Annexure "I"
Salinity Assessment Update

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Report

Salinity Management Plan
Proposed Residential Development
Nos 187 and 195-203, Lots 36, 37 and 38 DP 28024
Turner Road, Currans Hills, NSW

Prepared for:-

JMD Development Consultants
PO Box 25
CAMPBELLTOWN NSW 2560

JC04031A-r12
October 2017

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11th October 2017

Our Ref: JC04031A-r12

JMD Development Consultants
PO Box 25
CAMPBELLTOWN NSW 2560

Attention: Mr Shane Gray

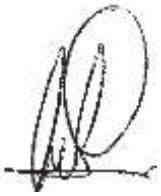
Dear Sir

Re: Salinity Management Plan
Proposed Residential Subdivision Development
Nos 187 and 195-203, Lots 36, 37 and 38 DP 28024 Turner Road
Currans Hills, NSW

Further to our Salinity Assessment Update report referenced JC04031A-r9 dated 2nd September 2015, this report presents our Salinity Management Plan for the above site.

Should you have any queries, please contact the undersigned.

Yours faithfully,
GeoEnviro Consultancy Pty Ltd



Solern Liew CPEng (NPER)
Director

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1. INTRODUCTION

This report presents the results of our Salinity Management Plan (SMP) for the site referred to as Nos 187 and 195-203, Lots 36, 37 and 38 DP 28024 Turner Road Currans Hills as shown on Drawing No 1.

The site was the subject of a number of salinity studies undertaken by GeoEnviro between 2004 and 2009 and an update report was compiled in our referenced JC04031A-r9 dated 2nd September 2015 (Reference 3).

The objective of this SMP was to provide a salinity management strategy to mitigate potential adverse impact of saline soils on the proposed development.

2. SITE INFORMATION

2.1 Site Location

The site is located on the northern side of Turner Road at Currans Hill and consists of three properties, Nos 187 and 195 to 203 Lots 36, 37 and 38 DP 28024. The overall property has an irregular shape with an approximate 225m frontage to Turner Road and extends about 530m to the north.

2.2 Geological and Topographical Setting

The site is situated on gentle undulating terrain with ground surface sloping down in a general direction to the southeast. Ground surface within the site generally slopes at angles of about 3 to 5 degrees. The ground surface steepens to the north at angles of about 8 to 12 degrees.

Based on the 1:100,000 Geological Map of Port Hacking-Wollongong (Reference 5), the site is underlain by Bringelly Shale (Rwa) of the Wianamatta Group comprising of shale, carbonaceous claystone, laminite and occasional coal.

The 1:100,000 Soil Landscape Map (Reference 6) indicates the overburden soil to consist of residual soil of the Blacktown soil landscape. The residual soil is typically highly plastic, low permeability and moderately reactive.

2.3 Hydrogeology

Based on our local knowledge and previous investigation of the general surrounding area, we expect permanent groundwater table to be at a significant depth (ie in excess of 3m from ground surface.). Some perched groundwater is expected to exist at shallower depths within close proximity to existing dams and drainage depression. Infiltration of surface water through subsurface ground is expected to be limited due to the relatively impervious nature of the insitu clayey soil.

2.4 Site Description

The site currently consists of vacant land will all previous buildings and sheds recently demolished and cleared. We understand that the site was mainly used for residential in the past. The dams (Site Features 7, 15, 16 and 19) remained undisturbed and there were a number of trees on property along the drainage depression.

3. SALINITY INVESTIGATION

The site was the subject of a number of salinity studies carried out between 2004 and 2009 by GeoEnviro Consultancy Pty Ltd (References 1 and 2). Refer to Appendix A and B for extracts of our previous report.

Our previous investigation (Reference 1) which was carried out between 24th February and 2nd March 2004 consisted of excavation of 210 test pits (TP 1 to TP 210) as shown in Appendix A. In February 2009, an additional contamination assessment involving excavation of 17 test pits (TP 1A to 17A) was carried out by GeoEnviro in order to further assess the contamination status of property Nos 195-203 (Reference 2) as shown in Appendix B. Salinity samples were collected and were analysed for the following;

- Emerson Dispersion Test
- pH
- Electrical Conductivity (Ec)
- Cation Exchange Capacity (CEC)
- Exchangeable Sodium Percentage (ESP)
- Chloride (Cl)
- Sulphate (S04)

4. SUBSURFACE CONDITIONS

Reference should be made to the attached Table 1 in Appendix A and B for details of subsurface profiles encountered. The following is a generalised subsurface profile;

Fill

Buried fill was encountered in a number of test pits such as TP 11, 12, 14, 16, 17, 18, 19, 22, 23, 24, 25 26, 27, 77, 78, 110 and 111 and in TP 11A to 16A , TP 131 to 135, 140 to 145, 165 to 168, rubbish fill was encountered.

Topsoil and Topsoil/Fill

Away from the above filled areas, topsoil and topsoil/fill was encountered on the surface in the majority of the test pits. The topsoil and topsoil/fill were found to consist predominantly of clayey silt of low liquid limit. Thickness of the topsoil and topsoil/fill were found to range from about 0.2m to 0.7m

Natural Soil

The underlying natural clay consists predominantly of high plasticity Silty Clay. The natural clay becomes more gravelly and medium plasticity at lower depths. In some deeper test pits, medium to high plasticity gravelly Silty Clay was encountered at lower depths.

Based on the hand penetrometer test results, the natural clay was generally assessed to be very stiff to hard. Moisture content of the natural clay was generally found to be less than to approximately equal to the plastic limit.

Bedrock

Shale/siltstone was encountered in a number of test pits with depths varying from 1.0m to 3.0m below existing ground surface.

Groundwater

All test pits were found to be dry during and upon completion of the site investigation. Based on our experience of the area, we anticipate that groundwater will generally be present at significant depths (ie greater than 3m). Some perched ground water may be present in the vicinity of the dam

All other test pits were found to be dry during and shortly after completion of the site investigation.

5. POLICIES AND GUIDELINES

5.1 Urban Salinity and Proposed Development

We understand that the proposed development will include the following;

- Bulk earthworks to regrade the site to design levels.
- Construction of roads including footpaths and pedestrian pavements.
- Laying of underground services including drainage pipes, sewer pipes, water supply pipes, gas pipes and conduits (electrical and telecommunication).
- Construction of water detention structures and basins.
- Formation of parklands and reserves.
- Construction of retaining walls and other amenities buildings

Salinity refers to the presence of excess salt in the environment and is able to occur if salts which are naturally found in soil or groundwater mobilise, allowing capillary rise and evaporation to concentrate the salt at the upper subsurface soil profile. Such movements are caused by changes in the natural water cycle. In urban areas, the processes which cause salinity are intensified by the increased volumes of water added to the natural system from irrigation of gardens, lawn and parks and from leaking infrastructures (eg pipes, sewer, stormwater, etc) and pool.

In recognition of the potential adverse impact of salinity to development, the Western Sydney Regional Organisation of Councils Ltd has a Salinity Code of Practice (Reference 7) to address the issue of salinity. It was acknowledged in the Code that salinity problems can change substantially over time and it is difficult to predict exactly where salinity will occur and how it will respond to the changing environment conditions.

5.2 Salinity Management Policy and Objectives

The salinity management policy to be adopted is as follows;

- The development of the site is carried out within the objectives and framework adopted by the Western Sydney Salinity Code of Practice. (Reference 7)
- The saline environment does not adversely impact on private and public assets.
- Adequate documentation and monitoring works are in placed and appropriate management practices are adopted.

The main objectives of this Salinity Management Plan (SMP) were to;

- Identify potential impacts of saline environment on the site during and after construction.
- Establish responsibilities and procedures for the various parties involved in the proposed development.
- Establish procedures to review the implementation process and corrective actions to improve the performance.

5.3 Guidelines and Code of Practice

The fundamental criterion for assessing soil salinity is based on Electrical Conductivity (Reference 4).

Class	**EC_e (ds/m)**
Non-Saline	<2
Slightly Saline	2-4
Moderately Saline	4-8
Very Saline	8-16
Highly Saline	>16

As soil salinity is a function of soil stability, other parameters such Emerson Dispersion, were used to assess saline soil. Soil dispersion relates to stability of the soil in the presence of water.

The following is a measure of soil dispersion;

Emerson Class No	Dispersibility
1	Very High
2	High
3	High to moderate
4	Moderate
5 and 6	Slight
7 and 8	Negligible/Aggregated

In addition to the above, the presence of Sulphate and Chloride in the soil has the potential to cause high soil aggressivity to concrete and steel structures, in particular if the structures are in direct contact with the soil. The following is a measure of soil aggressivity to concrete based on the Australian Standard (Reference 9).

Sulfate expressed as SO_3		PH	Chloride in water (ppm)	Soil conditions A*	Soil conditions B#
In Soil (ppm)	In Groundwater (ppm)				
<5000	<1000	>5.5	<6000	Non-aggressive	Non-aggressive
5000-1000	1000-3000	4.5-5.5	6000-12000	Mild	Mild
10000-20000	3000-10000	4-4.5	12000-30000	Severe	Moderate
>20000	>10000	<4	>30000	Very Severe	Severe

Approximate 100ppm of SO_4=80ppm of SO_3
* Soil condition A = High permeability soils (eg sands and gravels) which is below groundwater
# Soil conditions B = Low permeability soils (eg silts and clays) and all soils above groundwater

The following is a measure of soil aggressivity to steel piles based on the Australian Standard (Reference 9).

pH	Chlorides (Cl)		Resistivity Ohm.cm	Soil conditions A*	Soil conditions B#
	In Soil Ppm	In water ppm			
>5	<5000	<1000	>5000	Non-aggressive	Non-aggressive
4-5	5000-20000	1000-10000	2000-5000	Mild	Non-aggressive
3-4	20000-50000	10000-20000	1000-2000	Moderate	Mild
<3	>50000	>20000	<1000	Severe	Moderate

* Soil condition A = High permeability soils (eg sands and gravels) which is below groundwater
# Soil conditions B = Low permeability soils (eg silts and clays) and all soils above groundwater

6.0 LABORATORY TEST RESULTS

The following is a summary of the laboratory test results obtained from the initial salinity assessment of 2004 (Reference 1);

Sample	Depth (m)	pH	EC	EC_e	CEC	ESP	SAR	CL	SO4
TP 8	0.0-0.2	5.9	0.2	2.8	11.2	0.2	1		
	0.8-1.0	8.1	0.36	2.2	21.1	7.1	6	240	100
	1.8-2.0	8.2	0.4	2.8	19.2	15.6	8.4	350	120
TP 40	0.0-0.2	5.7	0.14	1.9	10	0.3	1.3		
	0.5-0.7	6.4	0.06	0.4	7.9	0.5	2.2	25	46
	1.0-1.2	7.0	0.08	0.6	13.8	4.9	3.1	45	32
TP 51	0.0-0.2	5.9	0.13	1.8	7.3	0.4	3.7		
	0.5-0.7	5.8	0.87	5.2	17.7	19.5	14.2	1170	90
	1.0-1.2	5.4	0.9	6.3	15.1	19.7	43	1350	27
TP 98	0.0-0.2	5.6	0.19	2.6	11.3	0.4	2.5		
	0.8-0.7	5.3	0.31	2.2	13.7	9.5	4.8	350	57
	1.0-1.2	5.5	0.38	3.2	14.2	12.7	16.9	530	32
TP 122	0.0-0.2	5.7	0.15	2.1	9.4	0.2	1.2		
	0.5-0.7	6.1	0.18	1.1	15.3	9.2	2.5	50	80
	1.0-1.2	6.2	0.39	3.1	10.9	12.8	8.3	560	37
TP 146	0.0-0.2	5.3	0.11	1.5	4.2	0.3	1		
	0.5-0.7	5.5	0.15	1.1	14.1	8.5	6	100	73
	1.8-2.0	5.6	0.55	4.4	18.8	10.6	34.3	850	150

Note: EC – Electrical Conductivity (dS/m)
EC_e-Electrical Conductivity (dS/m)
CEC – Cation Exchange Capacity (cmol+/kg)
ESP – Exchangeable Sodium Percentage (%)
Resistivity – ohm/cm
CL – Chloride (mg/kg)
SO4- Sulphate (mg/kg)

	Class	EC_e (ds/m)
	Non-Saline	<2
	Slightly Saline	2-4
	Moderately Saline	4-8
	Very Saline	8-16
	Highly Saline	>16

Emerson Class

Sample	Class	Description
TP 8 (0.8-1.0m)	2	Partial Dispersion
TP 8 (1.8-2.0m)	2	Partial Dispersion
TP 51 (0.5-0.7m)	1	Complete Dispersion
TP 98 (1.0-1.2m)	2	Partial Dispersion
TP 122 (0.5-0.7m)	3	Partial Dispersion
TP 146 (1.8-2.0m)	6	Non Dispersion
TP 171 (0.5-0.7m)	5	Non Dispersion
TP 185 (1.0-1.2m)	2	Partial Dispersion
TP 191 (0.5-0.7m)	3	Partial Dispersion
TP 191 (1.0-1.2m)	2	Partial Dispersion

Particle Size Distribution

Sample	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
TP 8 (0.8-1.0m)	54	26	18	2
TP 40 (1.0-1.2m)	34	20	45	1
TP 51 (0.5-0.7m)	50	30	20	0
TP 98 (1.0-1.2m)	41	31	25	3
TP 122 (0.5-0.7m)	58	26	15	1
TP 146 (1.8-2.0m)	44	34	22	0
TP 171 (1.0-1.2m)	43	45	9	3
TP 191 (0.5-0.7m)	61	25	12	2

The following is a summary of the laboratory test results obtained from the additional salinity assessment of 2009 (Reference 2).

Sample	Depth (m)	pH	EC	EC_e	CEC	ESP	CL	SO4
TP1A	0.0-0.1	6.0	0.075	1.1				
	1.1-1.2	6.2	0.91	7.3	22	39	1300	110
	2.4-3.0	8.4	0.15	1.3	15	22	160	<25
TP2A	0.0-0.1	6.3	0.044	0.6				
	0.4-0.5	7.8	0.21	1.7	29	11	370	61
	2.3-2.4	8.1	0.42	3.6	15	18	240	25
TP4A	0.0-0.1	5.9						
TP6A	0.0-0.1	6.2						
TP8A	0.0-0.1	6.1						
TP9A	0.0-0.1	6.5	0.018	0.3				
	1.5-1.6	8.2	0.43	3.4	26	22	530	57
	3.2-3.3	8.6	0.17	1.4	25	16	<100	26
TP10A	0.0-0.1	6.4	0.19	2.7				
	0.4-0.5	9.2	0.22	1.8	25	12	<100	<25
	2.2-2.3	8.4	0.33	2.8	44	8.5	220	<25
TP12A	0.0-0.1	6.7						
TP14A	0.0-0.1	7.5						
TP15A	0.0-0.1	7.8	0.094	1.3				
	0.5-0.6	6.2	0.62	5.0	11	37	910	<25
	2.4-2.5	7.8	0.76	6.5	21	32	1100	<25

Note: EC – Electrical Conductivity (dS/m)
EC_e-Electrical Conductivity (dS/m)
CEC – Cation Exchange Capacity (cmol+/kg)
ESP – Exchangeable Sodium Percentage (%)
Resistivity – ohm/cm
CL – Chloride (mg/kg)
SO4- Sulphate (mg/kg)

	Class	EC_e (ds/m)
	Non-Saline	<2
	Slightly Saline	2-4
	Moderately Saline	4-8
	Very Saline	8-16
	Highly Saline	>16

Emerson Class

Sample	Class	Description
TP1A(1.1-1.2m)	1	Very High Dispersion
TP 1A(2.4-3.0m)	1	Very High Dispersion
TP2A (0.4-0.5m)	2	High Dispersion
TP 2A (2.3-2.4m)	1	Very High Dispersion
TP 9A (1.5-1.6m)	1	Very High Dispersion
TP 9A (3.2-3.3m)	1	Very High Dispersion
TP 10A (0.4-0.5m)	2	High Dispersion
TP 10A (2.2-2.3m)	5	Slight Dispersion
TP 15A (0.5-0.6m)	1	Very High Dispersion
TP 15A (2.4-2.5m)	2	High Dispersion

7.0 SALINITY HAZARD IDENTIFICATION AND ASSESSMENT

7.1 Surface Indicators

The following are site indicators which are used to identify the presence of soil salinity;

- Scorching or absence of vegetation cover
- Salt encrustations on the ground surface.
- Dieback of trees or trees which show signs of distress.
- The existence of salt tolerant plants.

7.2 Groundwater

Groundwater was not encountered within the soil profile in our previous test pit investigation (maximum investigation depth of 3m) and moisture content of the underlying soil was found to be less than the plastic limit.

Some perched groundwater may be present during prolonged wet periods along the creeks and drainage depressions and in the vicinity of dams

7.3 Salinity Assessment and Salt Profiles

The fundamental measurement of soil salinity is EC_e values and based on the laboratory test results, the site salinity may be generalised as follows (refer to Drawing No 2 for salinity zones);

- The upper 0.5m of the subsurface profile was generally found to be predominantly Non to Slightly Saline with EC values ranging from 0.4 to 3.0 dS/m.
- The subsurface profile was generally found to be Moderately Saline soil was encountered in TP 51, 146. 1A, 2A and 15A with EC values ranging from 5.0 to 7.3 dS/m.

Drawing No 2 characterises the soil salinity of the site into Zone A and B as follows;

Zone A	Non to Slightly Saline over the entire subsurface profile.
Zone B	Moderately Saline over the entire subsurface profile.

The concentration of salts in the subsurface soil may be modelled to three different profiles as follows based on the DWLC (2002) guidelines (Reference 4);

- 'Normal' Salt Profiles – The salinity levels in this profile increase with depth and there is no rising groundwater effect to bring the salts to the surface. This profile commonly appeared over the central portion of the site.

- 'Recharge' Salt Profiles – The salinity levels in this profile are low and fairly constant with depth. This salt profile appeared to have occurred commonly over the northern and southern portions of the site.

- Discharge' Salt Profiles – The salinity levels in this profile reduce with depth and generally occurs when subsurface flows rises up due to the topography and vegetation uptake and salt is being brought up to the surface. This salt profile does not appear to have occurred on any part of the site.

The subsurface soil was found to have low Sulphate and Chloride concentrations however in an environment with the lowest pH being 5.3, the soil is considered to be Mildly-aggressive to buried concrete and steel structures.

7.4 Salinity Hazards

The impact of saline hazard on the development should be properly managed to ensure;

- The construction and maintenance of the proposed subdivision development do not result in a deterioration of the saline environment. Hazards derived from improper implementation of construction works and management of site may include;
    - Excavation and displacement of saline, sodic or dispersive soil during bulk earthworks.
    - Uncontrolled soil erosion and dispersion of sodic and dispersive soil down hill and into receiving waters.
    - Concentrations of salt due to altered surface and subsurface flows. Concentrations of salt may also occur from inadequate design of roads, drainage and footings resulting in impeded subsurface flows.
    - Rising of groundwater level due to basin construction and irrigation.
    - Increase in surface salt levels from poor management of parks and landscaping areas.
- The saline environment does not impact on the development. Hazards derived from improper design may include;
    - Damage to buildings and houses caused by deterioration of bricks, mortar and concrete when salt drawn up into capillaries of bricks and mortar expands resulting in spalling.
    - Deterioration of concrete kerbs and gutters as a result of chemical reaction between concrete and sulphates.
    - High chloride content in the soil may result in corrosion of steel reinforcement and buried metal structures.
    - Damage to underground pipes and infrastructures.
    - Water logging of ground surface due to sealing effect of sodic and dispersive soil.
    - Loss of vegetation cover and plants due to high salt content resulting in retardation of plants.

8.0 SALINITY MANAGEMENT PLAN

The salinity management plan takes into consideration the following;

- The assets to be constructed such as roads, buildings, services and parks.
- The construction activities during development and the maintenance required
- The associated salinity hazards and risks of the assets and activities (ie construction and maintenance)
- The likelihood of such hazards and risks eventuating
- The management of the hazards and risks including control measures
- The party responsible for the implementation and management of control measures.

The likelihood of hazards and risks eventuating may be categorised into three levels as follows;

Low : The risk is minimal and is not likely to occur unless under exceptional circumstances. Normal management procedures should be sufficient.

Moderate: The risk is likely to occur and some management procedures should be in placed to reduce such risk.

High: The risk is highly likely to occur and proper management and treatment will be required to mitigate the risk.

