moist; light medium clay; massive structure; wet when sampled; abrupt to
7C	5.2 to 5.4	Grey (2.5Y61) moist; fine sandy clay loam; single grain structure; moderately moist when sampled; abrupt to
8C	5.4 to 5.8	Grey (2.5Y51) moist; sandy light clay; massive structure; moderately moist when sampled; gradual to
9D	5.8 to 6	Light olive grey (5Y62) moist; common 10-20% coarse 15-30mm distinct gley mottles; sandy light medium clay; massive structure; moderately moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	1	5.5	3.6	3	1	5.2	1.6
.3	1	4.4	2.9	3.25	1	4.9	1.4
.6		3.9	2.6	3.5	1	4.7	1.9
.7		3.9	1.7	3.75	4	4.9	1.7
.8	1	4.5	1.7	4	1	5.4	3.0
1	1	4.9	1.2	4.25	1	6.1	2.9
1.25		5.2	1.9	4.5	1	6.8	3.1
1.5		5.4	1.4	4.75	1	6.5	3.5
1.75	3	5.4	1.7	5	1	6.2	2.9
2	2	5.1	1.7	5.25	1	6.2	3.3
2.25	2	5.0	1.6	5.5	1	6.2	4.6
2.5	2	5.0	1.3	5.75	1	6.2	4.6
2.75	1	4.8	1.3	6	1	6.1	4.4

Project: CAB **Site:** 230

Location:	GDA 94	ZONE	56	506495mE	7013258mN	Lat: -27.00275	Long: 153.06546
Location:	AGD 84	ZONE	56	506389mE	7013071mN	Lat: -27.00444	Long: 153.0644
Location:	AGD 66	ZONE	56	506390mE	7013072mN	Lat: -27.00443	Long: 153.0644

Described By: S (Shane) Pointon (POIS) **Date:** 17/JUL/07

Landscape:

Landform Pattern: plain **Element:** drainage depression

Surface Condition: Firm

Disturbances: No effective disturbance except grazing by hoofed animals

Classifications:

ASC: LEPTIC, Tenosol

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .4	Black (10YR21) moist; very few <2% medium 5-15mm faint grey mottles; light medium clay; subangular blocky strong 2-5mm structure; moderately moist when sampled; clear to
2A	.4 to .8	Very dark grey (10YR31) moist; sandy clay loam; angular blocky weak structure; moist when sampled; clear to
3C	.8 to 1.3	Dark grey (10YR41) moist; loamy sand; massive structure; moist when sampled; abrupt to
4C	1.3 to 1.75	White (10YR81) moist; sand; single grain structure; wet when sampled; clear to
5C	1.75 to 2.95	Light grey (10YR71) moist; sandy light clay; massive structure; wet when sampled; clear to
6C1	2.95 to 3.8	Dark grey (2.5Y41) moist; silty light clay; massive structure; wet when sampled; abrupt to
6C2	3.8 to 4.1	Very dark grey (2.5Y31) moist; light clay; massive structure; wet when sampled; abrupt to
7C	4.1 to 4.9	Grey (2.5Y61) moist; sand; wet when sampled; abrupt to
8D	4.9 to 5.8	Grey (2.5Y61) moist; few 2-10% very coarse >30mm faint gley mottles; sandy medium clay; massive structure; moist when sampled

Field Tests:

Depth	H2O2-	PH-2	PH-3	Depth	H2O2-	PH-2	PH-3
.1	2	6.5	3.5	3	1	6.0	3.2
.3	1	5.6	3.7	3.25	2	6.4	1.6
.6	1	5.7	3.4	3.5	2	6.3	1.9
.8	1	5.2	3.2	3.75	2	6.7	1.7
1		5.0	3.6	4	2	6.9	1.6
1.25		5.4	4.0	4.25	1	6.3	2.7
1.5		4.9	3.5	4.5	4	6.7	1.5
1.75		4.4	3.8	4.75	4	6.5	1.6
2	2	4.6	2.1	5	1	6.7	1.9
2.25	4	4.8	1.6	5.25	1	7.3	3.7
2.5		5.5	2.3	5.5	1	7.2	3.2
2.75		6.0	1.9	5.75	1	7.2	3.6

Project: CAB **Site:** 231

Location:	GDA 94	ZONE	56	506595mE	7013480mN	Lat: -27.00074	Long: 153.06647
Location:	AGD 84	ZONE	56	506489mE	7013293mN	Lat: -27.00243	Long: 153.06541
Location:	AGD 66	ZONE	56	506490mE	7013294mN	Lat: -27.00242	Long: 153.06541

Described By: S (Shane) Pointon (POIS) **Date:** 08/OCT/07

Landscape:

Landform Pattern: plain **Element:** plain

Runoff: Very slow **Permeability:** Moderately permeable

Drainage: Poorly drained **Slope:** No record

Depth to Water: 3.3

Rock OutCrops: **No record**

Surface Condition: Firm

Disturbances: Extensive clearing, Highly disturbed e.g. mining, urban

Classifications:

ASC: KANDOSOLIC, OXYAQUIC, Hydrosol

Vegetation:

Community Name: Tree, Eucalyptus tereticornis

Tallest Stratum:

Species: Eucalyptus tereticornis (blue gum, forest red gum); Melaleuca quinquenervia (swamp paperbark, paper-barked tea- tree, broad-leaved tea-tree); Acacia species

Profile Morphology:

Horizon	Depth (m)	Description
A1	0 to .3	Very dark greyish brown (10YR32) moist; loamy sand; weak structure; moderately moist when sampled; clear to
B2	.3 to 1	Brown (10YR43) moist; sandy loam; very few <2% angular charcoal medium pebbles 6-20 mm; massive structure; moderately moist when sampled; clear to
2B	1 to 1.7	Light grey (10YR72) moist; common 10-20% medium 5-15mm distinct orange mottles; clayey sand; few 2-10% rounded siltstone large pebbles 20-60 mm; massive structure; moist when sampled; clear to
3C1	1.7 to 2.3	White (10YR81) moist; sand; single grain structure; moist when sampled; gradual to
3C2	2.3 to 3.3	Light grey (10YR71) moist; sand; single grain structure; moist when sampled; clear to
4C1	3.3 to 3.8	Grey (10YR51) moist; fine sandy light clay; massive structure; wet when sampled; clear to
4C2	3.8 to 4.1	Grey (2.5Y51) moist; sandy light clay; massive structure; wet when sampled; clear to
5C1	4.1 to 4.5	Grey (2.5Y51) moist; sandy clay loam; massive structure; wet when sampled; clear to
5C2	4.5 to 5	Dark grey (2.5Y41) moist; sandy clay loam; massive structure; wet when sampled; clear to
6D	5 to 5.6	Grey (2.5Y61) moist; very few <2% medium 5-15mm faint gley mottles; sandy light medium clay; massive structure; moist when sampled; gradual to
7D	5.6 to 6	Light grey (2.5Y71) moist; few 2-10% coarse 15-30mm distinct yellow mottles, many 20-50% coarse 15-30mm prominent red mottles; medium clay; massive structure; moderately moist when sampled

Project: CAB **Site:** 231

Field Tests:

Depth	PH-2	PH-3
.1	4.2	2.5
.3	4.9	3.5
.6	5.4	4.5
.8	6.3	4.9
1	6.2	5.2
1.25	5.9	5.0
1.5	5.8	4.9
1.75	5.6	5.1
2	6.3	5.0
2.25	6.4	4.9
2.5	6.1	4.5
2.75	6.0	3.4
3	6.3	3.7
3.25	6.4	2.3
3.5	6.3	2.1
3.75	6.4	2.2
4	6.4	2.3
4.25	6.5	2.3
4.5	6.6	1.6
4.75	6.7	1.7
5	6.4	1.7
5.25	6.5	1.8
5.5	6.2	3.0
5.75	6.3	3.8
6	6.4	4.0

Observation Notes:

Observation slightly elevated above coastal plain. No photos or GPS available, location taken off map.

Project: CAB **Site:** 232

Location:	GDA 94	ZONE	56	506735mE	7013325mN	Lat: -27.00214	Long: 153.06788
Location:	AGD 84	ZONE	56	506629mE	7013138mN	Lat: -27.00383	Long: 153.06682
Location:	AGD 66	ZONE	56	506630mE	7013139mN	Lat: -27.00382	Long: 153.06682

Described By: S (Shane) Pointon (POIS) **Date:** 09/OCT/07

Landscape:

Landform Pattern: plain
Element: plain
Runoff: Slow
Permeability: Moderately permeable
Drainage: Poorly drained
Slope: No record
Depth to Water: 2
Surface Condition: Firm
Disturbances: Extensive clearing

Classifications:

ASC: HUMIC, AQUIC, Podosol

Vegetation:

Community Name: Tree, Eucalyptus tereticornis
Tallest Stratum:
Species: Eucalyptus tereticornis (blue gum, forest red gum); Lophostemon suaveolens (swamp box, swamp mahogany)

Profile Morphology:

Horizon	Depth (m)	Description
A11	0 to .3	Grey (10YR51) moist; sand; single grain structure; moderately moist when sampled; gradual to
A12	.3 to .5	Grey (10YR61) moist; sand; single grain structure; moderately moist when sampled; gradual to
A2	.5 to 1.7	Light grey (10YR71) moist; sand; single grain structure; wet when sampled; abrupt to
B2h	1.7 to 2	Black (10YR21) moist; sandy loam; massive structure; moderately cemented continuous massive organic pan; moist when sampled; clear to
2B2	2 to 2.4	Dark greyish brown (10YR42) moist; common 10-20% coarse 15-30mm faint brown mottles; loamy sand; massive structure; wet when sampled; clear to
3B2h	2.4 to 4.1	Black (10YR21) moist; sandy loam; massive structure; wet when sampled; gradual to
3C	4.1 to 4.7	Dark greyish brown (2.5Y42) moist; loamy sand; massive structure; wet when sampled; sharp to
4C	4.7 to 4.8	Dark grey (2.5Y41) moist; sandy clay loam; massive structure; wet when sampled; clear to
5C	4.8 to 6	Dark grey (N40) moist; silty light clay; massive structure; wet when sampled

Project: CAB **Site:** 232

Field Tests:

Depth	H2O2-	PH-2	PH-3
.1		5.9	3.5
.3		6.2	3.7
.6		5.8	4.2
.8		5.9	4.4
1		5.9	4.4
1.25		6.1	4.5
1.5		6.2	4.7
1.75		6.2	4.3
2		5.9	4.0
2.25		6.0	3.8
2.5		5.6	3.0
2.75		5.6	3.4
3		5.7	2.4
3.25		5.7	2.3
3.5		6.0	3.1
3.75		6.2	2.9
4		6.3	3.2
4.25		6.1	3.3
4.5	4	6.1	1.2
4.75	4	6.4	1.0
5		6.3	1.9
5.25		6.9	1.2
5.5		6.9	1.3
5.75		6.8	1.3
6		6.4	1.4

Observation Notes:

Observation On slightly elevated rise under blue gum trees adjacent park in Donnybrook

Appendix 2
Summarised Analytical Results