The following is a Salinity Management Plan considered relevant to the proposed development;

Assets and Procedures	Possible Hazards or Environmental Risks	Risk Class	Control Measures and Management	Action
Earthworks – Cut	1. Soil erosion and scouring of sodic soil from excavation works. 2. Instability of slope from disintegration of sodic and dispersive soils. 3. Concentration of runoff and deposition of salts.	Moderate – Zone A High - Zone B	1. Excavation in Zone B should avoid disturbance of Moderate Saline Soil at below 0.5m. 2. Avoid exposure and disturbance of sodic soil by minimising cut 3. Deeper excavations in excess of 0.9m should be covered and retained by retaining walls or batters to not steeper than 1 Vertical to 2 Horizontal 4. Vegetation of all batter slopes and bare surface. 5. Install adequate erosion controls such as silt fence. 6. Treatment of exposed surface with gypsum. 7. Install appropriate surface and subsurface drains	Developer/ Contractor
Earthworks – Fill and Stockpiling	1. Subsurface flows may be impeded. 2. Soil erosion and scouring of sodic fill. 3. Increase subsurface permeability potentially altering groundwater flows	Moderate – Zone A High - Zone B	1. All Moderate Saline Soil to be placed in Zone A should be placed at least 1.0m below proposed design level. This should be adopted in Zone B where possible. 2. Avoid exposure and disturbance of sodic soil 3. Avoid use of sodic soil 4. Vegetation of all batter slopes and bare surface. 5. Install adequate erosion controls such as silt fence. 6. Treatment of sodic and dispersive soil with gypsum. 7. Install appropriate surface and subsurface drains	Developer/ Contractor
Roadworks	1. Excavation and compaction of subgrade may impede subsurface flows resulting in accumulation of salts 2. Road construction will alter surface flows and salts will be deposited in a concentrated area	Moderate – Zone A High - Zone B	1. Excavation of Moderately Saline soil from Zone B and reusing in Zone A should be avoided. 2. Install appropriate subsoil drainage at the upgradient side of road to ease subsurface flows. 3. Design roads to minimise the effect of concentration of surface flows	Developer/ Contractor

Assets and Procedures	Possible Hazards or Environmental Risks	Risk Class	Control Measures and Management	Action
Trenching and Backfilling for Pipes and Services	1. Trenching will bring saline soil up to the surface. 2. Differential settlement of trench backfill due to erosion and tunnelling 3. Migration of fines from surrounding dispersive soil into the trench resulting in ground subsidence. 4. Migration of salts through the trenches and accumulation of salts downstream resulting in salt attack on concrete and steel infrastructures.	Moderate	1. Avoid displacement of saline soil from the bottom to the top, particularly in Zone B 2. It is recommended rubber-ring jointed pipes be used. 3. Special types of 'pipe-bedding' (eg clean coarse sand) are to be used. 4. Ensure adequate compaction of trench backfill to reduce the permeability of the trench. 5. Soil erosion and tunnelling may be treated by using gypsum or lime 6. Use of non-sodic and non-dispersive soil in the trench. 7. Use of geofabrics to prevent migration of fines into the trench.	Developer/ Contractor
Drainage Pipes and Pits	1. Structural degradation of concrete due to salt attack.	Moderate	1. Ensure use of appropriate concrete grade not less than 32 MPa characteristic strength. 2. Minimise excavation into sodic and dispersive soil 3. Ensure sufficient clearance above groundwater or construction of subsurface drains at the bottom	Developer/ Drainage Contractor
Conduits and Duct crossing	1. Structural degradation of steel due to salt attack	Moderate	1. Appropriate corrosion protection measures be in placed 2. Ensure sufficient clearance above groundwater or construction of subsurface drains at the bottom	Developer/ Electrical Contractor
Electrical conduits and Substations	1. Structural degradation of cables and earthing devices. 2. Salt attack on concrete structures	Moderate to High	1. Appropriate concrete grade be used. 2. Appropriate earthing devices with sacrificial element or anodic protection in place.	Developer/ Electrical Contractor
Street Lightings and Signage	1. Salt attack on steel and concrete structures	Moderate to High	3. Ensure sufficient clearance to ground water 4. Adopt Mildly aggressive soil for concrete and steel structures.	Developer/ Contractor

Assets and Procedures	Possible Hazards or Environmental Risks	Risk Class	Control Measures and Management	Action
House Floor slabs and Concrete Foundations	1. Structural degradation of concrete due to salt attack. 2. Corrosion of steel reinforcement and spalling of concrete	Moderate	1. Install appropriate waterproofing membranes under slab 2. Durability design based on Class A2 AS2870 3. Ensure use of appropriate concrete grade not less than 32 MPa characteristic strength. 4. Ensure adequate concrete cover from reinforcement. Normally concrete cover is not less than 50mm. A lesser cover may be appropriate subject to other protection measures in placed 5. Ensure structures are sufficiently elevated above groundwater table. 6. Placement of damp proof course and vapour barriers where required. 7. Construction of adequate surface and subsurface drainage around the house slab.	Owner/ Builder
House Steel Foundations and Buried Steel poles	1.Corrosion of steel	Moderate	1. Design for Mildly aggressive soils by adopting a corrosion rate of 0.01-0.02mm/year (AS2159)	Owner/ Builder
Masonry Walls	1. Structural degradation of brick and masonry walls	Moderate	1. Placement of damp proof course and vapour barriers. 2. Use correct mortar and ensure appropriate mix.	Owner/ Builder
Concrete and bitumen driveways	1. Structural degradation of concrete caused by salt. 2. Deformation and cracking of asphalt seal.	Moderate	1. Construct appropriate surface and subsoil drains to intercept flows. 2. Use appropriate concrete grade.	Owner/ Builder
Sewer and water pipes	1. Structural degradation caused by salt 2. Subsidence of service trenches caused by tunnelling and erosion. 3. Migration of fines into the trenches and transportation of salts downstream.	Low to moderate	1. Design system to minimis the interception of surface and subsurface flows. 2. Ensure service trenches do not intercept the groundwater. 3. Adequate compaction of the service trenches	Owner/ Builder
Steel fencing	1. Corrosion and pitting of steel members in contact with the soil generally limited to 1m depth.	Moderate	1. Use concrete footings with appropriate grade. 2. Ensure sufficient clearance to groundwater	Owner/ Builder

Assets and Procedures	Possible Hazards or Environmental Risks	Risk Class	Control Measures and Management	Action
Detention Basin and Ponds	1. Collection and accumulation of salt from runoffs 2. Leaching of salt into the underlying groundwater system. 3. Erosion and scouring of embankment and banks	Moderate – Zone A. High – Zone B	1. Ensure detention basins are adequately design to minimise leakage. Use of liners maybe necessary. 2. Use of gypsum to treat sodic and dispersive soil 3. Cover ground surface with appropriate vegetation to stabilise the slopes. 4. Adopt appropriate batter slopes for the embankment. Slope batters should not be steeper than 1 Vertical to 3 Horizontal.	Developer/ Council
Landscaping	1. Growth impairment or death	Low – Zone A Moderate -Zone B	1. Select appropriate tree planting schemes. 2. Avoid planting trees and vegetation which are sensitive to salts.	Developer
Parks and Reserve	1. Accumulation of salts on the ground surface from irrigation 2. Increase in salinity level from fertilisers	Low – Zone A Moderate -Zone B	1. Implementation of proper park management 2. Monitor salt levels in receiving waters and basins. 3. Avoid over irrigation and over fertilising of park areas.	Council

9.0 GENERAL RECOMMENDATIONS

9.1 Earthworks and Construction

In general, for earthworks and construction, the management plan recommends the following;

- Earthworks for redevelopment of site will require stripping of the topsoil to expose the natural clay. Though the topsoil was generally assessed to be Non to Slightly Saline, some form of treatment by mixing with lime and other additives is recommended to reduce salinity and improve topsoil properties.
- Avoid exposure and disturbance of sodic and dispersive soil to minimising erosion and siltation. Erosion and sediment control plans should be developed and implemented by the earthworks contractor in accordance with the NSW Department of Housing Document "Managing Urban Stormwater: Soils and Construction (1998). All erosion and sediment controls should be installed prior to commencement of any earthworks.
- Trenching for underground services should be carried out in a manner such that there is minimal rotation and vertical displacement of the original soil profile as the lower soil profile is generally assessed to be more saline. Generally, excavation deeper than 1m should be backfilled in the same order, alternatively the excavated Moderately Saline material may be treated by using lime and/or placed at depths greater than 1m from finished level.
- Site regrading by earthworks particularly involving excavation should be kept to a minimum to avoid disturbing the Moderately Saline soils. Moderately Saline soil may be capped with 1.0m of Non to Slightly saline soil to improve site salinity. Surplus Moderate Saline soils for use on site to form building platforms may be treated by mixing with 3% by weight of lime.

- Appropriate batter slopes for excavations should be adopted to prevent erosion and scouring. Under good drainage conditions, the following batter slopes or less may be adopted;

Material	Recommended Minimum Batter Slopes
Compacted Fill	2.5 Horizontal : 1 Vertical
Very stiff residual clay	2 Horizontal : 1 Vertical
Weathered Shale/Siltstone	0.5 Horizontal : 1 Vertical

- The roadworks should be planned to reduce cutting and filling to a minimum and the earthworks undertaken in stages to alleviate erosion and localised instability problem. To minimise the effects of erosion, all road batters, whether in cut or fill should be stabilised by planting (or the application of a sprayed-on mulch) with appropriate species of vegetation as soon as practical after construction.
- Special considerations must be given to the design, bedding of pipework for stormwater and other services, as the soils within these areas are generally 'erodible' or 'dispersive'. It is recommended rubber-ring jointed pipes be used. Special types of 'pipe-bedding' (eg clean coarse sand) may also be required.
- The insitu soil was found to be sodic and dispersive, therefore unstable in the presence of water resulting in tunnelling. Construction of infrastructures should include adequate compaction of service trenches and construction of cut-off walls (eg concrete collars) to prevent migration of fines and prevent breakdown of soil structures.
- Prevention of soil erosion, tunnelling and salt scalds may be treated by using gypsum or lime.
- All excavation works into the Moderately Saline soil should be minimised by staging the construction into small areas to prevent salinity from developing. Any High Saline soil encountered is not recommended for use as building platform fill and this material may be buried beneath proposed roadways at depths greater than 1.0m below design level and covered with non to slightly saline fill.

- Time of exposure of bare ground (without vegetation) should be kept to a minimum and this will depend on weather conditions. Weather forecasts should be regularly updated and if extended periods of rain are forecast, the bare ground should be covered with stable fill such as ripped sandstone or stabilised with lime proportioned to 3% by weight.

- Temporary detention ponds in construction sites should be regularly monitored for water quality and cloudy water should be appropriately treated by flocculation with gypsum. This process is considered critical particularly before a storm event.

- During construction, hay bales and other temporary erosion control devices should be placed at appropriate locations in areas where concentrated flows are expected and suitable dish drains should be constructed to retard flow and trap silt particles during heavy runoff.

- Length of overland flow slopes which are bare of vegetation from the earthworks should be kept to a minimum not exceeding 20m. Overland flow slopes may be reduced by bunding and placement of silt fencing or hay bales.

- Further sampling and laboratory analysis may be required out in areas showing signs of instability in order to determine preventative course of action and minimise potential salinity problems.

- Adequate revegetation of the site should be carried out and this may involve treatment of topsoil material and planting appropriate plant species which are salt-tolerant.

9.2 Building Structures and Infrastructures

Reference should be made to AS 2159 (Reference 9), AS 3600 (Reference 12) and AS2870 (Reference 10) for recommendations on protection of buried concrete and steel structures. Based on the laboratory test results, the site may be generally classified as Mildly Aggressive - Class A2 (AS2870) for the buried concrete and steel structures.

As the site is situated within a saline prone environment, the following are general recommendations for future building and infrastructure construction;

- A high impact waterproof membrane, not just a vapour proof membrane, should be lain under house slabs (refer to NSW Building Code of Australia). The waterproof membrane must be extended to the outside face of the external edge beam up to the finishing ground level, as detailed in the Building Code of Australia (BCA).
- For masonry building construction, the damp proof course must consist of poly-ethylene or poly-ethylene coated metal and correctly placed in accordance with BCA. Ground levels immediately adjacent to masonry walls must be kept below the damp proof course
- For slab on ground construction, a layer of bedding sand at least 50mm thick should be laid under the slab to allow free drainage of water and to prevent pooling of water potentially carrying salts.
- Concrete floor slabs house comprises of Class 32MPa concrete or sulphate resisting Type SR cement with a water cement ratio of 0.5. Similar concrete should be used for bored piers or footings.
- Slabs must be vibrated and cured for a minimum 3 days
- The minimum cover to reinforcement should be 30mm from a membrane in contact with the ground.
- The minimum cover to reinforcement should be 50mm for strip footings and beams.
- Admixtures for waterproofing and /or corrosion prevention may be used.

- Use of salt tolerant masonry and mortar below the damp proof course
- Constant monitoring of water pipes to detect any leakages and the repair of damages pipes as soon as possible after detection
- Use Copper or non-metallic pipes instead of galvanised iron
- Ensure any underground services are provided with adequate corrosion protection

10.0 OTHER MANAGEMNET ISSUES

10.1 Health and Safety

Contractors and subcontractors performing work activities are expected to meet all Workcover's and other applicable Commonwealth and State/Territory requirements for employee's health and safety.

Appropriate personal protective equipment and clothings and on-site monitoring during fieldwork should be observed.

10.2 Records and Documentations

The entire process of the remedial works shall be sufficiently recorded and documented. Such information shall be systematically stored by the Project Manager and Council.

10.3 Compliance and Corrective Actions

The salinity management plan shall be taken to ensure the objectives outlined in above Section 4.3 are met and the works comply with the current regulations and practices. This will include;

- The monitoring of environmental performance on a regularly basis;
- Regularly perform audit of the environmental management system
- Record, investigate and analysis accidents/incidents

In the event where the objectives are not met, appropriate documentation should be made, and corrective actions be undertaken.

11.0 LIMITATIONS

The findings contained in this report are the results of discreet/specific sampling methodologies used in accordance with normal practices and standards. There is no investigation which is thorough enough to preclude the presence of material which presently, or in future, may be considered hazardous to the site. The site may subject of dumping of rubbish fill in the past and the scope of this report do not cover for future dumping and burial of such material on the subject site.

As regulatory evaluation criteria are constantly updated, concentrations of contaminants presently considered low, may in the future fall short of regulatory standards that require further investigation/redemption.

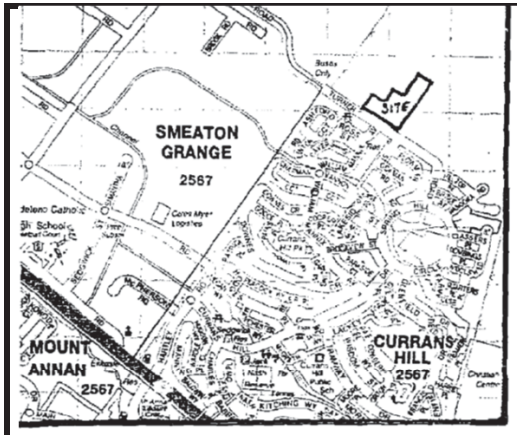
The statements presented in these documents are intended to advise you of what should be your realistic expectations of this report, and to present you with recommendations on how to minimise the risks associated with the groundworks for this project. The document is not intended to reduce the level of responsibility accepted by GeoEnviro Consultancy Pty Ltd, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

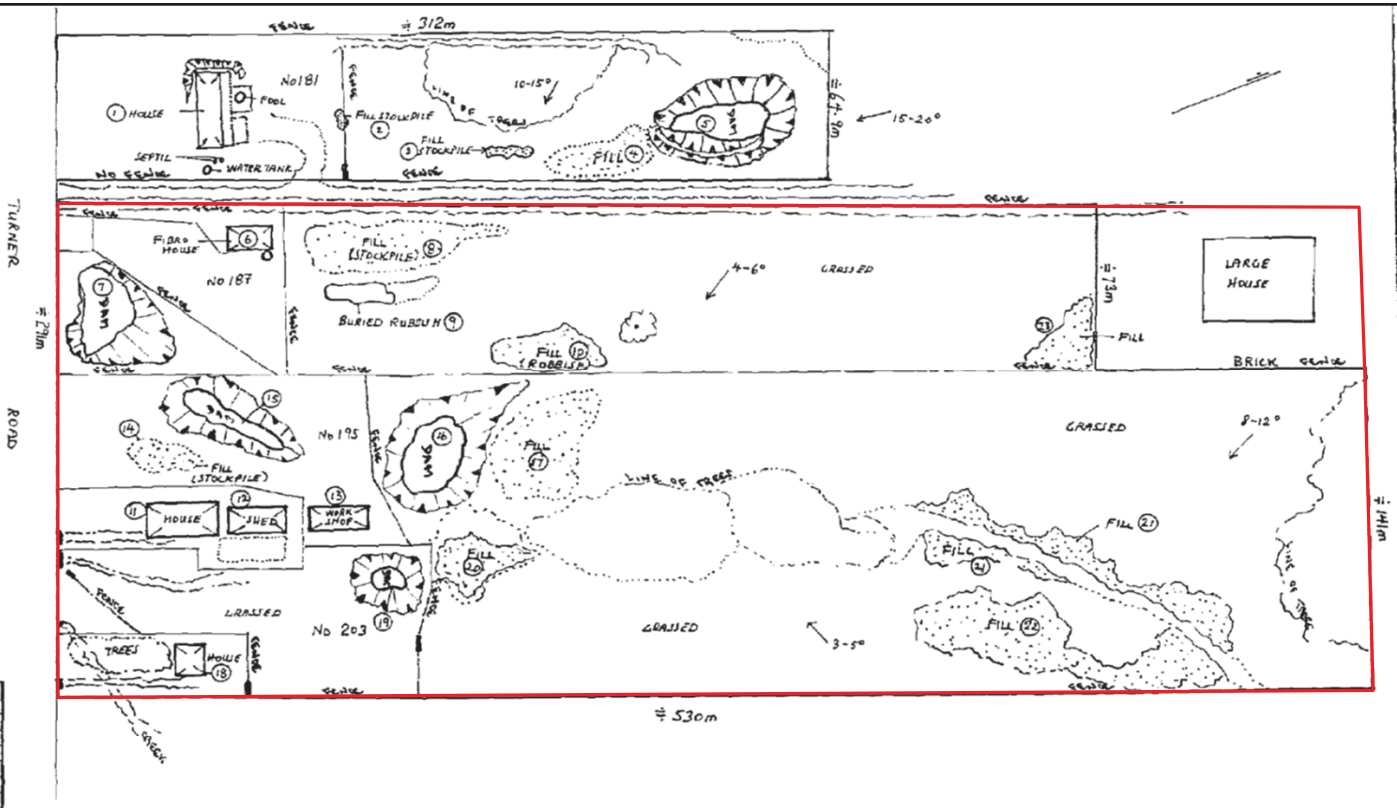
Attached in Appendix C are documents entitled "Important Information about Your Environmental Site Assessment" in conjunction with which this report must be read, as it details important limitations regarding the investigation undertaken and this report.

C:\\15JOB\031\A\JC04031A-R12
16/10/17 10:43 AM

REFERENCES

1. *Salinity Assessment Update, No 187, 195-203 Turner Road Currans Hill – GeoEnviro Consultancy Pty Ltd Ref JC04031A-r9 dated September 2015*
2. *Preliminary Contamination, Geotechnical and Salinity Assessment, No 181, 187, 195-203 Turner Road Currans Hill – GeoEnviro Consultancy Pty Ltd Ref JC04031A dated March 2004*
3. *Additional Salinity/Contamination Assessment and RAP, No 195-203 Lots 37 and 38 DP 28024 Turner Road Currans Hill – GeoEnviro Consultancy Pty Ltd Ref JC04031A-r5 dated March 2009*
4. *Department of Land and Water Conservation – "Site Investigation for Urban Salinity".2002*
5. *1:100,000 Geological Map of Penrith – Geological Series Sheet 9029-9129 (Edition 1) 1985*
6. *1:100,000 Soil Landscape Map of Penrith – Soil Conservation Service of NSW; Sheet 9029-9129*
7. *Salinity Code of Practice – Western Sydney Regional Organisation of Councils Ltd – 2002*
8. *What do all the numbers mean? A guide for the interpretation of soil test results. – Department of Conservation and Land Management, 1992*
9. *Australian Standard, AS 2159-2009 "Piling – Design and Installation", 2009*
10. *Australian Standard, AS 2870 -2013 "Residential Slabs and Footings".*
11. *Australian Standard, AS 3798 - 1996"Bulk Earthworks for Commercial and Residential Site*
12. *Australian Standard, AS 3600- 2009"Concete Structures"*





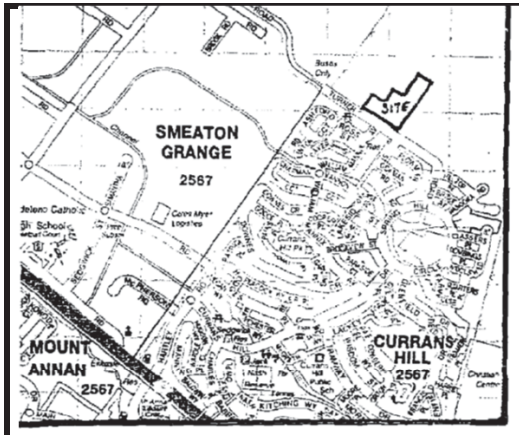
Feature No	Description
1	Single storey brick residential dwelling with metal roof
2	Small fill stockpile with some bricks and concrete
3	Small earthfill stockpile about 1m high
4	Filled Area
5	Dam, mainly dry
6	Fibro house with a septic tank
7	Dry dam
8	A spread of fill consisting of timber, wirss, metal pieces, tiles and rubbish
9	Buried rubbish consisting mainly of timber. Depth in excess of 3m
10	Buried rubbish
11	Timber and brick house
12	Garage/shed on concrete slab
13	Workshop shed on concrete slab. Some oil staining on the floor
14	Filled Area consisting mainly of earthfill
15	Dry Dam
16	Dam, mainly dry
17	Slighlty raised filled area consisting mainly of topsoil and earthfill mixture
18	Timber and fibro house
19	Dry Dam
20	Filled area
21	Filled area
22	Filled area
23	Filled area consisting of earthfill with some rubbish

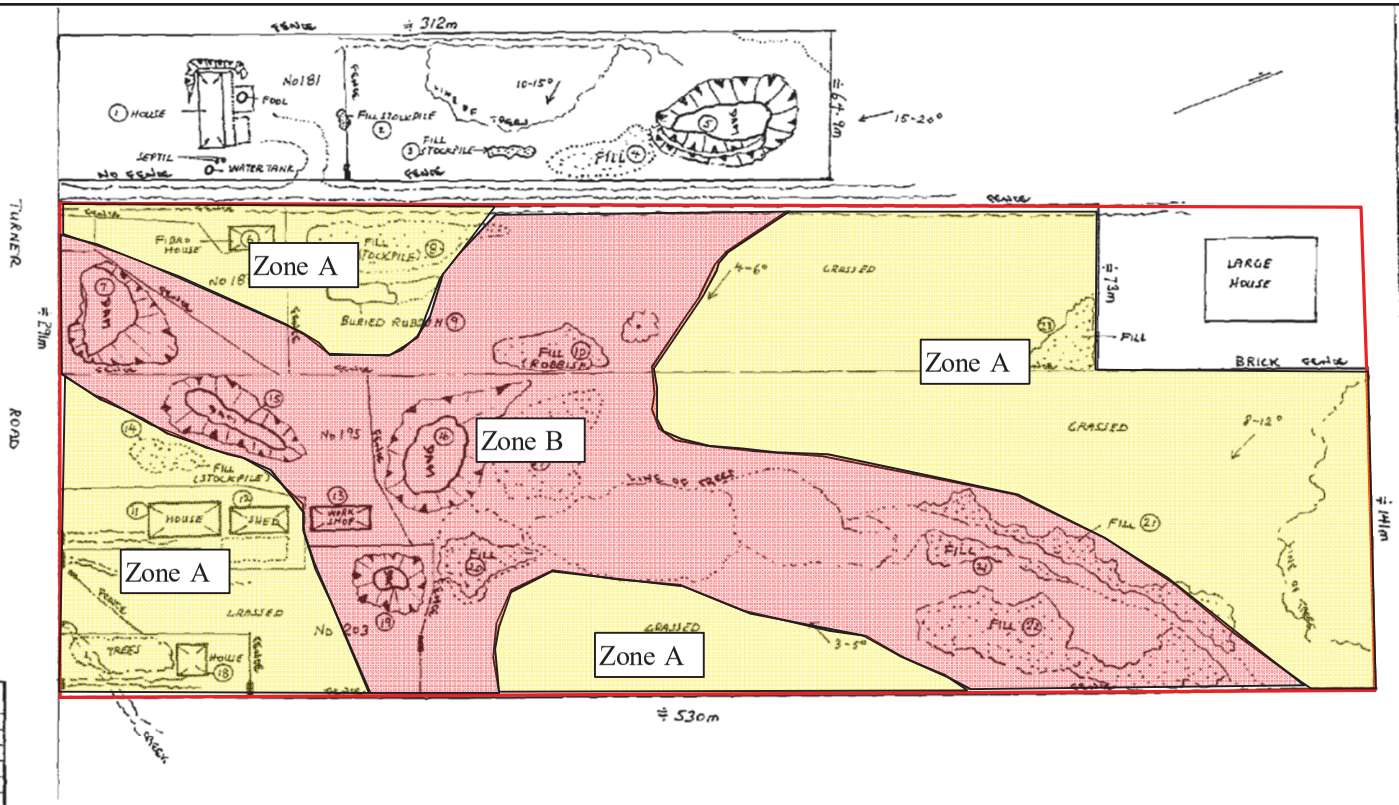
LEGEND

6° → SLOPE DOWN AT 6°

GeoEnviro Consultancy
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: AT	Date: 11/10/17	Dartanyon Pty Ltd	
Checked By: SL	Date: 11/10/17	No 187 and 195-203 Turner Road Currans Hill	
Revision By:	Date:	Site Locality and Previous Site Feature Plan	
Scale: Proportional	A3	Project No: JC04031A-r12	Drawing No: 1





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21	Filled area
22	Filled area
23	Filled area consisting of earthfill with some rubbish

LEGEND

60 → SLOPE DOWN AT 6°

GeoEnviro Consultancy
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
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Drawn By: AT	Date: 11/10/17	Dartanyon Pty Ltd	
Checked By: SL	Date: 11/10/17	No 187 and 195-203 Turner Road Currans Hill	
Revision By:	Date:	Salinity Zone Plan	
Scale: Proportional	A3	Project No: JC04031A-r12	Drawing No: 1

APPENDIX A

Extracts of the Preliminary Contamination and Salinity Report (Reference 2)

GeoEnviro Consultancy Pty Ltd
Unit 5, 39-41 Fourth Avenue, Blacktown, NSW 2148, Australia
PO Box 1543, Macquarie Centre. North Ryde, NSW 2113

ABN 62 084 294 762
Tel : (02) 9679 8733
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Report

Additional Salinity/Contamination Assessment and Remediation Action Plan
Nos 195-203, Lots 37 and 38 DP 28024
Turner Road, Currans Hills, NSW

Prepared for
Mr Jim and Ms Vanessa Driver
"Beltie Park"
941, Old South Road
MITTAGONG NSW 2575

Ref: JC04031A-r5
March 2009

Sodic soils are dispersible and are vulnerable to erosion and tunnelling. Sodicity is a measure of Exchangeable Sodium Percentage (ESP) and Cation Exchangeable Capacity (CEC). The following is a measure of soil sodicity;

ESP (%)	**Rating**
Less than 5	Non-Sodic
5 to 15	Sodic
Greater than 15	Highly Sodic

The measure of Cation Exchangeable Capacity is as follows;

CEC ($cmol^+/kg$)	**Rating**
Less than 6	Very Low
6 to 12	Low
12 to 25	Moderate
25 to 40	High
Greater than 40	Very High

In addition to the above, the presence of Sulphate and Chloride in the soil has the potential to cause high soil aggressivity to concrete and steel structures, in particular if the structures are in direct contact with the soil. The following is a measure of soil aggressivity based on the Australian Standard (Reference 14).

Sulfate expressed as SO_3		**PH**	**Chloride in water (ppm)**	**Soil conditions A***	**Soil conditions B#**
In Soil (%)	**In Groundwater (ppm)**				
<0.2	<300	>6.5	<2000	Non-aggressive	Non-aggressive
0.2-0.5	300-1000	5-6	2000-6000	Mild	Non-aggressive
0.5-1.0	1000-2500	4.5-5	6000-12000	Moderate	Mild
1.0-2.0	2500-5000	4-4.5	12000-30000	Severe	Moderate
>2.0	>5000	<4	>30000	Very Severe	Severe

Approximate 100ppm of SO_4=80ppm of SO_3
* Soil condition A = High permeability soils (eg sands and gravels) which is below groundwater
# Soil conditions B = Low permeability soils (eg silts and clays) and all soils above groundwater

8.2 Laboratory Test Results

The following is a summary of the laboratory test results;

Sample	Depth (m)	Ph	EC	EC_e	CEC	ESP	CL	SO4
TP1A	0.0-0.1	6	0.075	1.1				
	1.1-1.2	6.2	0.91	7.3	22	39	1300	110
	2.4-3.0	8.4	0.15	1.3	15	22	160	<25
TP2A	0.0-0.1	6.3	0.044	0.6				
	0.4-0.5	7.8	0.21	1.7	29	11	370	61
	2.3-2.4	8.1	0.42	3.6	15	18	240	25
TP4A	0.0-0.1	5.9						
TP6A	0.0-0.1	6.2						
TP8A	0.0-0.1	6.1						
TP9A	0.0-0.1	6.5	0.018	0.3				
	1.5-1.6	8.2	0.43	3.4	26	22	530	57
	3.2-3.3	8.6	0.17	1.4	25	16	<100	26
TP10A	0.0-0.1	6.4	0.19	2.7				
	0.4-0.5	9.2	0.22	1.8	25	12	<100	<25
	2.2-2.3	8.4	0.33	2.8	44	8.5	220	<25
TP12A	0.0-0.1	6.7						

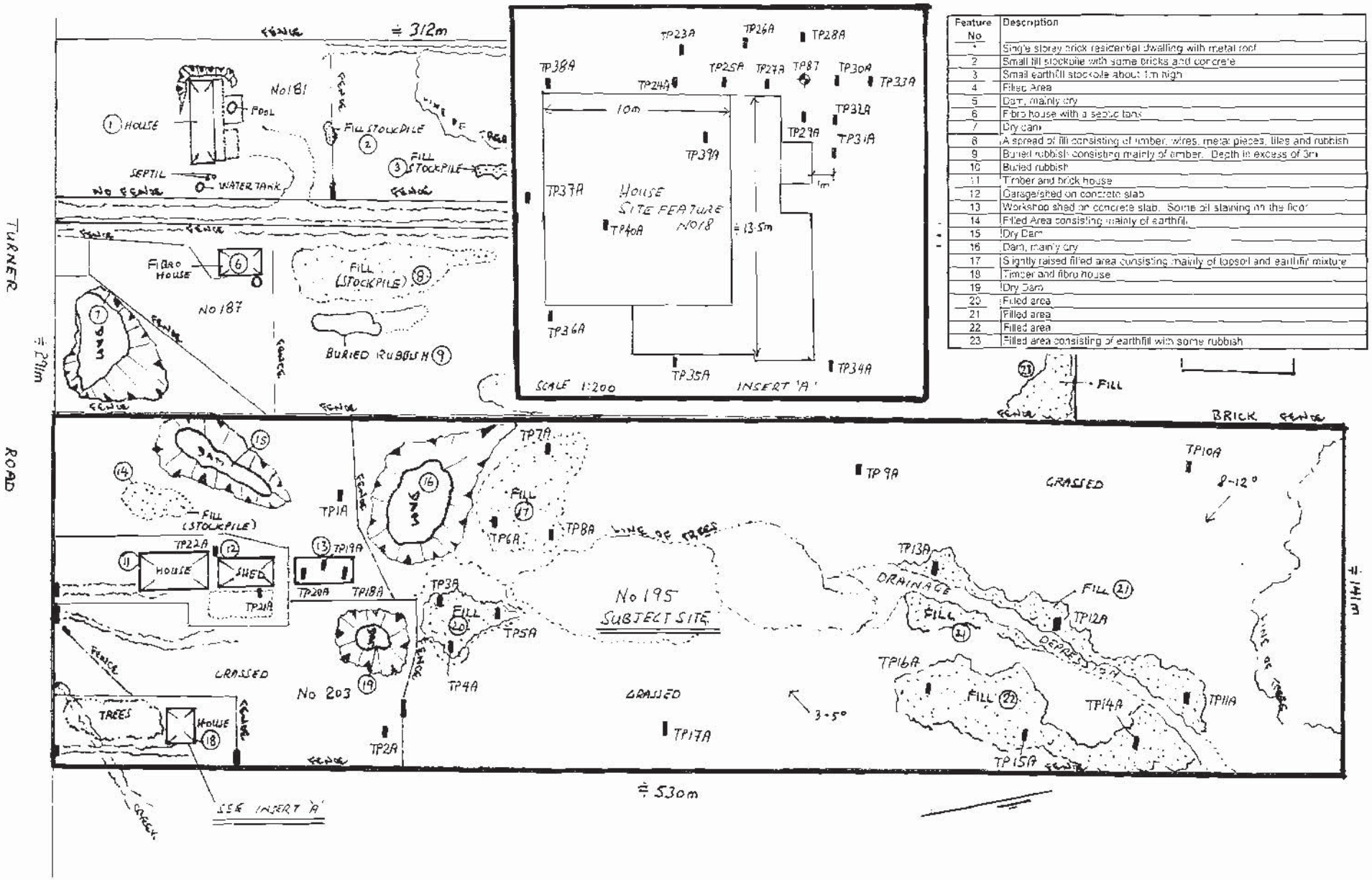
Note: EC – Electrical Conductivity (ds/m)
EC_e-Electrical Conducivity (ds/m)
CEC – Cation Exchange Capacity ($cmol^+/kg$)
ESP – Exchangeable Sodium Percentage (%)
SAR – Sodium Absorption Ratio
CL – Chloride (mg/kg)
SO4- Sulphate (mg.kg)

Sample	Depth (m)	Ph	EC	EC_e	CEC	ESP	CL	SO4
TP14A	0.0-0.1	7.5						
TP15A	0.0-0.1	7.8	0.094	1.3				
	0.5-0.6	6.2	0.62	5	11	37	910	<25
	2.4-2.5	7.8	0.76	6.5	21	32	1100	<25
TP16A	0.0-0.1	6.9						
TP18A	0.3-0.4	8						
TP19A	0.1-0.2	6.3						
TP20A	0.1-0.2	6.6						
TP21A	0.0-0.1	7.7						
TP22A	0.0-0.1	5.7						
TP40A	0.0-0.1	5.5						

Note: EC – Electrical Conductivity (ds/m)
EC_e-Electrical Conducivity (ds/m)
CEC – Cation Exchange Capacity ($cmol^+/kg$)
ESP – Exchangeable Sodium Percentage (%)
SAR – Sodium Absorption Ratio
CL – Chloride (mg/kg)
SO4- Sulphate (mg.kg)

Emerson Class

Sample	Material Description	Class	Description
TP1A(1.1-1.2m)	Silty Clay, high plasticity, red brown	1	Very High Dispersion
TP 1A(2.4-3.0m)	Gravelly Silty Clay, medium plasticity, yellow brown	1	Very High Dispersion
TP2A (0.4-0.5m)	Silty Clay, high plasticity, yellow brown	2	High Dispersion
TP 2A (2.3-2.4m)	Gravelly Silty Clay: medium plasticity, orange brown	1	Very High Dispersion
TP 9A (1.5-1.6m)	Silty Clay/Gravelly Silty Clay, medium plasticity, grey brown	1	Very High Dispersion
TP 9A (3.2-3.3m)	Gravelly Shaley Clay, medium plasticity, brown	1	Very High Dispersion
TP 10A (0.4-0.5m)	Silty Clay: high plasticity, yellow brown	2	High Dispersion
TP 10A (2.2-2.3m)	Silty Clay, medium plasticity, grey mottled yellow brown	5	Slight Dispersion
TP 15A (0.5-0.6m)	Silty Clay, medium to high plasticity, yellow brown	1	Very High Dispersion
TP 15A (2.4-2.5m)	Gravelly Silty Clay: medium plasticity, grey brown	2	High Dispersion



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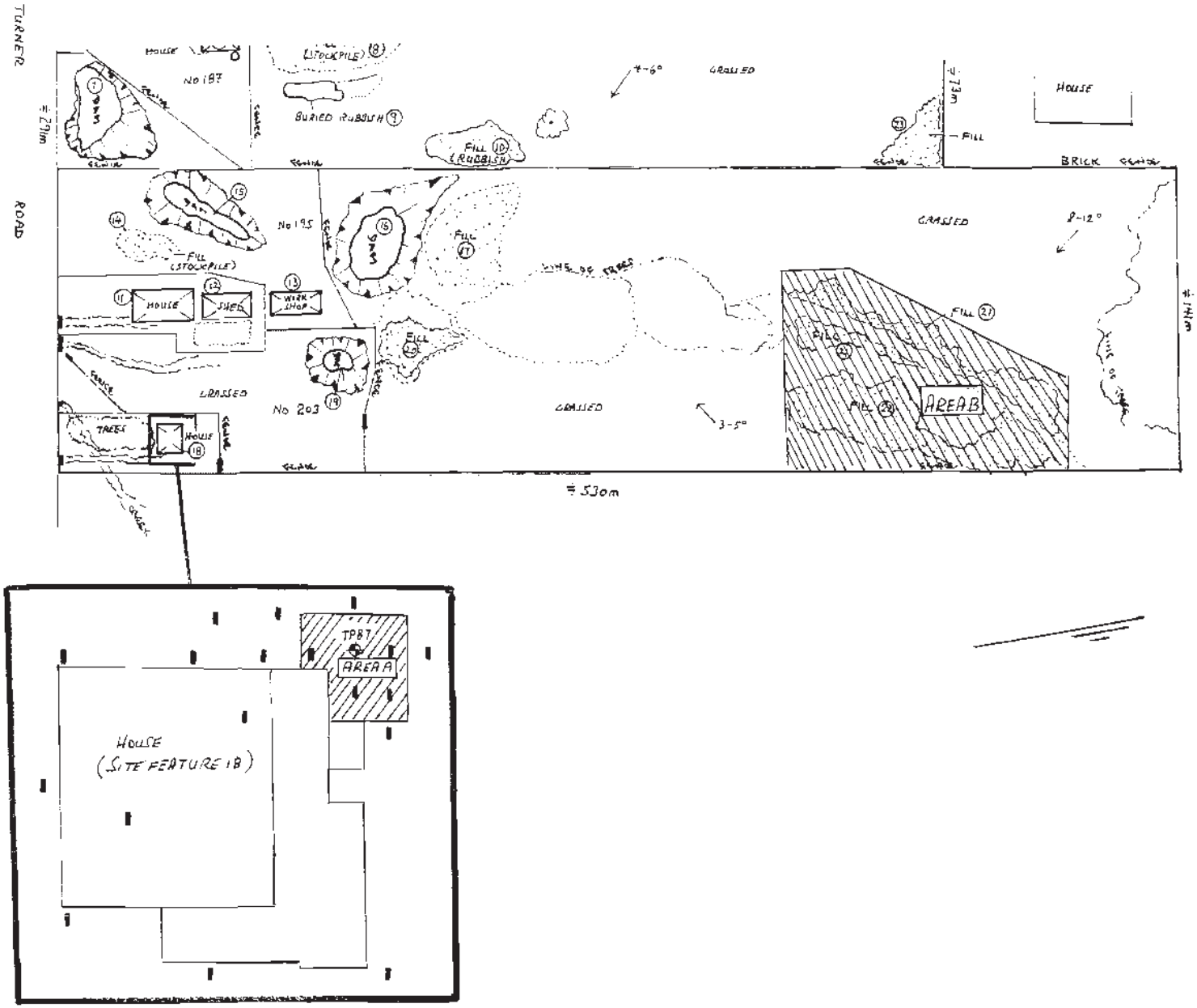
18	Timber and fibro house
19	Dry Dam
20	Filled area
21	Filled area
22	Filled area
23	Filled area consisting of earthfill with some rubbish

Legend

- Test Pit
- (10) SITE FEATURE No 10
- PREVIOUS TEST PIT 2004

GeoEnviro Consultancy

Drawn By: SL	Date: 16/3/09	Mr Jim and Ms Vanessa Driver	
Checked By: SL	Date: 16/3/09	Nos 195-203 Turner Road Currans Hill	
Revision By:	Date:	Sampling Location Plan	
Scale: Proportional	A3	Project No: JC04031A-r5	Drawing No: 1A



Legend

Remediation Area B

GeoEnviro Consultancy

Drawn By: SL	Date: 16/3/09	Mr Jim and Ms Vanessa Driver	
Checked By: SL	Date: 16/3/09	Nos 195-203 Turner Road Currans Hill	
Revision By:	Date:	Remediation Area Plan	
Scale: Proportional	A3	Project No: JC04031A-rS	Drawing No: 2A

Test Pit Number	Depth (m)	Profile Type	Description
100	0.0-0.5	Topsoil/Fill	Clayey silt mixed with silt and some gravel, light grey and brown, dry
	0.5-0.9	Natural	(CI-CH) Silty Clay: medium to high plasticity, red and grey, MC<=PL, PP>600kPa
101	0.0-0.7	Topsoil/Fill	Silt with gravel and some clayey silt, grey, dry to moist
	0.7-1.0	Natural	(CI) Silty Clay: medium plasticity, yellow and red/brown, MC<=PL, hard
102	Dam Embankment	Fill	Clayey silt and silty clay high plasticity and some gravel, brown, moist
103	0.0-0.3	Topsoil/Fill	Clayey silt with some gravel, brown, dry to moist
	0.3-0.7	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown, dry, hard
104	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.4-1.4	Natural	(CH) Silty Clay: high plasticity, red and brown, with some gravel, dry to moist, hard, MC<=PL, PP>600kPa
105	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry
	0.3-1.0	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
	1.0-1.9	Natural	(CI) Gravelly Silty Clay: medium plasticity, brown, very hard, MC<PL, PP>600kPa
106	0.0-0.8	Fill	Silty clay and some silt mixed with some gravel, grey and brown, dry
	0.8-1.0	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, dry, hard
107	Dam Embankment	Fill	Mixture of clayey silt, silty clay of high plasticity and some gravel, yellow/brown and dark brown/grey, moist
108	Dam Embankment	Fill	Mixed clayey silt, silty clay of high/medium to high plasticity, some gravel, yellow and brown and dark brown/grey, moist
109	Dam Embankment	Fill	Mixture of silty clay and clayey silt, silty clay of high plasticity with some gravel, yellow/brown and dark grey and dark brown, moist
110	0.0-0.7	Fill	Silty clay of medium plasticity mixed with gravel, some silt, some clayey silt, some sandstone cobbles, brown, dry to moist
	0.7-1.0	Topsoil	Silt, low liquid limit, light grey, dry
	1.0-1.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, yellow and brown, MC<=PL, hard
111	0.0-0.8	Fill	Mixed silty clay with silt and sandstone gravel/cobbles, brown, moist
	0.8-1.0	Topsoil	Silt, with some clayey silt, grey, dry
	1.0-1.3	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and yellow, hard, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

TABLE 1 (Page 10 of 11)
SUMMARY OF SOIL PROFILE

Test Pit Number	Depth (m)	Profile Type	Description
112	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, dry
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard, PP>600kPa
113	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, dry to moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, moist, MC<=PL, hard, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

TABLE 1 (Page 11 of 11)
SUMMARY OF SOIL PROFILE

GeoEnviro Consultancy

Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Test Pit Number	Depth (m)	Profile Type	Description
1A	0.0-0.1	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry
	0.1-0.6	Fill	Silty Clay: medium to high plasticity, brown loose
	0.6-0.7	Natural	Clayey Silt, low liquid limit, brown dry
	0.7-1.7	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
	1.7-2.7	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey brown, moist to wet with a trace of fine gravel
	2.7-3.3	Natural	(CI) Silty Clay: medium plasticity, brown and grey some minor groundwater seepage at about 3.0m
2A	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.3-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard, PP>600kPa
	1.2-2.1	Natural	As above but pale brown, MC<PL, hard, PP>600kPa
	2.1-3.1	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey brown, with some ironstone gravel, MC<PL
	3.1-3.5	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
3A	0.0-0.2	Fill	Clayey Silt, low liquid limit, brown and grey, dry, a trace of fine gravel
	0.2-0.8	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, some sand, dark red and brown, MC<PL, PP>600kPa
4A	0.0-0.3	Fill	Mixture of silty clay medium plasticity with some gravel and with some silt, yellow brown and grey, moist to wet
	0.3-0.9	Natural	(CI-CH) Silty Clay: medium to high plasticity, some sand, dark red and brown, MC<PL, PP>600kPa
5A	0.0-0.4	Fill/Topsoil	Mixture of silty clay medium plasticity with some gravel and with some silt, yellow brown and grey, moist to wet
	0.4-1.1	Natural	(CI-CH) Silty Clay: medium to high plasticity, some sand, brown, very stiff
6A	0.0-0.2	Fill/Topsoil	Clayey Silt with gravel and some sand, some clayey silt, grey and red/brown, dry
	0.2-0.5	Fill	Silty Clay: medium plasticity, red brown and dark brown , MC<PL
	0.5-1.1	Natural	(CI) Sillty Clay: medium plasticity, orange brown , MC<PL, PP>600kPa
7A	0.0-0.2	Fill/Topsoil	Clayey Silt/Silty Clay: low liquid limit, low plasticity with gravel dry
	0.2-0.5	Fill	Silty Clay: medium plasticity, red brown , a trace of gravel
	0.5-1.2	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, MC<PL, PP>600kPa
8A	0.0-0.2	Fill/Topsoil	Silty clay with gravel and some sand, some clayey silt, grey and red/brown, dry
	0.2-0.8	Fill	Silty Clay/Clayey Silt : low to medium plasticity, red brown , a trace of gravel and sand
	0.8-1.7	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, MC<PL, PP>600kPa

Note:
PP = Pocket Penetrometer
MC = Moisture Content
PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1A (Page 1 of 4)
SUMMARY OF SOIL PROFILE

Mr Jim and Vanessa Driver

Proposed Residential Development

Nos 195-203 Turner Street Elderslie

Prepared By: SL 23/03/2009
Checked By:_____Date:_____

Test Pit Number	Depth (m)	Profile Type	Description
9A	0.0-0.35	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.35-1.3	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.3-2.0	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey, with some shale fragments, MC<=PL, hard, PP>600kPa
	2.0-3.0	Natural	(CI) Gravelly Shaley Clay: medium plasticity, grey, with layers/bands of extremely weathered shale
	3.0-3.5	Natural	As above but medium to high plasticity, brown grey MC=PL
10A	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.3-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.2-2.0	Natural	(CI-CH) Silty Sandy Clay/Gravelly Silty Clay: medium to high plasticity, dark red and brown, dry, MC<PL, PP>600kPa
	2.0-2.4	Natural	(CI) Silty Clay: medium plasticity, grey, with some shale fragments, MC<=PL, hard, PP>600kPa
	2.4-3.0	Natural	(CI) Gravelly Shaley Clay: medium plasticity, grey, with layers/bands of extremely weathered shale
	3.0-3.7	Bedrock	Shale/Siltstone: extremely weathered, extremely low strength, grey and brown
11A	0.0-0.2	Fill	Gravelly Silty Clay: medium plasticity, brown with some of sandstone and a trace of asphalt
	0.2-0.35	Topsoil	Silt and Clayey Silt, brown and grey, dry
	0.35-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and brown, very hard, dry
12A	0.0-0.6	Fill	Mixture of silty clay and sandstone gravel, some shale and roadbase
	0.6-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, MC<PL
13A	0.0-0.7	Fill	Silty Clay/Clayey Silt: low to medium plasicity, brown with a trace of concrete fragments
	0.7-1.5	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, MC<PL
14A	0.0-0.6	Fill	Gravelly Silty Clay: medium plasticity, brown with some of sandstone and a trace of asphalt
	0.6-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, MC<PL
15A	0.0-0.4	Fill	Gravelly Silty Clay: medium plasticity, brown with some of sandstone and a trace of asphalt
	0.4-0.5	Topsoil	Silt and Clayey Silt, brown and grey, dry
	0.5-1.3	Natural	(CI-CH) Silty Sandy Clay/Gravelly Silty Clay: medium to high plasticity, dark red and brown, dry, MC<PL, PP>600kPa
	1.3-2.4	Natural	(CI) Silty Clay: medium plasticity, grey, with some shale fragments, MC<=PL, hard, PP>600kPa
	2.4-3.1	Natural	(CI) Gravelly Shaley Clay: medium plasticity, grey, with layers/bands of extremely weathered shale

Note:

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MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1A (Page 2 of 4)

SUMMARY OF SOIL PROFILE

Mr Jim and Vanessa Driver

Proposed Residential Development

Nos 195-203 Turner Street Elderslie

Prepared By: SL 23/03/2009

Checked By:_____Date:_____

Test Pit Number	Depth (m)	Profile Type	Description
16A	0.0-0.2	Fill	Gravelly Silty Clay: medium plasticity, brown with some of sandstone and a trace of asphalt
	0.2-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, MC<PL
17A	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.3-1.0	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.0-1.7	Natural	(CI) Silty Clay: medium plasticity, grey, some shale gravel, MC<=PL, PP>600kPa
	1.7-1.8	Bedrock	Shale: extremely weathered/Interbedded with gravelly shaley clay, grey and brown, dry to moist
18A	0.0-0.15	Slab	Concrete : 150mm thick
	0.15-0.3	Subbase	Sand: fine to medium grained, brown
	0.3-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown MC<PL, some gravel
	0.6-0.7	Natural	(CI) Gravelly Shaley Clay: medium plasticity, grey
19A	0.0-0.07	Slab	Concrete : 150mm thick
	0.07-0.5	Fill	Silty Clay: medium plasticity, brown, MC<PL some gravel
	0.5-0.9	Fill	Gravelly Silty Clay: medium plasticity, some ironstone gravel,
20A	0.0-0.11	Slab	Concrete : 150mm thick
	0.11-0.25	Fill	Gravelly Silty Clay: medium plasticity, some ironstone gravel,
21A	0.0-0.1	Fill	Silty Sandy Gravel
	0.1-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, hard, PP>600kPa
22A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard
23A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa
24A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity,grey mottled brown, MC<=PL, hard
25A	0.0-0.1	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.1-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa

Note:

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GeoEnviro Consultancy

TABLE 1A (Page 3 of 4)

SUMMARY OF SOIL PROFILE

Mr Jim and Vanessa Driver

Proposed Residential Development

Nos 195-203 Turner Street Elderslie

Prepared By: SL 23/03/2009

Checked By:_____Date:_____

Test Pit Number	Depth (m)	Profile Type	Description
26A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa
27A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, red brown, MC<=PL, hard
28A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard
29A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, grey brown, hard, PP>600kPa
30A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, red brown and grey, MC<=PL, hard, PP>600kPa
31A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and red brown
32A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa
33A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.45	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and red brown
34A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and red brown
35A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.45	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard
36A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.45	Natural	(CI-CH) Silty Clay: medium to high plasticity, grey brown, hard, PP>600kPa
37A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa
38A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, grey brown, hard, PP>600kPa
39A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa
40A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa

Note:

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PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1A (Page 4 of 4)

SUMMARY OF SOIL PROFILE

Mr Jim and Vanessa Driver

Proposed Residential Development

Nos 195-203 Turner Street Elderslie

Sample	Depths	Sample Date	Sample Type	Analysis														
					Heavy Metals								OCP	OPP	PCB	TRH	BTEX	PAH
				pH	Cu	Pb	Zn	Cd	Cr	Ni	As	Hg						
TP1A	0.0-0.1	9/02/2009	Soil	o														
TP1A	1.1-1.2	9/02/2009	Soil	o														
TP1A	2.4-3.0	9/02/2009	Soil	o														
TP2A	0.0-0.1	9/02/2009	Soil	o														
TP2A	0.4-0.5	9/02/2009	Soil	o														
TP2A	2.3-2.4	9/02/2009	Soil	o														
TP3A	0.0-0.1	9/02/2009	Soil															
TP3A	0.4-0.5	9/02/2009	Soil															
TP4A	0.0-0.1	9/02/2009	Soil	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP4A	0.4-0.5	9/02/2009	Soil															
TP5A	0.0-0.1	9/02/2009	Soil															
TP5A	0.4-0.5	9/02/2009	Soil															
TP6A	0.0-0.1	9/02/2009	Soil	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP6A	0.4-0.5	9/02/2009	Soil															
TP8A	0.0-0.1	9/02/2009	Soil	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
TP8A	0.4-0.5	9/02/2009	Soil															
TP8A	1.0-1.1	9/02/2009	Soil															
TP9A	0.0-0.1	9/02/2009	Soil	o														
TP9A	1.5-1.6	9/02/2009	Soil	o														
TP9A	3.2-3.3	9/02/2009	Soil	o														
TP10A	0.0-0.1	9/02/2009	Soil	o														
TP10A	0.4-0.5	9/02/2009	Soil	o														
TP10A	2.2-2.3	9/02/2009	Soil	o														
TP11A	0.0-0.1	9/02/2009	Soil															
TP11A	0.4-0.5	9/02/2009	Soil															
TP12A	0.0-0.1	9/02/2009	Soil	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o

Note: O denotes tested

GeoEnviro Consultancy

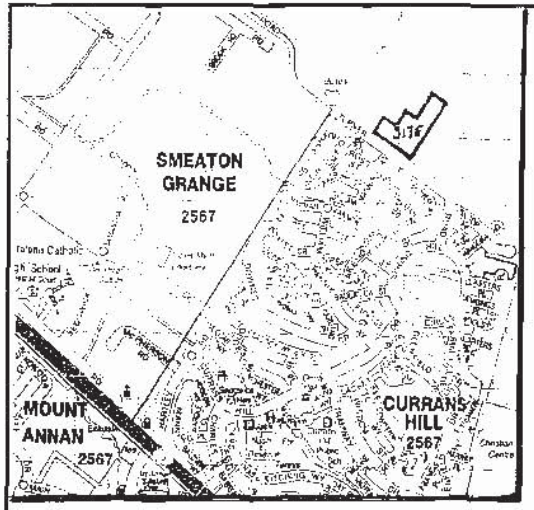
TABLE 2A (Page 1 of 3)

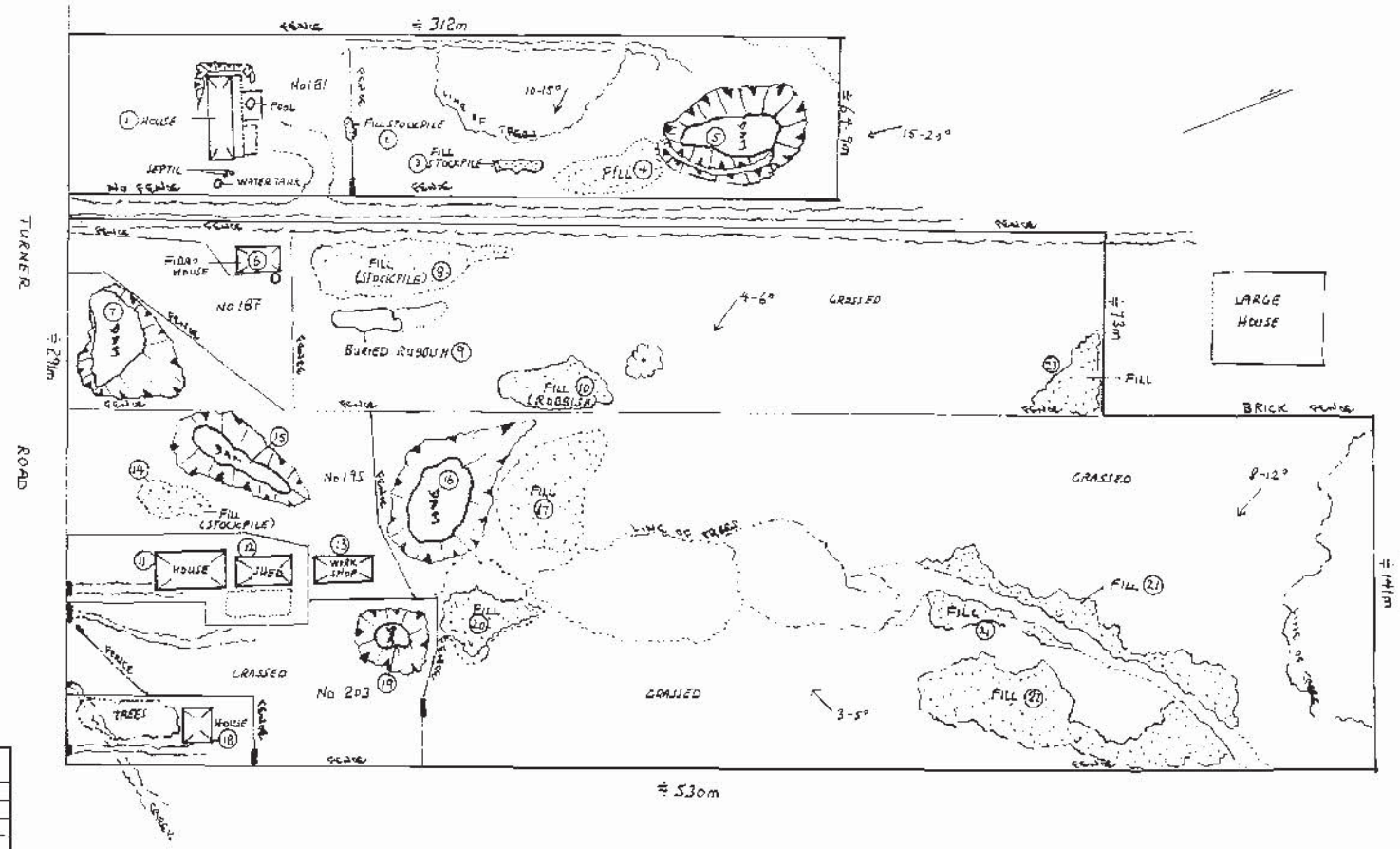
Analytical Program

Mr Jim and Vanessa Driver

Proposed Residential Development

Nos 195-203 Turner Street Elderslie



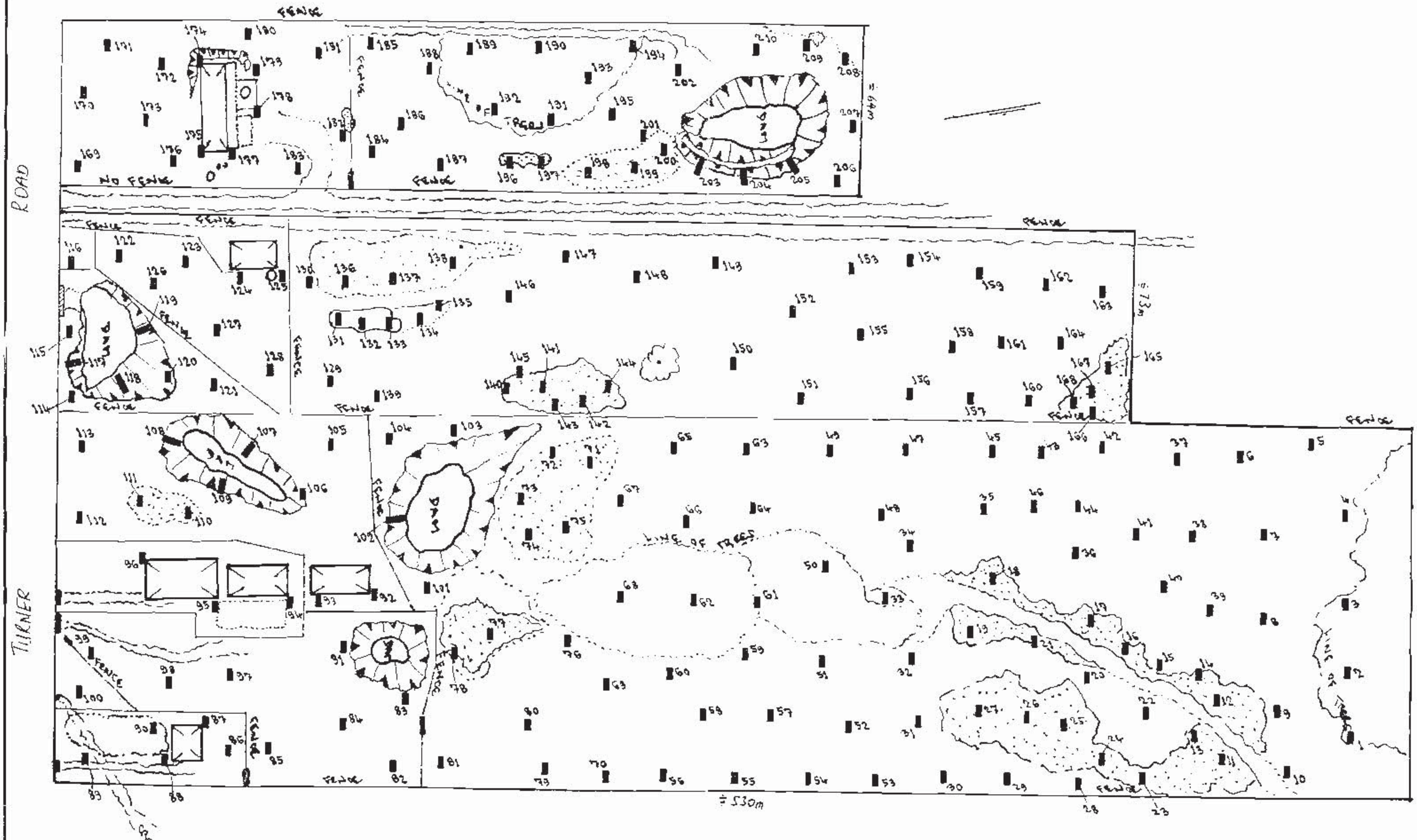


Feature No	Description
1	Single storey brick residential dwelling with metal roof
2	Small fill stockpile with some bricks and concrete
3	Small earthfill stockpile about 1m high
4	Filled Area
5	Dam, mainly dry
6	Fibro house with a septic tank
7	Dry dam
8	A spread of fill consisting of timber, wires, metal pieces, ties and rubbish
9	Buried rubbish consisting mainly of timber. Depth in excess of 3m
10	Buried rubbish
11	Timber and brick house
12	Garage/shed on concrete slab
13	Workshop shed on concrete slab. Some oil staining on the floor
14	Filled Area consisting mainly of earthfill
15	Dry Dam
16	Dam, mainly dry
17	Slightly raised filled area consisting mainly of topsoil and earthfill mixture
18	Timber and fibro house
19	Dry Dam
20	Filled area
21	Filled area
22	Filled area
23	Filled area consisting of earthfill with some rubbish

Note: All site features indicated on the drawings are only indicative and not to scale

GeoEnviro Consultancy

Drawn By:	SI.	Date: 22/3/04	Australand Holdings Ltd
Checked By:	SI.	Date: 22/3/04	No 181, 187, 195-203 Turner Road, Currans Hill
Revision By:		Date:	Site Locality and Features Plan
Scale:	1:2000 (approx)	A3	Project No: JC04031A / Drawing No: 1



Legend ▮ Test Pit

Note: All site features indicated on the drawings are only indicative and not to scale

GeoEnviro Consultancy	Drawn By:	SL	Date : 22/3/04	Australand Holdings Ltd
	Checked By:	SL	Date : 22/3/04	No 181, 187, 195-203 Turner Road, Currans Hill
	Revision By:		Date:	Test Pit Location Plan
	Scale:	Proportional	A3	Project No: JC04031A — Drawing No: 2

Test Pit Number	Depth (m)	Profile Type	Description
1	0.0-0.4	Topsoil	Silt, low liquid limit, light grey, dry
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, with some gravel, MC<=PL, hard, PP>600kPa
2	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow, dry, MC<PL, PP>600kPa
3	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.4-1.2	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, very hard, MC<PL, PP>600kPa
	1.2-1.4	Natural	(CI) Gravelly Silty Clay: medium plasticity, red brown and grey, MC<PL, PP>600kPa
4	0.0-0.4	Topsoil	Clayey Silt, some gravel, brown, dry
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, red and grey, MC<PL, PP>600kPa
5	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.4-1.1	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<PL, hard, PP>600kPa
	1.1-1.3	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey, MC<PL, PP>600kPa
	1.3-1.6	Bedrock	Shale/Siltstone: extremely to distinctly weathered, extremely to very low strength, grey and brown
	1.6		Backhoe refusal
6	0.0-0.7	Topsoil/Fill	Clayey silt with silt, dark brown and brown, dry, hard
	0.7-1.2	Natural	(CI-CH) Silty Clay: medium to high plasticity, red and brown, MC<PL, PP>600kPa
7	0.0-0.5	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.5-0.9	Natural	(CH) Silty Clay: high plasticity, grey and brown, MC<=PL, PP>600kPa
8	0.0-0.6	Topsoil	Clayey Silt, dark grey and dark brown, dry to moist
	0.6-1.5	Natural	(CH) Silty Clay: high plasticity, yellow and brown, some gravel, MC<PL, PP>600kPa
	1.5-2.8	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, red/grey and brown, some sand, MC<=PL, PP>600kPa
	2.8-3.3	Bedrock	Shale/Siltstone: extremely weathered, extremely low strength, grey and brown
9	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow brown, MC<PL, PP>600kPa
10	0.0-0.5	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.5-0.7	Natural	(CH) Silty Clay: high plasticity, yellow brown, dry, hard

Note: PP = Pocket Penetrometer

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PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 1 of 11)
SUMMARY OF SOIL PROFILE

Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Test Pit Number	Depth (m)	Profile Type	Description
11	0.0-0.3	Fill	Mixture of sandstone and roadbase, some pieces of asphaltic concrete, with some shale gravel, grey and brown
	0.3-0.6	Topsoil	Silt and Clayey Silt, brown and grey, dry
	0.6-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, very hard, dry
12	0.0-1.0	Fill	Mixture of sandstone gravel/cobbles with silty clay and some roadbase, small pieces of asphaltic concrete, small pieces of concrete, brown and grey, moist
	1.0-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, dry
13	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.4-0.8	Natural	(CI-CH) Silty Clay: medium to high plasticity, yellow, dry, PP>600kPa
14	0.0-0.4	Fill	Mixture of sandstone gravel/cobbles, silty clay, some roadbase, small pieces of asphaltic concrete, small pieces of concrete, brown/grey, moist
	0.4-0.6	Topsoil	Silt and Clayey Silt, brown and grey, dry
	0.6-0.9	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<PL, hard, PP>600kPa
15	0.0-0.3	Topsoil	Clayey Silt and Silt, low liquid limit, grey, dry
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow brown, dry, PP>600kPa
16	0.0-0.6	Fill	Mixture of sandstone and roadbase, some pieces of asphaltic concrete, some shale gravel, grey and brown
	0.6-1.0	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, PP>600kPa
17	0.0-1.0	Fill	Mixture of silty clay, sandstone gravel, shale, roadbase, asphalt pieces, some small pieces of concrete, brown and grey, moist
	1.0-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, dry
18	0.0-0.7	Fill	Mixture of silty clay and sandstone gravel, some shale and roadbase, asphalt pieces, some small pieces of concrete, brown and grey, moist
	0.7-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, MC<PL
19	0.0-0.2	Fill	Mixture of sandstone and roadbase, some pieces of asphaltic concrete and with shale gravel, grey and brown, dry to moist
	0.2-0.4	Topsoil	Clayey Silt, brown, dry
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, yellow, dry, MC<PL, hard, PP>600kPa
20	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, yellow/brown, hard, MC<PL
21	0.0-0.1	Fill	Mixed silty clay and clayey silt and sandstone gravel, some roadbase, dark grey, moist
	0.1-0.4	Topsoil	Clayey Silt, low liquid limit, some gravel, grey and brown, dry
	0.4-0.5	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, dry

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MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 2 of 11)
SUMMARY OF SOIL PROFILE

Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Test Pit Number	Depth (m)	Profile Type	Description
22	0.0-0.3	Fill	Mixture of sandstone and roadbase, some pieces of asphaltic concrete and with shale gravel, brown and dark grey, dry
	0.3-0.6	Topsoil	Clayey Silt, some gravel, brown, dry
	0.6-0.7	Natural	(CH) Silty Clay: high plasticity, yellow, dry, MC<PL, hard, PP>600kPa
23	0.0-0.2	Fill	Mixture of silty clay and some silt with sandstone gravel/cobbles and roadbase, some small pieces of concrete, some pieces of asphaltic concrete, some sand, dark grey and brov
	0.2-0.4	Topsoil	Clayey Silt, brown, dry
	0.4-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard, PP>600kPa
24	0.0-0.4	Fill	Mixture of silty clay, silt, some sandstone gravel/cobbles and roadbase, some small pieces of concrete, some pieces of asphaltic concrete, some sand, brown and grey, dry
	0.4-0.7	Topsoil	Clayey Silt, brown, dry
	0.7-1.0	Natural	(CH) Silty Clay: high plasticity, yellow/brown, MC<=PL, hard
25	0.0-0.6	Fill	Mixed silty clay and clayey silt and concrete pieces, sandstone, some asphalt, brown, dry to moist
	0.6-0.9	Topsoil	Clayey Silt and Silt, some gravel, grey, dry
	0.9-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, PP>600kPa
26	0.0-0.4	Fill	Mixed silty clay/clayey silt and some concrete pieces, sandstone gravel, with some asphalt, brown and grey, dry to moist
	0.4-0.7	Topsoil	Clayey Silt and Silt, some gravel, grey, dry
	0.7-0.9	Natural	(CH) Silty Clay: high plasticity, yellow, dry, hard
27	0.0-0.8	Fill	Mixed silty clay and topsoil, silt and some concrete pieces, sandstone gravel, with some asphalt, dark brown and grey, dry to moist
	0.8-1.0	Topsoil	Silt and Clayey Silt, with some gravel, grey, dry
	1.0-1.2	Natural	(CH) Silty Clay: high plasticity, yellow/brown, dry, hard
28	0.0-0.2	Topsoil	Clayey Silt, with some gravel, brown and grey, dry
	0.2-0.4	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, MC<PL, PP>600kPa
29	0.0-0.3	Topsoil	Clayey Silt and Silt, low liquid limit, brown/grey, dry
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow, dry, PP>600kPa
30	0.0-0.4	Topsoil	Silt with some Clayey Silt, grey, dry
	0.4-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, MC<PL, hard
31	0.0-0.4	Topsoil	Clayey Silt, brown, dry
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, yellow, dry, hard

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 3 of 11)
SUMMARY OF SOIL PROFILE

Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Test Pit Number	Depth (m)	Profile Type	Description
32	0.0-0.4	Topsoil	Clayey Silt, brown and grey, dry
	0.4-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<PL, PP>600kPa
33	0.0-0.6	Topsoil	Silt, some Clayey Silt, dark grey and light grey, dry
	0.6-1.2	Natural	(CH) Silty Clay: high plasticity, yellow brown, MC<PL, dry, PP>600kPa
	1.2-1.4	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey and red, MC<=PL, hard, PP>600kPa
34	0.0-0.5	Topsoil	Clayey Silt and Silt, low liquid limit, grey, dry
	0.5-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, hard
35	0.0-0.4	Topsoil	Clayey Silt, brown and grey, dry
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow, MC<PL, hard
36	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, grey brown, dry
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, hard
37	0.0-0.6	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.6-1.8	Natural	(CH) Silty Clay: high plasticity, yellow brown, MC<=PL, PP>600kPa
	1.8-2.6	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey and brown, MC<=PL, hard, PP>600kPa
38	0.0-0.5	Topsoil	Clayey Silt, dark brown and brown, dry
	0.5-0.9	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, PP>600kPa
39	0.0-0.4	Topsoil/Fill	Clayey silt, some gravel, dark brown and brown/grey, dry
	0.4-0.8	Topsoil	Silt with some Clayey Silt, grey, dry
	0.8-1.6	Natural	(CI-CH) Silty Sandy Clay/Gravelly Silty Clay: medium to high plasticity, dark red and dark brown, very hard, very dry, MC<PL, PP>600kPa
40	0.0-0.4	Topsoil/Fill	Clayey silt, dark brown, dry
	0.4-0.7	Topsoil	Silt, some Clayey Silt, light grey, dry
	0.7-1.6	Natural	(CI-CH) Silty Clay/Gravelly Silty-Sandy Clay: medium to high plasticity, dark red and dark brown, very hard, very dry, MC<PL, PP>600kPa
41	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.3-1.0	Natural	(CI) Silty Clay: medium plasticity, dark brown and red, some gravel, MC<=PL, PP>600kPa
42	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.3-1.6	Natural	(CH) Silty Clay: high plasticity, yellow, dry/moist, MC<=PL, PP>600kPa
	1.6-2.2	Natural	(CI-CH) Gravelly Silty Clay: medium to high plasticity, red/brown and dark red, some sand, MC<PL, hard, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

TABLE 1 (Page 4 of 11)
SUMMARY OF SOIL PROFILE

GeoEnviro Consultancy

Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Test Pit Number	Depth (m)	Profile Type	Description
43	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.4-1.2	Natural	(CH) Silty Clay: high plasticity, yellow brown, MC<=PL, PP>600kPa
44	0.0-0.4	Topsoil	Clayey Silt, some gravel, dark brown, moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow, MC<=PL, PP>600kPa
45	0.0-0.3	Topsoil	Clayey silt, brown and dark brown, dry
	0.3-0.5	Topsoil	Silt, light grey, very dry
	0.5-1.3	Natural	(CH) Silty Clay: high plasticity, yellow and brown, moist, hard
46	0.0-0.3	Topsoil	Clayey silt, dark brown, moist
	0.3-0.4	Topsoil	Silt, light grey, very dry
	0.4-0.9	Natural	(CH) Silty Clay: high plasticity, yellow/brown, moist, MC<=PL, PP>600kPa
47	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, brown and yellow, moist, hard
48	0.0-0.4	Topsoil	Clayey Silt and Silt, brown, dry to moist
	0.4-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry and hard, some gravel, MC<=PL, PP>600kPa
49	0.0-0.3	Topsoil	Clayey Silt and Silt with some gravel, brown and grey, moist
	0.3-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and yellow , MC<PL, hard
50	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.3-1.1	Natural	(CH) Silty Clay: high plasticity, red/orange and yellow, some gravel, moist, hard
51	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.0-1.5	Natural	(CI-CH) Silty Sandy Clay/Gravelly Silty Clay: medium to high plasticity, dark red and brown, dry, MC<PL, PP>600kPa
	1.5-1.7	Bedrock	Shale/Siltstone: extremely weathered, extremely low strength, grey and brown
52	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, dry to moist
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, hard
53	0.0-0.3	Topsoil	Clayey Silt, some gravel, brown, dry to moist
	0.3-0.8	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, very dry and very hard

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

TABLE 1 (Page 5 of 11)
SUMMARY OF SOIL PROFILE

GeoEnviro Consultancy

Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Test Pit Number	Depth (m)	Profile Type	Description
54	0.0-0.3	Topsoil	Clayey Silt, some gravel, brown, moist
	0.3-0.5	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, PP>600kPa
55	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.4-1.2	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.2-1.8	Natural	(CI) Silty Clay: medium plasticity, grey, some shale gravel, MC<=PL, PP>600kPa
	1.8-2.4	Bedrock	Shale: extremely weathered/Interbedded with gravelly shaley clay, grey and brown, dry to moist
56	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.3-0.6	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, hard
57	0.0-0.3	Topsoil	Clayey Silt, some gravel, brown, moist
	0.3-0.9	Natural	(CH) Silty Clay: high plasticity, yellow, hard, MC<=PL, PP>600kPa
58	0.0-0.3	Topsoil	Clayey Silt, with some gravel, brown, dry/moist
	0.3-0.5	Natural	(CH) Silty Clay: high plasticity, yellow/brown, MC<PL, hard
59	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown and brown, dry to moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and red/brown, MC<=PL, hard
60	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.3-1.3	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.3-1.9	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey, with some shale fragments, MC<=PL, hard, PP>600kPa
	1.9-2.2	Natural	(CL) Gravelly Shaley Clay: low plasticity, grey, with layers/bands of extremely weathered shale
	2.2-2.4	Bedrock	Shale: extremely weathered, extremely low strength, grey and brown
61	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, dark brown, dry to moist
	0.2-0.5	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, PP:480-560kPa
62	0.0-0.3	Topsoil	Clayey Silt, brown, moist
	0.3-0.9	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
63	0.0-0.2	Topsoil	Clayey Silt, brown, some gravel, moist
	0.2-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard
64	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.3-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and red, MC<PL, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

TABLE 1 (Page 6 of 11)
SUMMARY OF SOIL PROFILE

GeoEnviro Consultancy

Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Test Pit Number	Depth (m)	Profile Type	Description
65	0.0-0.3	Topsoil	Clayey Silt, brown, dry to moist
	0.3-1.4	Natural	(CH) Silty Clay: high plasticity, red/grey and brown, MC<PL, very hard
66	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry/moist
	0.3-1.6	Natural	(CH) Silty Clay: high plasticity, red/brown and grey, with some gravel, MC<=PL, hard, PP>600kPa
	1.6-2.4	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, dark red and dark brown/grey, very dry and very hard, MC<PL, PP>600kPa
67	0.0-0.3	Topsoil	Clayey Silt with Silt, grey and brown, moist
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, dry to moist, hard
68	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, with some gravel, dry/moist
	0.4-0.8	Natural	Silt/(CL) Silty Clay: low plasticity, grey and brown, dry, MC<PL, hard, PP>600kPa, with some fine to coarse gravel
	0.8-1.2	Natural	(CH) Silty Clay: high plasticity, red/brown and grey, with some gravel, MC<PL, hard, PP>600kPa
69	0.0-0.2	Topsoil	Clayey Silt, brown, moist
	0.2-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown/red, MC<=PL, PP>600kPa
70	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.2-1.2	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
71	0.0-0.7	Fill/Topsoil	Clayey silt and silty clay with gravel, brown/red and grey, dry
	0.7-1.2	Natural	(CI-CH) Silty Clay/Gravelly Silty-Sandy Clay: medium to high plasticity, dark brown and red, very hard, MC<PL, PP>600kPa
72	0.0-0.6	Fill/Topsoil	Clayey silt/silty clay with some gravel, brown and grey, dry
	0.6-1.5	Natural	(CI-CH) Gravelly Silty Clay: medium to high plasticity, some sand, MC<PL, PP>600kPa
73	0.0-0.8	Fill/Topsoil	Silty clay with gravel and some sand, some clayey silt, grey and red/brown, dry
	0.8-1.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, MC<PL, PP>600kPa
74	0.0-0.7	Fill/Topsoil	Clayey silt with silty clay and some gravel, brown/red and grey, dry
	0.7-1.2	Natural	(CI-CH) Silty Sandy Clay: medium to high plasticity, brown and red, dry, hard
75	0.0-0.5	Topsoil/Fill	Clayey silt mixed with some gravel, brown and grey, dry
	0.5-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, dry
76	0.0-0.6	Topsoil/Fill	Clayey silt and silty clay with some gravel, brown and grey, dry
	0.6-1.0	Natural	(CI-CH) Silty Sandy Clay: medium to high plasticity, red and grey, MC<=PL, hard

Note: PP = Pocket Penetrometer

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TABLE 1 (Page 7 of 11)
SUMMARY OF SOIL PROFILE

GeoEnviro Consultancy

Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Test Pit Number	Depth (m)	Profile Type	Description
77	0.0-0.6	Fill	Silty clay mixed with sandstone gravel, some asphaltic concrete pieces, some clayey silt, dark brown and grey, moist to wet profile
	0.6-1.0	Topsoil	Silt, with some clayey silt, light grey and brown, dry
	1.0-1.4	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, MC<PL, hard
78	0.0-0.7	Fill	Mixture of silty clay medium plasticity with some gravel and with some silt, yellow brown and grey, moist to wet
	0.7-0.9	Topsoil	Silt and some clayey silt, light grey, dry
	0.9-1.1	Natural	(CI) Silty Sandy Clay: medium plasticity, red and dark grey, MC<=PL, PP>600kPa
79	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry
	0.4-1.1	Natural	(CH) Silty Clay: high plasticity, yellow and red/brown, MC<=PL, hard, PP>600kPa
	1.1-1.9	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, some sand, dark red and brown, MC<PL, PP>600kPa
80	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.3-0.5	Natural	(CH) Silty Clay: high plasticity, red and grey, MC<PL, PP>600kPa
81	0.0-0.6	Fill/Topsoil	Clayey silt with silty clay, some gravel, brown/grey and yellow, moist
	0.6-1.0	Natural	(CI-CH) Silty Sandy Clay: medium to high plasticity, brown, MC<PL, hard
82	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard, PP>600kPa
83	0.0-0.3	Topsoil/Fill	Silty clay and clayey silt with gravel, brown, moist
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard
84	0.0-0.5	Topsoil/Fill	Clayey silt with silt and with some gravel, brown, moist
	0.5-1.4	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, some sand, grey yellow and brown, MC<PL, PP>600kPa, very hard and very dry
85	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and grey, moist
	0.4-0.9	Natural	(CI-CH) Silty Clay: medium to high plasticity, yellow/brown and grey, MC<PL, PP>600kPa
86	0.0-0.4	Topsoil/Fill	Clayey silt, some gravel, brown and grey, moist
	0.4-0.7	Natural	(CI-CH) Silty Clay: medium to high plasticity, grey and brown, dry, hard
87	0.0-0.3	Topsoil/Fill	Clayey silt with some gravel, brown, dry to moist
	0.3-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, hard, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

TABLE 1 (Page 8 of 11)
SUMMARY OF SOIL PROFILE

GeoEnviro Consultancy

Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Test Pit Number	Depth (m)	Profile Type	Description
88	0.0-0.4 0.4-0.6	Topsoil/Fill Natural	Clayey silt, some gravel, brown, dry to moist (CI-CH) Silty Clay: medium to high plasticity, brown, dry, hard
89	0.0-0.4 0.4-0.9	Topsoil/Fill Natural	Clayey silt with some gravel, dark brown and grey, moist (CH) Silty Clay: high plasticity, yellow and brown, dry, hard, PP>600kPa
90	0.0-0.4 0.4-0.6	Topsoil Natural	Clayey Silt, low liquid limit, dark grey and brown, dry (CH) Silty Clay: high plasticity, red and grey, MC<PL, PP>600kPa
91	0.0-0.6 0.6-1.0	Fill/Topsoil Natural	Clayey silt with gravel, brown and grey, moist (CI-CH) Silty Clay: medium to high plasticity, yellow and brown, MC<PL, hard
92	0.0-0.2 0.2-0.6	Fill Natural	Silty clay with sandstone and clayey silt, grey, moist (CH) Silty Clay: high plasticity, yellow/brown, dry, MC<PL, PP>600kPa
93	0.0-0.4 0.4-0.7	Fill Natural	Silty clay with gravel, some clayey silt, dark grey, moist (CI-CH) Silty Clay: medium to high plasticity, brown, MC<PL, hard
94	0.0-0.3 0.3-0.6	Fill/Topsoil Natural	Clayey silt with gravel, brown and grey, dry (CI-CH) Silty Clay: medium to high plasticity, brown, MC<PL, hard
95	0.0-0.3 0.3-0.6	Fill/Topsoil Natural	Clayey silt with some gravel, brown and grey, dry (CI-CH) Silty Clay: medium to high plasticity, brown, dry, hard
96	0.0-0.3 0.3-0.6	Fill/Topsoil Natural	Clayey silt with gravel, brown and grey, dry (CI-CH) Silty Clay: medium to high plasticity, brown, very hard, dry
97	0.0-0.3 0.3-0.5	Topsoil Natural	Clayey Silt, low liquid limit, dark brown, dry (CI-CH) Silty Clay: medium to high plasticity, brown and dark red, MC<PL, hard, PP>600kPa
98	0.0-0.4 0.4-0.9	Topsoil/Fill Natural	Clayey silt with some gravel, brown and grey, dry (CI-CH) Silty Clay: medium to high plasticity, yellow and brown, dry, MC<PL, hard, PP>600kPa
99	0.0-0.4 0.4-1.0	Topsoil Natural	Clayey Silt, low liquid limit, brown, moist (CH) Silty Clay: high plasticity, red and brown, with some gravel, MC<=PL, PP:380-460kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

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SUMMARY OF SOIL PROFILE

APPENDIX B

Extracts of the Salinity/Contamination & RAP Report (Reference 3)

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Report

Salinity Assessment Update
Proposed Residential Development
Nos 187 and 195-203, Lots 36, 37 and 38 DP 28024
Turner Road, Currans Hills, NSW

Prepared for:-
Turner Developments
Harrington Park Plaza
Level 1, 23 Fairwater Drive
HARRINGTON PARK NSW 2567

Ref: JC04031A-r9
September 2015

3.2 Laboratory Test Results

The following is a summary of the laboratory test results obtained from the initial salinity assessment of 2004 (Reference 1);

Sample	Depth (m)	pH	EC	EC_e	CEC	ESP	SAR	CL	SO4
TP 8	0.0-0.2	5.9	0.2	2.8	11.2	0.2	1		
	0.8-1.0	8.1	0.36	2.2	21.1	7.1	6	240	100
	1.8-2.0	8.2	0.4	2.8	19.2	15.6	8.4	350	120
TP 40	0.0-0.2	5.7	0.14	1.9	10	0.3	1.3		
	0.5-0.7	6.4	0.06	0.4	7.9	0.5	2.2	25	46
	1.0-1.2	7	0.08	0.6	13.8	4.9	3.1	45	32
TP 51	0.0-0.2	5.9	0.13	1.8	7.3	0.4	3.7		
	0.5-0.7	5.8	0.87	5.2	17.7	19.5	14.2	1170	90
	1.0-1.2	5.4	0.9	6.3	15.1	19.7	43	1350	27
TP 98	0.0-0.2	5.6	0.19	2.6	11.3	0.4	2.5		
	0.8-0.7	5.3	0.31	2.2	13.7	9.5	4.8	350	57
	1.0-1.2	5.5	0.38	3.2	14.2	12.7	16.9	530	32
TP 122	0.0-0.2	5.7	0.15	2.1	9.4	0.2	1.2		
	0.5-0.7	6.1	0.18	1.1	15.3	9.2	2.5	50	80
	1.0-1.2	6.2	0.39	3.1	10.9	12.8	8.3	560	37
TP 146	0.0-0.2	5.3	0.11	1.5	4.2	0.3	1		
	0.5-0.7	5.5	0.15	1.1	14.1	8.5	6	100	73
	1.8-2.0	5.6	0.55	4.4	18.8	10.6	34.3	850	150
TP 171	0.0-0.2	5.6	0.22	3.0	14.3	0.4	1.5		
	0.5-0.7	5.7	0.17	1.2	19.4	5.2	1.9	75	85
	1.0-1.2	5.6	0.21	1.7	18.3	7.7	3.1	180	66
TP 185	0.0-0.2	5.7	0.16	2.2	7.7	0.3	0.5		
	0.5-0.7	6.7	0.46	2.8	20.2	18.3	8.9	570	44
	1.0-1.2	6.7	0.41	2.9	14.3	17.5	8.6	530	46
TP 191	0.0-0.2	5.1	0.37	5.0	13.7	0.4	1.6		
	0.5-0.7	4.3	0.29	1.7	19.3	4.6	7.1	120	150
	1.0-1.2	4.8	0.42	2.9	15.1	19.9	5.2	420	200

Note: EC – Electical Conductivity (ds/m)
EC_e-Electrical Conducivity (ds/m)
CEC – Cation Exchange Capacity ($cmol^+/kg$)
ESP – Exchangeable Sodium Percentage (%)
SAR – Sodium Absorption Ratio
CL – Chloride (mg/kg)
SO4- Sulphate (mg.kg)

Emerson Class

Sample	Class	Description
TP 8 (0.8-1.0m)	2	Partial Dispersion
TP 8 (1.8-2.0m)	2	Partial Dispersion
TP 51 (0.5-0.7m)	1	Complete Dispersion
TP 98 (1.0-1.2m)	2	Partial Dispersion
TP 122 (0.5-0.7m)	3	Partial Dispersion
TP 146 (1.8-2.0m)	6	Non Dispersion
TP 171 (0.5-0.7m)	5	Non Dispersion
TP 185 (1.0-1.2m)	2	Partial Dispersion
TP 191 (0.5-0.7m)	3	Partial Dispersion
TP 191 (1.0-1.2m)	2	Partial Dispersion

Particle Size Distribution

Sample	Clay (%)	Silt (%)	Sand (%)	Gravel (%)
TP 8 (0.8-1.0m)	54	26	18	2
TP 40 (1.0-1.2m)	34	20	45	1
TP 51 (0.5-0.7m)	50	30	20	0
TP 98 (1.0-1.2m)	41	31	25	3
TP 122 (0.5-0.7m)	58	26	15	1
TP 146 (1.8-2.0m)	44	34	22	0
TP 171 (1.0-1.2m)	43	45	9	3
TP 191 (0.5-0.7m)	61	25	12	2

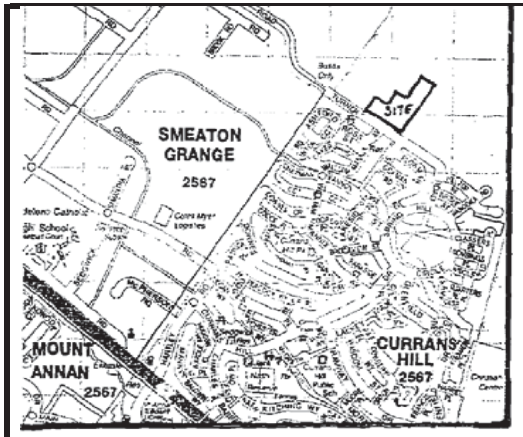
The following is a summary of the laboratory test results obtained from the additional salinity assessment of 2009 (Reference 2)

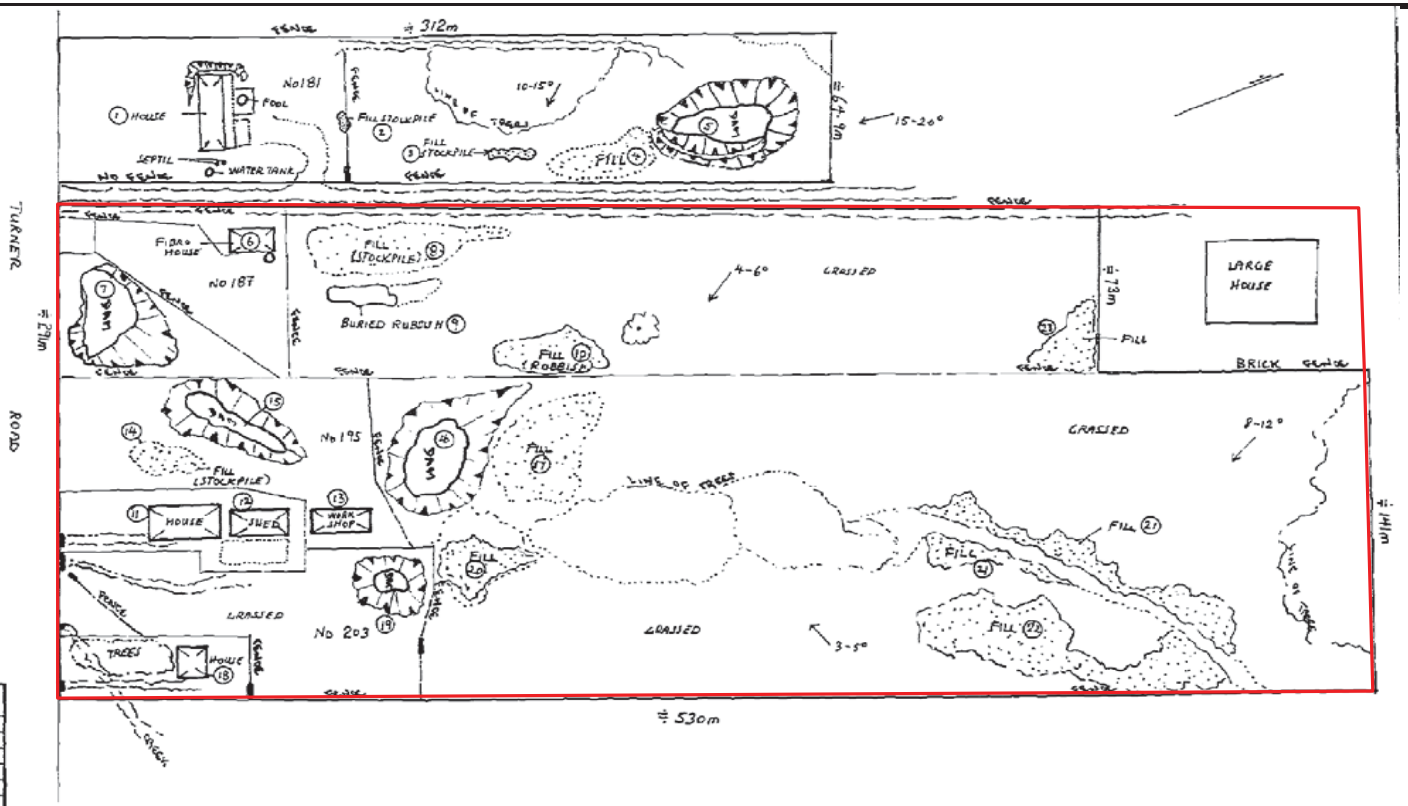
Sample	Depth (m)	Ph	EC	EC_e	CEC	ESP	CL	SO4
TP1A	0.0-0.1	6	0.075	1.1				
	1.1-1.2	6.2	0.91	7.3	22	39	1300	110
	2.4-3.0	8.4	0.15	1.3	15	22	160	<25
TP2A	0.0-0.1	6.3	0.044	0.6				
	0.4-0.5	7.8	0.21	1.7	29	11	370	61
	2.3-2.4	8.1	0.42	3.6	15	18	240	25
TP4A	0.0-0.1	5.9						
TP6A	0.0-0.1	6.2						
TP8A	0.0-0.1	6.1						
TP9A	0.0-0.1	6.5	0.018	0.3				
	1.5-1.6	8.2	0.43	3.4	26	22	530	57
	3.2-3.3	8.6	0.17	1.4	25	16	<100	26
TP10A	0.0-0.1	6.4	0.19	2.7				
	0.4-0.5	9.2	0.22	1.8	25	12	<100	<25
	2.2-2.3	8.4	0.33	2.8	44	8.5	220	<25
TP12A	0.0-0.1	6.7						
TP14A	0.0-0.1	7.5						
TP15A	0.0-0.1	7.8	0.094	1.3				
	0.5-0.6	6.2	0.62	5	11	37	910	<25
	2.4-2.5	7.8	0.76	6.5	21	32	1100	<25

Note: EC – Electrical Conductivity (ds/m)
EC_e-Electrical Conducivity (ds/m)
CEC – Cation Exchange Capacity ($cmol^+/kg$)
ESP – Exchangeable Sodium Percentage (%)
SAR – Sodium Absorption Ratio
CL – Chloride (mg/kg)
SO4- Sulphate (mg.kg)

Emerson Class

Sample	Material Description	Class	Description
TP1A(1.1-1.2m)	Silty Clay, high plasticity, red brown	1	Very High Dispersion
TP 1A(2.4-3.0m)	Gravelly Silty Clay, medium plasticity, yellow brown	1	Very High Dispersion
TP2A (0.4-0.5m)	Silty Clay, high plasticity, yellow brown	2	High Dispersion
TP 2A (2.3-2.4m)	Gravelly Silty Clay: medium plasticity, orange brown	1	Very High Dispersion
TP 9A (1.5-1.6m)	Silty Clay/Gravelly Silty Clay, medium plasticity, grey brown	1	Very High Dispersion
TP 9A (3.2-3.3m)	Gravelly Shaley Clay, medium plasticity, brown	1	Very High Dispersion
TP 10A (0.4-0.5m)	Silty Clay: high plasticity, yellow brown	2	High Dispersion
TP 10A (2.2-2.3m)	Silty Clay, medium plasticity, grey mottled yellow brown	5	Slight Dispersion
TP 15A (0.5-0.6m)	Silty Clay, medium to high plasticity, yellow brown	1	Very High Dispersion
TP 15A (2.4-2.5m)	Gravelly Silty Clay: medium plasticity, grey brown	2	High Dispersion





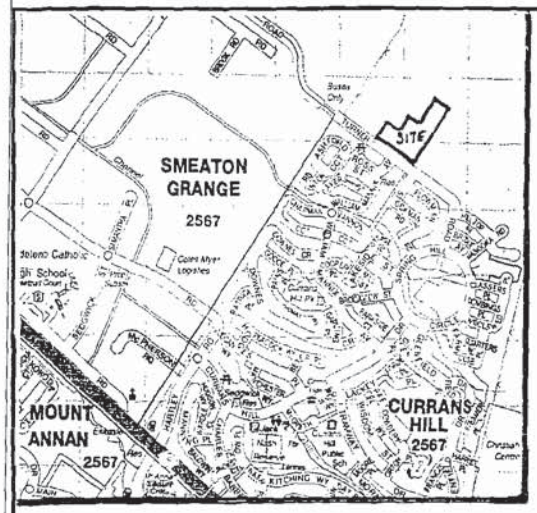
Feature No	Description
1	Single storey brick residential dwelling with metal roof
2	Small fill stockpile with some bricks and concrete
3	Small earthfill stockpile about 1m high
4	Filled Area
5	Dam, mainly dry
6	Fibro house with a septic tank
7	Dry dam
8	A spread of fill consisting of timber, wires, metal pieces, tiles and rubbish
9	Buried rubbish consisting mainly of timber. Depth in excess of 3m
10	Buried rubbish
11	Timber and brick house
12	Garage/shed on concrete slab
13	Workshop shed on concrete slab. Some oil staining on the floor
14	Filled Area consisting mainly of earthfill
15	Dry Dam
16	Dam, mainly dry
17	Slightly raised filled area consisting mainly of topsoil and earthfill mixture
18	Timber and fibro house
19	Dry Dam
20	Filled area
21	Filled area
22	Filled area
23	Filled area consisting of earthfill with some rubbish

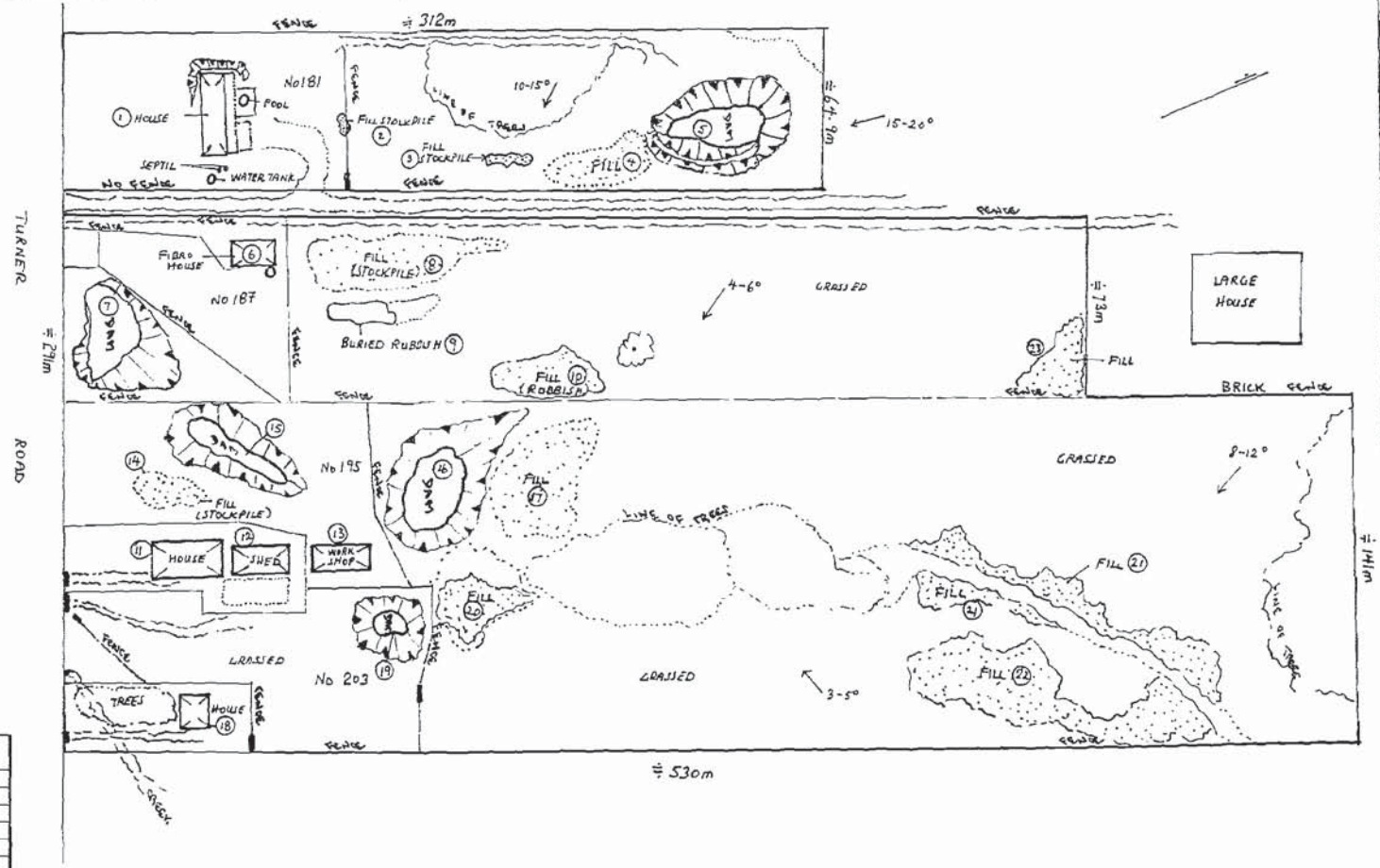
LEGEND

6° → SLOPE DOWN AT 6°

GeoEnviro Consultancy
Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia
Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: AT	Date: 12/08/15	Dartanyon Pty Ltd	
Checked By: SL	Date: 12/08/15	No 187 and 195-203 Turner Road Currans Hill	
Revision By:	Date:	Site Locality and Previous Site Feature Plan	
Scale: Proportional	A3	Project No: JC04031A-r9	Drawing No: 1





Feature No	Description
1	Single storey brick residential dwelling with metal roof
2	Small fill stockpile with some bricks and concrete
3	Small earthfill stockpile about 1m high
4	Filled Area
5	Dam, mainly dry
6	Fibro house with a septic tank
7	Dry dam
8	A spread of fill consisting of timber, wires, metal pieces, tiles and rubbish
9	Buried rubbish consisting mainly of timber. Depth in excess of 3m
10	Buried rubbish
11	Timber and brick house
12	Garage/shed on concrete slab
13	Workshop shed on concrete slab. Some oil staining on the floor
14	Filled Area consisting mainly of earthfill
15	Dry Dam
16	Dam, mainly dry
17	Slightly raised filled area consisting mainly of topsoil and earthfill mixture
18	Timber and fibro house
19	Dry Dam
20	Filled area
21	Filled area
22	Filled area
23	Filled area consisting of earthfill with some rubbish

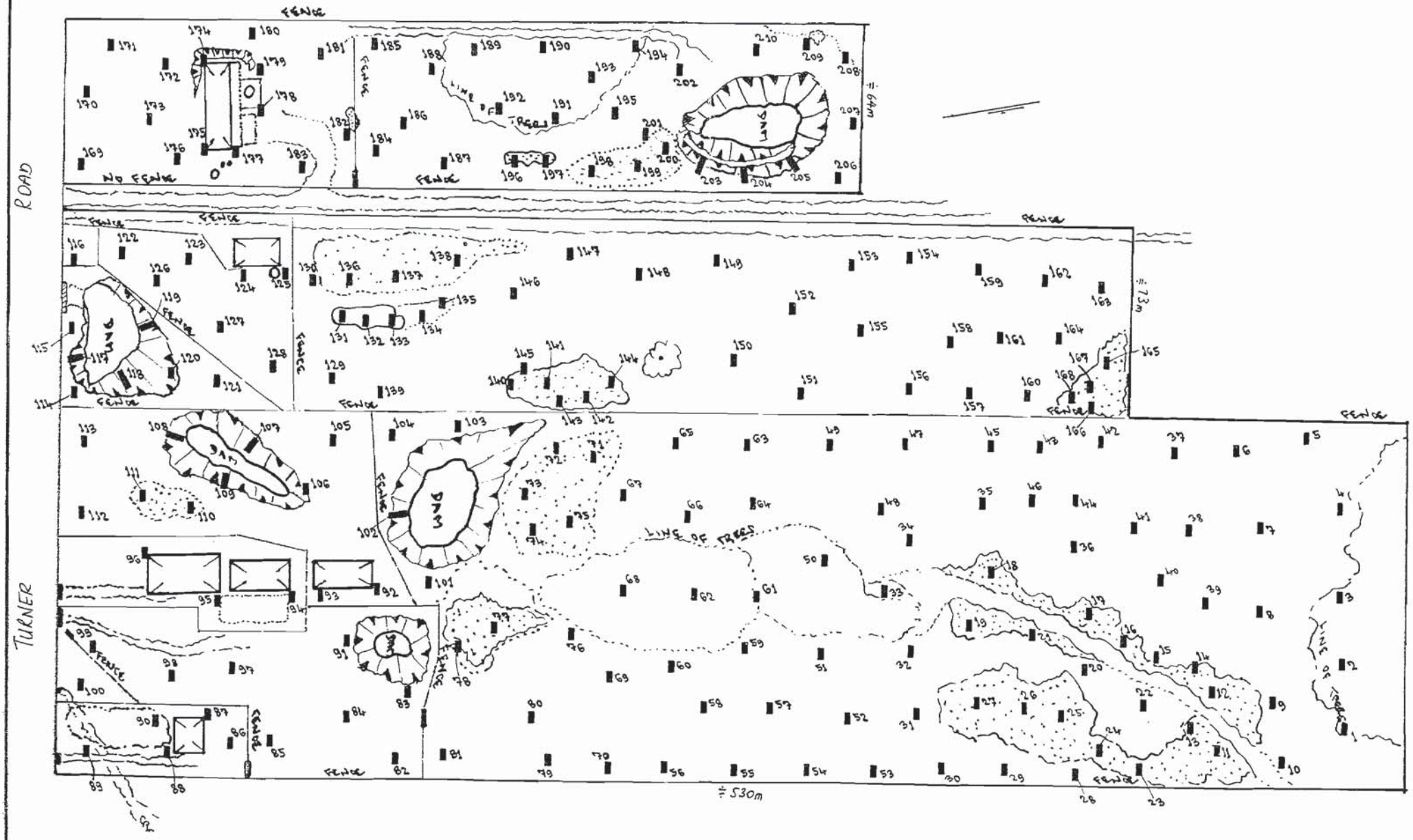
LEGEND

6° → SLOPE DOWN AT 6°

Note: All site features indicated on the drawings are only indicative and not to scale

GeoEnviro Consultancy

Drawn By:	SL	Date: 22/3/04	Australand Holdings Ltd
Checked By:	SL	Date: 22/3/04	No 181, 187, 195-203 Turner Road, Currans Hill
Revision By:		Date:	Site Locality and Features Plan
Scale:	1:2000 (approx)	A3	Project No: JC04031A / Drawing No: 1



Legend

Test Pit

Note: All site features indicated on the drawings are only indicative and not to scale

GeoEnviro Consultancy

Drawn By: SL	Date : 22/3/04	Australand Holdings Ltd	
Checked By: SL	Date : 22/3/04	No 181, 187, 195-203 Turner Road, Currans Hill	
Revision By:	Date:	Test Pit Location Plan	
Scale: Proportional	A3	Project No: JC04031A	Drawing No: 2

Test Pit Number	Depth (m)	Profile Type	Description
1	0.0-0.4	Topsoil	Silt, low liquid limit, light grey, dry
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, with some gravel, MC<=PL, hard, PP>600kPa
2	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow, dry, MC<PL, PP>600kPa
3	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.4-1.2	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, very hard, MC<PL, PP>600kPa
	1.2-1.4	Natural	(CI) Gravelly Silty Clay: medium plasticity, red brown and grey, MC<PL, PP>600kPa
4	0.0-0.4	Topsoil	Clayey Silt, some gravel, brown, dry
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, red and grey, MC<PL, PP>600kPa
5	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.4-1.1	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<PL, hard, PP>600kPa
	1.1-1.3	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey, MC<PL, PP>600kPa
	1.3-1.6	Bedrock	Shale/Siltstone: extremely to distinctly weathered, extremely to very low strength, grey and brown
	1.6		Backhoe refusal
6	0.0-0.7	Topsoil/Fill	Clayey silt with silt, dark brown and brown, dry, hard
	0.7-1.2	Natural	(CI-CH) Silty Clay: medium to high plasticity, red and brown, MC<PL, PP>600kPa
7	0.0-0.5	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.5-0.9	Natural	(CH) Silty Clay: high plasticity, grey and brown, MC<=PL, PP>600kPa
8	0.0-0.6	Topsoil	Clayey Silt, dark grey and dark brown, dry to moist
	0.6-1.5	Natural	(CH) Silty Clay: high plasticity, yellow and brown, some gravel, MC<PL, PP>600kPa
	1.5-2.8	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, red/grey and brown, some sand, MC<=PL, PP>600kPa
	2.8-3.3	Bedrock	Shale/Siltstone: extremely weathered, extremely low strength, grey and brown
9	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow brown, MC<PL, PP>600kPa
10	0.0-0.5	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.5-0.7	Natural	(CH) Silty Clay: high plasticity, yellow brown, dry, hard

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

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TABLE 1 (Page 1 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ____ Date: 1/V/04

Test Pit Number	Depth (m)	Profile Type	Description
11	0.0-0.3	Fill	Mixture of sandstone and roadbase, some pieces of asphaltic concrete, with some shale gravel, grey and brown
	0.3-0.6	Topsoil	Silt and Clayey Silt, brown and grey, dry
	0.6-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, very hard, dry
12	0.0-1.0	Fill	Mixture of sandstone gravel/cobbles with silty clay and some roadbase, small pieces of asphaltic concrete, small pieces of concrete, brown and grey, moist
	1.0-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, dry
13	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.4-0.8	Natural	(CI-CH) Silty Clay: medium to high plasticity, yellow, dry, PP>600kPa
14	0.0-0.4	Fill	Mixture of sandstone gravel/cobbles, silty clay, some roadbase, small pieces of asphaltic concrete, small pieces of concrete, brown/grey, moist
	0.4-0.6	Topsoil	Silt and Clayey Silt, brown and grey, dry
	0.6-0.9	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<PL, hard, PP>600kPa
15	0.0-0.3	Topsoil	Clayey Silt and Silt, low liquid limit, grey, dry
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow brown, dry, PP>600kPa
16	0.0-0.6	Fill	Mixture of sandstone and roadbase, some pieces of asphaltic concrete, some shale gravel, grey and brown
	0.6-1.0	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, PP>600kPa
17	0.0-1.0	Fill	Mixture of silty clay, sandstone gravel, shale, roadbase, asphalt pieces, some small pieces of concrete, brown and grey, moist
	1.0-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, dry
18	0.0-0.7	Fill	Mixture of silty clay and sandstone gravel, some shale and roadbase, asphalt pieces, some small pieces of concrete, brown and grey, moist
	0.7-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, MC<PL
19	0.0-0.2	Fill	Mixture of sandstone and roadbase, some pieces of asphaltic concrete and with shale gravel, grey and brown, dry to moist
	0.2-0.4	Topsoil	Clayey Silt, brown, dry
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, yellow, dry, MC<PL, hard, PP>600kPa
20	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, yellow/brown, hard, MC<PL
21	0.0-0.1	Fill	Mixed silty clay and clayey silt and sandstone gravel, some roadbase, dark grey, moist
	0.1-0.4	Topsoil	Clayey Silt, low liquid limit, some gravel, grey and brown, dry
	0.4-0.5	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, dry

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 2 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road, Currans Hill

Prepared By: SL 21/03/04
Checked By: ___ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
22	0.0-0.3	Fill	Mixture of sandstone and roadbase, some pieces of asphaltic concrete and with shale gravel, brown and dark grey, dry
	0.3-0.6	Topsoil	Clayey Silt, some gravel, brown, dry
	0.6-0.7	Natural	(CH) Silty Clay: high plasticity, yellow, dry, MC<PL, hard, PP>600kPa
23	0.0-0.2	Fill	Mixture of silty clay and some silt with sandstone gravel/cobbles and roadbase, some small pieces of concrete, some pieces of asphaltic concrete, some sand, dark grey and brown, dry
	0.2-0.4	Topsoil	Clayey Silt, brown, dry
	0.4-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard, PP>600kPa
24	0.0-0.4	Fill	Mixture of silty clay, silt, some sandstone gravel/cobbles and roadbase, some small pieces of concrete, some pieces of asphaltic concrete, some sand, brown and grey, dry
	0.4-0.7	Topsoil	Clayey Silt, brown, dry
	0.7-1.0	Natural	(CH) Silty Clay: high plasticity, yellow/brown, MC<=PL, hard
25	0.0-0.6	Fill	Mixed silty clay and clayey silt and concrete pieces, sandstone, some asphalt, brown, dry to moist
	0.6-0.9	Topsoil	Clayey Silt and Silt, some gravel, grey, dry
	0.9-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, PP>600kPa
26	0.0-0.4	Fill	Mixed silty clay/clayey silt and some concrete pieces, sandstone gravel, with some asphalt, brown and grey, dry to moist
	0.4-0.7	Topsoil	Clayey Silt and Silt, some gravel, grey, dry
	0.7-0.9	Natural	(CH) Silty Clay: high plasticity, yellow, dry, hard
27	0.0-0.8	Fill	Mixed silty clay and topsoil, silt and some concrete pieces, sandstone gravel, with some asphalt, dark brown and grey, dry to moist
	0.8-1.0	Topsoil	Silt and Clayey Silt, with some gravel, grey, dry
	1.0-1.2	Natural	(CH) Silty Clay: high plasticity, yellow/brown, dry, hard
28	0.0-0.2	Topsoil	Clayey Silt, with some gravel, brown and grey, dry
	0.2-0.4	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, MC<PL, PP>600kPa
29	0.0-0.3	Topsoil	Clayey Silt and Silt, low liquid limit, brown/grey, dry
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow, dry, PP>600kPa
30	0.0-0.4	Topsoil	Silt with some Clayey Silt, grey, dry
	0.4-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, MC<PL, hard
31	0.0-0.4	Topsoil	Clayey Silt, brown, dry
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, yellow, dry, hard

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 3 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ___ Date: 17/4/04

Test Pit Number	Depth (m)	Profile Type	Description
32	0.0-0.4	Topsoil	Clayey Silt, brown and grey, dry
	0.4-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<PL, PP>600kPa
33	0.0-0.6	Topsoil	Silt, some Clayey Silt, dark grey and light grey, dry
	0.6-1.2	Natural	(CH) Silty Clay: high plasticity, yellow brown, MC<PL, dry, PP>600kPa
	1.2-1.4	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey and red, MC<=PL, hard, PP>600kPa
34	0.0-0.5	Topsoil	Clayey Silt and Silt, low liquid limit, grey, dry
	0.5-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, hard
35	0.0-0.4	Topsoil	Clayey Silt, brown and grey, dry
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow, MC<PL, hard
36	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, grey brown, dry
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, hard
37	0.0-0.6	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.6-1.8	Natural	(CH) Silty Clay: high plasticity, yellow brown, MC<=PL, PP>600kPa
	1.8-2.6	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey and brown, MC<=PL, hard, PP>600kPa
38	0.0-0.5	Topsoil	Clayey Silt, dark brown and brown, dry
	0.5-0.9	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, PP>600kPa
39	0.0-0.4	Topsoil/Fill	Clayey silt, some gravel, dark brown and brown/grey, dry
	0.4-0.8	Topsoil	Silt with some Clayey Silt, grey, dry
	0.8-1.6	Natural	(CI-CH) Silty Sandy Clay/Gravelly Silty Clay: medium to high plasticity, dark red and dark brown, very hard, very dry, MC<PL, PP>600kPa
40	0.0-0.4	Topsoil/Fill	Clayey silt, dark brown, dry
	0.4-0.7	Topsoil	Silt, some Clayey Silt, light grey, dry
	0.7-1.6	Natural	(CI-CH) Silty Clay/Gravelly Silty-Sandy Clay: medium to high plasticity, dark red and dark brown, very hard, very dry, MC<PL, PP>600kPa
41	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.3-1.0	Natural	(CI) Silty Clay: medium plasticity, dark brown and red, some gravel, MC<=PL, PP>600kPa
42	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.3-1.6	Natural	(CH) Silty Clay: high plasticity, yellow, dry/moist, MC<=PL, PP>600kPa
	1.6-2.2	Natural	(CI-CH) Gravelly Silty Clay: medium to high plasticity, red/brown and dark red, some sand, MC<PL, hard, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 4 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ____ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
43	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.4-1.2	Natural	(CH) Silty Clay: high plasticity, yellow brown, MC<=PL, PP>600kPa
44	0.0-0.4	Topsoil	Clayey Silt, some gravel, dark brown, moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow, MC<=PL, PP>600kPa
45	0.0-0.3	Topsoil	Clayey silt, brown and dark brown, dry
	0.3-0.5	Topsoil	Silt, light grey, very dry
	0.5-1.3	Natural	(CH) Silty Clay: high plasticity, yellow and brown, moist, hard
46	0.0-0.3	Topsoil	Clayey silt, dark brown, moist
	0.3-0.4	Topsoil	Silt, light grey, very dry
	0.4-0.9	Natural	(CH) Silty Clay: high plasticity, yellow/brown, moist, MC<=PL, PP>600kPa
47	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, brown and yellow, moist, hard
48	0.0-0.4	Topsoil	Clayey Silt and Silt, brown, dry to moist
	0.4-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry and hard, some gravel, MC<=PL, PP>600kPa
49	0.0-0.3	Topsoil	Clayey Silt and Silt with some gravel, brown and grey, moist
	0.3-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and yellow , MC<PL, hard
50	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.3-1.1	Natural	(CH) Silty Clay: high plasticity, red/orange and yellow, some gravel, moist, hard
51	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.0-1.5	Natural	(CI-CH) Silty Sandy Clay/Gravelly Silty Clay: medium to high plasticity, dark red and brown, dry, MC<PL, PP>600kPa
	1.5-1.7	Bedrock	Shale/Siltstone: extremely weathered, extremely low strength, grey and brown
52	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, dry to moist
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, hard
53	0.0-0.3	Topsoil	Clayey Silt, some gravel, brown, dry to moist
	0.3-0.8	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, very dry and very hard

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

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SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By:____ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
54	0.0-0.3	Topsoil	Clayey Silt, some gravel, brown, moist
	0.3-0.5	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, PP>600kPa
55	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.4-1.2	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.2-1.8	Natural	(CI) Silty Clay: medium plasticity, grey, some shale gravel, MC<=PL, PP>600kPa
	1.8-2.4	Bedrock	Shale: extremely weathered/Interbedded with gravelly shaley clay, grey and brown, dry to moist
56	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.3-0.6	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, hard
57	0.0-0.3	Topsoil	Clayey Silt, some gravel, brown, moist
	0.3-0.9	Natural	(CH) Silty Clay: high plasticity, yellow, hard, MC<=PL, PP>600kPa
58	0.0-0.3	Topsoil	Clayey Silt, with some gravel, brown, dry/moist
	0.3-0.5	Natural	(CH) Silty Clay: high plasticity, yellow/brown, MC<PL, hard
59	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown and brown, dry to moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and red/brown, MC<=PL, hard
60	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.3-1.3	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.3-1.9	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey, with some shale fragments, MC<=PL, hard, PP>600kPa
	1.9-2.2	Natural	(CL) Gravelly Shaley Clay: low plasticity, grey, with layers/bands of extremely weathered shale
	2.2-2.4	Bedrock	Shale: extremely weathered, extremely low strength, grey and brown
61	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, dark brown, dry to moist
	0.2-0.5	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, PP:480-560kPa
62	0.0-0.3	Topsoil	Clayey Silt, brown, moist
	0.3-0.9	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
63	0.0-0.2	Topsoil	Clayey Silt, brown, some gravel, moist
	0.2-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard
64	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.3-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and red, MC<PL, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 6 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By:____ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
65	0.0-0.3	Topsoil	Clayey Silt, brown, dry to moist
	0.3-1.4	Natural	(CH) Silty Clay: high plasticity, red/grey and brown, MC<PL, very hard
66	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry/moist
	0.3-1.6	Natural	(CH) Silty Clay: high plasticity, red/brown and grey, with some gravel, MC<=PL, hard, PP>600kPa
	1.6-2.4	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, dark red and dark brown/grey, very dry and very hard, MC<PL, PP>600kPa
67	0.0-0.3	Topsoil	Clayey Silt with Silt, grey and brown, moist
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, dry to moist, hard
68	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, with some gravel, dry/moist
	0.4-0.8	Natural	Silt/(CL) Silty Clay: low plasticity, grey and brown, dry, MC<PL, hard, PP>600kPa, with some fine to coarse gravel
	0.8-1.2	Natural	(CH) Silty Clay: high plasticity, red/brown and grey, with some gravel, MC<PL, hard, PP>600kPa
69	0.0-0.2	Topsoil	Clayey Silt, brown, moist
	0.2-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown/red, MC<=PL, PP>600kPa
70	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.2-1.2	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
71	0.0-0.7	Fill/Topsoil	Clayey silt and silty clay with gravel, brown/red and grey, dry
	0.7-1.2	Natural	(CI-CH) Silty Clay/Gravelly Silty-Sandy Clay: medium to high plasticity, dark brown and red, very hard, MC<PL. PP>600kPa
72	0.0-0.6	Fill/Topsoil	Clayey silt/silty clay with some gravel, brown and grey, dry
	0.6-1.5	Natural	(CI-CH) Gravelly Silty Clay: medium to high plasticity, some sand, MC<PL, PP>600kPa
73	0.0-0.8	Fill/Topsoil	Silty clay with gravel and some sand, some clayey silt, grey and red/brown, dry
	0.8-1.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, MC<PL, PP>600kPa
74	0.0-0.7	Fill/Topsoil	Clayey silt with silty clay and some gravel, brown/red and grey, dry
	0.7-1.2	Natural	(CI-CH) Silty Sandy Clay: medium to high plasticity, brown and red, dry, hard
75	0.0-0.5	Topsoil/Fill	Clayey silt mixed with some gravel, brown and grey, dry
	0.5-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, dry
76	0.0-0.6	Topsoil/Fill	Clayey silt and silty clay with some gravel, brown and grey, dry
	0.6-1.0	Natural	(CI-CH) Silty Sandy Clay: medium to high plasticity, red and grey, MC<=PL, hard

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PL = Plastic Limit

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TABLE 1 (Page 7 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: CL Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
77	0.0-0.6	Fill	Silty clay mixed with sandstone gravel, some asphaltic concrete pieces, some clayey silt, dark brown and grey, moist to wet profile
	0.6-1.0	Topsoil	Silt, with some clayey silt, light grey and brown, dry
	1.0-1.4	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, MC<PL, hard
78	0.0-0.7	Fill	Mixture of silty clay medium plasticity with some gravel and with some silt, yellow brown and grey, moist to wet
	0.7-0.9	Topsoil	Silt and some clayey silt, light grey, dry
	0.9-1.1	Natural	(CI) Silty Sandy Clay: medium plasticity, red and dark grey, MC<=PL, PP>600kPa
79	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry
	0.4-1.1	Natural	(CH) Silty Clay: high plasticity, yellow and red/brown, MC<=PL, hard, PP>600kPa
	1.1-1.9	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, some sand, dark red and brown, MC<PL, PP>600kPa
80	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, dry
	0.3-0.5	Natural	(CH) Silty Clay: high plasticity, red and grey, MC<PL, PP>600kPa
81	0.0-0.6	Fill/Topsoil	Clayey silt with silty clay, some gravel, brown/grey and yellow, moist
	0.6-1.0	Natural	(CI-CH) Silty Sandy Clay: medium to high plasticity, brown, MC<PL, hard
82	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard, PP>600kPa
83	0.0-0.3	Topsoil/Fill	Silty clay and clayey silt with gravel, brown, moist
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard
84	0.0-0.5	Topsoil/Fill	Clayey silt with silt and with some gravel, brown, moist
	0.5-1.4	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, some sand, grey yellow and brown, MC<PL, PP>600kPa, very hard and very dry
85	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and grey, moist
	0.4-0.9	Natural	(CI-CH) Silty Clay: medium to high plasticity, yellow/brown and grey, MC<PL, PP>600kPa
86	0.0-0.4	Topsoil/Fill	Clayey silt, some gravel, brown and grey, moist
	0.4-0.7	Natural	(CI-CH) Silty Clay: medium to high plasticity, grey and brown, dry, hard
87	0.0-0.3	Topsoil/Fill	Clayey silt with some gravel, brown, dry to moist
	0.3-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, hard, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

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TABLE 1 (Page 8 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ___ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
88	0.0-0.4	Topsoil/Fill	Clayey silt, some gravel, brown, dry to moist
	0.4-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, dry, hard
89	0.0-0.4	Topsoil/Fill	Clayey silt with some gravel, dark brown and grey, moist
	0.4-0.9	Natural	(CH) Silty Clay: high plasticity, yellow and brown, dry, hard, PP>600kPa
90	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark grey and brown, dry
	0.4-0.6	Natural	(CH) Silty Clay: high plasticity, red and grey, MC<PL, PP>600kPa
91	0.0-0.6	Fill/Topsoil	Clayey silt with gravel, brown and grey, moist
	0.6-1.0	Natural	(CI-CH) Silty Clay: medium to high plasticity, yellow and brown, MC<PL, hard
92	0.0-0.2	Fill	Silty clay with sandstone and clayey silt, grey, moist
	0.2-0.6	Natural	(CH) Silty Clay: high plasticity, yellow/brown, dry, MC<PL, PP>600kPa
93	0.0-0.4	Fill	Silty clay with gravel, some clayey silt, dark grey, moist
	0.4-0.7	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<PL, hard
94	0.0-0.3	Fill/Topsoil	Clayey silt with gravel, brown and grey, dry
	0.3-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<PL, hard
95	0.0-0.3	Fill/Topsoil	Clayey silt with some gravel, brown and grey, dry
	0.3-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, dry, hard
96	0.0-0.3	Fill/Topsoil	Clayey silt with gravel, brown and grey, dry
	0.3-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, very hard, dry
97	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.3-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and dark red, MC<PL, hard, PP>600kPa
98	0.0-0.4	Topsoil/Fill	Clayey silt with some gravel, brown and grey, dry
	0.4-0.9	Natural	(CI-CH) Silty Clay: medium to high plasticity, yellow and brown, dry, MC<PL, hard, PP>600kPa
	0.9-1.8	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, some sand, grey yellow and brown, MC<PL, PP>600kPa, dry
99	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, red and brown, with some gravel, MC<=PL, PP:380-460kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 9 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 22/03/2004
Checked By: ____ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
100	0.0-0.5	Topsoil/Fill	Clayey silt mixed with silt and some gravel, light grey and brown, dry
	0.5-0.9	Natural	(CI-CH) Silty Clay: medium to high plasticity, red and grey, MC<=PL, PP>600kPa
101	0.0-0.7	Topsoil/Fill	Silt with gravel and some clayey silt, grey, dry to moist
	0.7-1.0	Natural	(CI) Silty Clay: medium plasticity, yellow and red/brown, MC<=PL, hard
102	Dam Embankment	Fill	Clayey silt and silty clay high plasticity and some gravel, brown, moist
103	0.0-0.3	Topsoil/Fill	Clayey silt with some gravel, brown, dry to moist
	0.3-0.7	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown, dry, hard
104	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.4-1.4	Natural	(CH) Silty Clay: high plasticity, red and brown, with some gravel, dry to moist, hard, MC<=PL, PP>600kPa
105	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry
	0.3-1.0	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
	1.0-1.9	Natural	(CI) Gravelly Silty Clay: medium plasticity, brown, very hard, MC<PL, PP>600kPa
106	0.0-0.8	Fill	Silty clay and some silt mixed with some gravel, grey and brown, dry
	0.8-1.0	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, dry, hard
107	Dam Embankment	Fill	Mixture of clayey silt, silty clay of high plasticity and some gravel, yellow/brown and dark brown/grey, moist
108	Dam Embankment	Fill	Mixed clayey silt, silty clay of high/medium to high plasticity, some gravel, yellow and brown and dark brown/grey, moist
109	Dam Embankment	Fill	Mixture of silty clay and clayey silt, silty clay of high plasticity with some gravel, yellow/brown and dark grey and dark brown, moist
110	0.0-0.7	Fill	Silty clay of medium plasticity mixed with gravel, some silt, some clayey silt, some sandstone cobbles, brown, dry to moist
	0.7-1.0	Topsoil	Silt, low liquid limit, light grey, dry
	1.0-1.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, yellow and brown, MC<=PL, hard
111	0.0-0.8	Fill	Mixed silty clay with silt and sandstone gravel/cobbles, brown, moist
	0.8-1.0	Topsoil	Silt, with some clayey silt, grey, dry
	1.0-1.3	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and yellow, hard, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

TABLE 1 (Page 10 of 20)
SUMMARY OF SOIL PROFILE

GeoEnviro Consultancy

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ___ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
112	0.0-0.4 0.4-0.7	Topsoil Natural	Clayey Silt, low liquid limit, brown and dark brown, dry (CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard, PP>600kPa
113	0.0-0.4 0.4-1.0	Topsoil Natural	Clayey Silt, low liquid limit, dark brown, dry to moist (CH) Silty Clay: high plasticity, yellow and brown, moist, MC<=PL, hard, PP>600kPa
114	0.0-0.4 0.4-1.0	Topsoil/Fill Natural	Clayey silt, dark brown, dry to moist (CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard
115	0.0-1.5 1.5-2.0	Fill Natural	Mixture of silty clay high and medium to high plasticity with gravel and some topsoil, brown/yellow and grey, moist (CI-CH) Silty Clay: medium to high plasticity, yellow and grey, MC<=PL, PP>600kPa
116	0.0-1.0 1.0-1.1	Fill Natural	Silty clay mixed with some ironstone and shale gravel, some topsoil, brown, moist (CH) Silty Clay: high plasticity, yellow/brown, moist, hard
117	Dam Embankment	Fill	Mixture of silty clay high plasticity with some clayey silt/topsoil and some gravel, brown and dark brown/grey, moist
118	Dam Embankment	Fill	Mixed clayey silt, silty clay of high plasticity, some gravel, yellow and brown and grey, moist
119	Dam Embankment	Fill	Mixture of silty clay and clayey silt, silty clay of high plasticity, some gravel, yellow/brown and dark grey, moist
120	0.0-1.0 1.0-1.3	Topsoil/Fill Natural	Clayey silt with some gravel and some silty clay, dark brown/grey, some silt, moist (CI) Silty Clay/Gravelly Silty Clay: medium plasticity, brown, MC>=PL, very stiff
121	0.0-0.3 0.3-0.6	Topsoil Natural	Clayey Silt, low liquid limit, grey and brown, dry to moist (CI-CH) Silty Clay: medium to high plasticity, red and brown, MC<PL, PP>600kPa
122	0.0-0.5 0.5-1.0 1.0-1.9	Topsoil Natural Natural	Clayey Silt and Silt, low liquid limit, some fine gravel, dark brown and grey, moist (CH) Silty Clay: high plasticity, yellow and brown, moist, MC<=PL, very hard, PP>600kPa (CI) Silty Sandy Clay/Gravelly Silty Clay: medium plasticity, red/orange and brown, MC<PL, very hard, PP>600kPa
123	0.0-0.4 0.4-0.8	Topsoil Natural	Clayey Silt and Silt with some gravel, brown and grey, moist (CH) Silty Clay: high plasticity, yellow and grey, moist, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 11 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ea Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
124	0.0-0.3	Topsoil/Fill	Clayey silt, dark brown, moist
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and brown/grey, moist, hard
125	0.0-0.4	Topsoil/Fill	Clayey silt mixed with some gravel, dark brown and grey, moist
	0.4-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, PP>600kPa
126	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.3-0.5	Topsoil	Silt, light grey, dry
	0.5-1 2	Natural	(CI-CH) Silty Clay: medium to high plasticity, red and grey, moist, hard
127	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, some gravel, dark brown, dry to moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, red and brown/yellow, moist, hard
128	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and red, MC<=PL, PP>600kPa
129	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, some gravel, dark brown, moist
	0.3-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and grey, moist, hard
130	0.0-0.4	Topsoil/Fill	Clayey silt with some gravel, brown, dry
	0.4-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, orange and red, MC<PL, PP>600kPa
131	0.0-0.4	Fill	Topsoil mixed with silty clay high plasticity and gravel, brown/red and grey, moist
	0.4-3.0	Fill	Timber and topsoil mixture with corrugated iron, broken timber poles, cloth, plastic pieces, tiles, bricks, some silty clay, one small piece of bonded asbestos, dry
132	0.0-0.6	Fill	Silty clay/topsoil mixed with some silty clay high plasticity and gravel, red and brown grey, moist
	0.6-2.8	Fill	Topsoil and some silty clay mixed with broken timber pieces, poles, tree stumps, fence posts, some pieces of brick and concrete, some plastic and rusty metal pieces, very dry
	2.8		Test pit terminated due to collapsing and test pit started caving in
133	0.0-0.8	Fill	Silty clay and clayey silt /topsoil mixture with some silty clay medium/high plasticity and gravel, red/brown and grey, moist
	0.8-2.6	Fill	Topsoil and silty clay with broken timber poles, tree stumps, fence posts, some pieces of brick and concrete, some plastic and rusty metal pieces, dry to very dry
	2.6		Test pit terminated due to collapsing and test pit started caving in
134	0.0-0.8	Fill	Mixed silty clay with topsoil and brick/concrete fragments, brown and grey, moist
	0.8-1.0	Topsoil	Silt and Clayey Silt, grey and brown, dry
	1.0-1.2	Natural	(CH) Silty Clay: high plasticity, red/brown and grey, MC<=PL, PP>600kPa

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SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ___ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
135	0.0-0.4	Fill/Topsoil	Clayey silt with concrete fragments, dark grey and brown, moist
	0.4-0.8	Natural	(CI-CH) Silty Clay: medium to high plasticity, red and grey, MC<PL, hard
136	0.0-0.6	Fill	Silty clay with gravel and topsoil, yellow and brown, dry to moist
	0.6-0.9	Topsoil	Clayey Silt and Silt, light grey and brown, dry
	0.9-1.2	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP:>600kPa
137	0.0-0.5	Fill/Topsoil	Clayey silt with gravel, brown, moist
	0.5-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, moist, hard
138	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, yellow/red, MC<PL, PP>600kPa
139	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and brown, moist, PP>600kPa
			board, timber pieces, rusty metal car parts, brown, dry
140	0.0-0.7	Fill	Mixed topsoil and silty clay with some gravel, some concrete fragments, brown, moist
	0.7-1.0	Topsoil	Silt and Clayey Silt, grey and brown, dry
	1.0-1.2	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard
141	0.0-1.0	Fill	Silty clay mixed with topsoil, some small brick and concrete fragments, some sandstone gravel, brown and grey, moist
	1.0-2.4	Natural	(CI) Silty Sandy Clay/Gravelly Silty Clay: medium plasticity, brown and grey, MC<=PL, very hard, PP>600kPavery stiff
142	0.0-1.5	Fill	Topsoil and some silty clay mixed with large concrete boulders up to 0.8-1.0m, bricks and cloth, plastic, steel mesh, rusty metal pieces, grey/dark grey and brown, moist
	1.5-2.2	Natural	(CI-CH) Silty Clay: medium to high plasticity, yellow and brown, MC<=PL, PP>600kPa
143	0.0-2.0	Fill	Mixture of dark brown topsoil and some silty clay with bricks, timber, large concrete boulders, steel (mesh and wire), plastic pieces, glass, two small asbestos pieces, some sandstone and crushed rock gravel, dark brown and grey, moist
	2.0-2.4	Natural	(CI) Silty Sandy Clay/Gravelly Silty Clay: medium plasticity, dark grey and brown, moist, hard
144	0.0-0.6	Fill	Silty clay and topsoil mixed with brick and concrete fragments, some crushed rock, brown and grey, moist
	0.6-0.9	Topsoil/Fill	Clayey silt and silt, grey and brown, moist
	0.9-1.2	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and red, dry, hard, PP>600kPa
145	0.0-0.7	Fill	Mixed topsoil and silty clay with sandstone, concrete and brick rubble, some steel, plastic, crushed rock, brown/grey, moist
	0.7-1.0	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and dark red, MC<PL, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 13 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ___ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
146	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.4-1.8	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark red/brown and orange, some sand, some gravel, MC<=PL, hard, PP>600kPa
	1.8-2.2	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey with yellow mottling, MC<=PL, moist, hard, PP>600kPa
147	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.4-1.0	Natural	(CI-CH) Silty Clay: medium to high plasticity, red and brown, MC<=PL, PP>600kPa
148	0.0-0.6	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.6-0.9	Natural	(CH) Silty Clay: high plasticity, yellow/brown and red, MC<=PL, PP>600kPa
149	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, with some gravel, moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, moist, hard, PP>600kPa
150	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown and brown, some gravel, moist
	0.4-1.2	Natural	(CH) Silty Clay: high plasticity, brown and dark red, MC<=PL, PP>600kPa
151	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and grey, some gravel, moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, PP>600kPa
152	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, yellow/brown, hard, with some gravel, moist
153	0.0-0.6	Topsoil/Fill	Clayey silt mixed with some gravel, dark brown and brown/grey, moist
	0.6-1.4	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, PP>600kPa
	1.4-1.8	Bedrock	Shale/Gravelly Shaley Clay: extremely weathered, extremely low strength, grey and brown
154	0.0-0.5	Topsoil/Fill	Clayey silt with gravel, brown, moist
	0.5-0.9	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard
155	0.0-0.3	Topsoil/Fill	Clayey silt, with low liquid limit, dark brown, moist
	0.3-0.6	Topsoil	Silt, with some gravel, light grey, dry
	0.6-1.0	Natural	(CH) Silty Clay: high plasticity, yellow/brown, moist, hard
156	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, with some gravel, dark brown, moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, moist

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 14 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ___ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
157	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, dry to moist
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and grey, MC<=PL, PP>600kPa
158	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow/brown and grey, hard, some gravel, moist
159	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, yellow brown, MC<=PL, PP>600kPa
160	0.0-0.3	Topsoil	Clayey Silt, with some gravel, dark brown, moist
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, grey yellow/brown, moist, MC<=PL, PP>600kPa
	0.8-1.9	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, PP>600kPa, with some gravel
161	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, PP>600kPa
162	0.0-0.6	Topsoil/Fill	Silty clay and clayey silt mixed with some shale gravel, brown/dark brown and grey, moist
	0.6-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown/grey, moist, hard
163	0.0-0.3	Topsoil/Fill	Clayey silt with gravel and some sandy silt, brown, moist
	0.3-1.2	Natural	(CH) Silty Clay: high plasticity, yellow brown and grey, with some gravel, MC<=PL, hard, PP>600kPa
	1.2-1.7	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey and brown, MC<=PL, hard, PP>600kPa
	1.7-2.2	Bedrock	Siltstone: extremely weathered, extremely to very low strength, grey and brown
164	0.0-0.5	Topsoil	Clayey Silt, low liquid limit, some gravel, dark brown and black, moist
	0.5-1.0	Natural	(CH) Silty Clay: high plasticity, yellow/brown, moist, PP>600kPa
165	0.0-0.6	Fill	Mixed topsoil with silty clay and with bricks, pieces of concrete, timber, plastic, metal wires, some gravel, brown and grey, moist
	0.6-1.9	Natural	(CH) Silty Clay: high plasticity, yellow and brown/grey, with some gravel, MC<=PL, hard, PP>600kPa
	1.9-2.3	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey and brown, some sand, MC<=PL, hard
166	0.0-0.6	Topsoil/Fill	Clayey silt with some gravel, some sand, brown and grey, moist
	0.6-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, moist, hard
167	0.0-1.0	Fill	Topsoil mixed with silty clay and bricks/concrete pieces, timber, plastic, metal wires, some gravel, brown/dark brown and grey, moist
	1.0-1.3	Natural	(CH) Silty Clay: high plasticity, yellow and grey, some gravel, MC<=PL, hard, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 15 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ____ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
168	0.0-0.7	Fill	Mixture of topsoil with some silty clay, bricks, concrete pieces, plastic, cloth, timber and some metal wires, some gravel, brown and grey, moist
	0.7-1.0	Natural	(CH) Silty Clay: high plasticity, brown and yellow, MC<PL, PP>600kPa
169	0.0-0.4	Topsoil/Fill	Clayey silt with some gravel, dark brown, moist
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and red, MC<=PL, hard
170	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.2-0.8	Natural	(CH) Silty Clay: high plasticity, red/yellow and brown, MC<=PL, PP>600kPa
171	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.2-0.9	Natural	(CH) Silty Clay: high plasticity, red and brown, some fine to coarse ironstone gravel, MC<=PL, moist, PP>600kPa
	0.9-1.2	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey and brown, MC<PL, hard and dry clays, PP>600kPa
	1.2-1.5	Bedrock	Siltstone/Shale: extremely weathered, extremely low strength, grey
172	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, PP>600kPa
173	0.0-0.4	Topsoil/Fill	Clayey silt, with some gravel, brown and dark brown, moist
	0.4-0.6	Topsoil	Silt/Clayey Silt, light grey, very dry
	0.6-0.8	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, hard
174	0.0-0.2	Fill/Topsoil	Clayey silt with silty clay and some gravel, brown and grey, moist
	0.2-0.4	Natural	(CH) Silty Clay: high plasticity, brown, hard, MC<=PL
175	0.0-0.4	Topsoil/Fill	Clayey silt with gravel, brown, moist
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, MC<=PL, hard
176	0.0-0.7	Topsoil/Fill	Clayey silt with silt and some gravel, light grey/dark brown, moist
	0.7-0.9	Natural	(CH) Silty Clay: high plasticity, brown and red, MC<=PL, PP>600kPa
177	0.0-0.3	Fill/Topsoil	Silty clay with clayey silt, brown and grey, moist
	0.3-0.6	Natural	(CH) Silty Clay: high plasticity, brown and grey, hard, MC<=PL
178	0.0-0.2	Topsoil/Fill	Clayey silt with gravel, brown, moist
	0.2-0.6	Natural	(CH) Silty Clay: high plasticity, red and brown, dry, hard

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 16 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: [illegible] Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
179	0.0-0.4	Topsoil/Fill	Clayey silt with some gravel, brown, moist
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, red and brown, dry, hard, PP>600kPa
180	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, some gravel, brown, dry to moist
	0.2-0.6	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<PL, PP>600kPa
	0.6-1.0	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey and brown, MC<PL, dry, PP>600kPa
	1.0-1.6	Bedrock	Siltstone: extremely weathered, extremely low strength, grey and brown, with some shale bands/layers
181	0.0-0.4	Topsoil	Clayey Silt, some gravel, dark brown, moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, MC<=PL, PP>600kPa
182	0.0-0.4	Topsoil/Fill	Clayey silt with some gravel, brown, moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, red and brown with grey mottling, MC<=PL, hard, PP>600kPa
183	0.0-0.5	Fill	Silty clay with some ash, shale and sandstone gravel, grey and dark brown
	0.5-0.8	Natural	(CH) Silty Clay: high plasticity, red and grey, moist, MC<=PL, PP>600kPa
184	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, some gravel, dark brown, moist
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, red and grey, dry, PP>600kPa
185	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, dry to moist
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and brown, some gravel, MC<=PL, PP>600kPa
	0.8-1.6	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, red and grey, hard, MC<PL, dry, PP>600kPa
	1.6-2.0	Bedrock	Siltstone/Shale: extremely weathered, extremely low strength, brown and grey
186	0.0-0.4	Topsoil/Fill	Clayey silt with some gravel, grey and brown/dark brown, moist
	0.4-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and red/brown, dry/moist, hard, PP>600kPa
187	0.0-0.3	Topsoil	Clayey Silt, some gravel, dark brown, moist
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, MC<=PL, PP>600kPa
188	0.0-0.4	Topsoil	Clayey Silt, with some gravel, brown, moist
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 17 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ___ Date: 21/4/04

Test Pit Number	Depth (m)	Profile Type	Description
189	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, dry to moist
	0.3-1.0	Natural	(CH) Silty Clay: high plasticity, red/yellow and brown, some gravel, MC<=PL, PP>600kPa
	1.0-1.6	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey, hard, MC<PL, PP>600kPa
	1.6-1.8	Bedrock	Siltstone: extremely weathered, extremely low strength, brown and grey
190	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.3-1.1	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, PP>600kPa
	1.1-1.4	Natural	(CI) Silty Clay: medium plasticity, grey and brown, with gravel, moist, hard
	1.4-1.8	Bedrock	Siltstone/Shale: extremely weathered, extremely low strength, grey/brown
191	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, MC<=PL, PP>600kPa
	1.0-1.6	Natural	(CI) Silty Clay: medium plasticity, grey and brown, with some gravel, moist, PP>600kPa
	1.6-2.0	Bedrock	Siltstone: extremely weathered, extremely low to very strength, grey
192	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, some gravel, brown and dark brown, moist
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, hard, PP>600kPa
193	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.3-0.6	Natural	(CH) Silty Clay: high plasticity, red and brown, moist, PP>600kPa
194	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown/dark brown, moist
	0.3-1.0	Natural	(CH) Silty Clay: high plasticity, red brown, with some gravel, MC<=PL, PP>600kPa
	1.0-1.6	Natural	(C-CH) Silty Clay: medium to high plasticity, brown/red and grey, with gravel, MC<=PL, hard clays, PP>600kPa
	1.6-2.4	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey with red mottling, MC<=PL, hard
195	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, moist
	0.3-0.7	Natural	(CH) Silty Clay: high plasticity, brown, moist, PP>600kPa
196	0.0-0.6	Fill	Mixed silty clay with sandstone and some shale gravel, brown and grey, moist
	0.6-1.0	Natural	(CH) Silty Clay: high plasticity, red/grey, moist, PP>600kPa, hard
197	0.0-0.5	Fill	Mixed silty clay with sandstone/shale gravel, brown, moist
	0.5-0.8	Natural	(CH) Silty Clay: high plasticity, brown and red, MC<=PL, PP>600kPa
198	0.0-0.8	Topsoil/Fill	Clayey silt with silty clay and some gravel, dark brown, moist
	0.8-1.1	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 18 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By:____ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
199	0.0-0.9	Topsoil/Fill	Clayey silt mixed with some silty clay and some gravel, dark brown, moist
	0.9-1.2	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, PP>600kPa
200	0.0-0.6	Topsoil/Fill	Clayey silt with some gravel, dark brown, moist
	0.6-1.2	Natural	(CH) Silty Clay: high plasticity, red and brown, with some gravel, MC<=PL, PP>600kPa, hard
201	0.0-0.5	Topsoil/Fill	Clayey silt, brown and dark brown, moist
	0.5-0.7	Natural	(CH) Silty Clay: high plasticity, red/grey and brown, moist, hard
202	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown/dark brown, some gravel, moist
	0.2-1.2	Natural	(CH) Silty Clay: high plasticity, red and brown with grey mottling, with some gravel, MC<=PL, PP>600kPa
	1.2-2.2	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey and brown, MC<=PL, hard
203	Dam Embankment	Fill	Mixed silty clay of high plasticity with some gravel and topsoil, brown/red and grey, moist
204	Dam Embankment	Fill	Mixed clayey silt, silty clay of high plasticity, some gravel, red/grey and yellow/brown, moist
205	Dam Embankment	Fill	Mixture of silty clay high plasticity and clayey silt, with some gravel, brown and red/grey, moist
206	0.0-0.5	Topsoil	Clayey Silt, low liquid limit, dark brown, some gravel, moist
	0.5-1.5	Natural	(CH) Silty Clay: high plasticity, yellow and brown, with some gravel, MC<=PL, PP>600kPa
	1.5-2.4	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey, MC<=PL, hard, PP>600kPa
207	0.0-0.4	Topsoil/Fill	Silt/Clayey silt with some gravel, brown, moist
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, red and grey, some gravel, MC<=PL, PP>600kPa, hard
208	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, some gravel, moist
	0.4-1.1	Natural	(CH) Silty Clay: high plasticity, red/grey and brown, MC<=PL, PP>600kPa
	1.1-2.0	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey and brown, dry and very hard,
	2.0-2.5	Bedrock	Siltstone/Shale: extremely weathered, extremely low strength, brown and grey, with frequent gravelly shaley clay bands

Note: PP = Pocket Penetrometer

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PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 19 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ___ Date: 1/4/04

Test Pit Number	Depth (m)	Profile Type	Description
209	0.0-0.4	Topsoil/Fill	Clayey silt with some gravel, dark brown and brown, moist
	0.4-0.6	Natural	(CH) Silty Clay: high plasticity, red and brown/grey, with some gravel, MC<=PL, hard, PP>600kPa
210	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown, some gravel, dry
	0.3-0.8	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1 (Page 20 of 20)
SUMMARY OF SOIL PROFILE

Australand Holdings Ltd
Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Prepared By: SL 21/03/04
Checked By: ___ Date: 1/4/04

SL4260/1-AO JR : LEA
17 March 2004

GeoEnviro Consultancy Pty Ltd
PO Box 1543
Macquarie Centre
NORTH RYDE NSW 2113

Attention: Mr Solern Liew

Dear Sloern,

RE: MATERIAL ASSESSMENT-JOB NO. JC040331A

Please find attached three copies of the results of laboratory testing carried out on eight samples supplied on the 5/3/04.

Please contact the undersigned if you have questions regarding the test results.

For and on behalf of

COFFEY GEOSCIENCES PTY LTD

JAMES RUSSELL

Encl: Test Result Sheets

Copies Issued: 3 No.

RECEIVED
BY DATE 19/3/04

142 Wicks Road North Ryde
NSW 2113 Australia
PO Box 125 North Ryde
NSW 1670 Australia
Telephone +61 2 **9888 7444**
Facsimile +61 2 9888 9977
Email sydney@coffey.com.au

Coffey Geosciences Pty Ltd A.C.N.0 56 335 516

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

142 Wicks Road, North Ryde, NSW, 2113
Ph:(02) 9888 7444 Fax (02) 9878 8155

particle size distribution

client : *GEOENVIRO CONSULTANCY PTY LTD.*

job no : *SL4260/1*

principal :

laboratory : *SYDNEY*

project : *MATERIAL ASSESSMENT - JOB No.JC040331A*

report date : *March 16, 2004*

location : *CURRANS HILL*

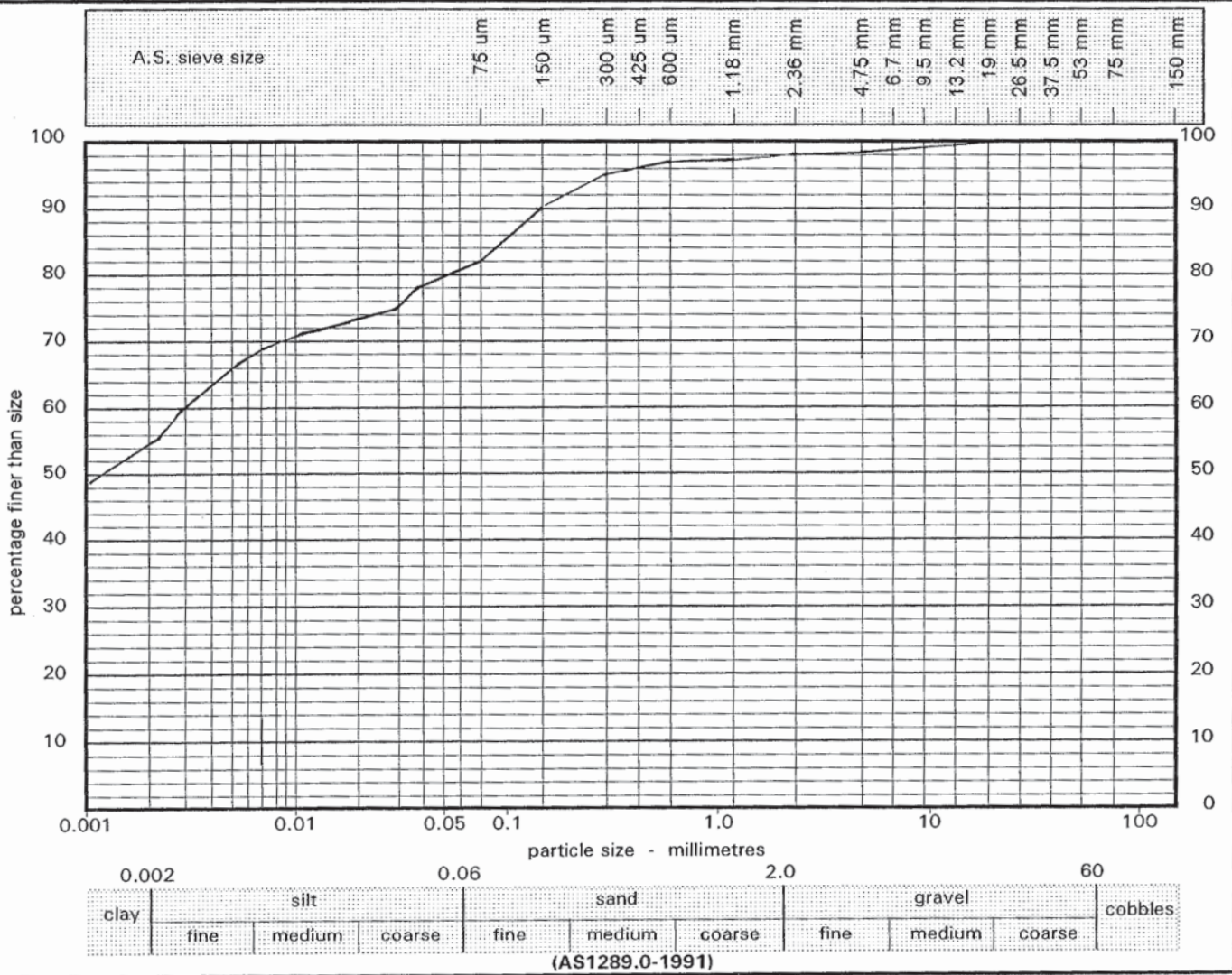
test report : -

test procedure : *AS1289.3.6.1,3.6.3*

depth : *0.80 to 1.00m*

sample no : *T.P No 8*

sample identification: *Sample supplied by the client on the 5/03/04.*



(AS1289.0-1991)

Atterberg Limit :

liquid limit	%	-
plastic limit	%	-
plasticity index	%	-
linears hrinkage	%	-
natural moisture	%	-

Sample History

- natural state ☐
- aird ried ☐
- oven dried ☐
- other ☐

Preparation Method

- dry sieving ☐
- wet sieving ☐

LinearS hrinkage

- Mould size mm
- crumbing ☐
- curling ☐

classification :

Thet ests, calibrations or measurements covered by this documenth ave been performed in accordance with NATA requirements whichi nclude the requirements of ISO/IEC 17025 and are traceable to national standards of measurement. This document shall not be reproduced except in full.

NATA Accredited Laboratory No. 431

Date : *16 March, 2004*

Authorised Signature:

James Russell
Laboratory Manager

Coffey Geosciences Pty Ltd A.C.N.0 56 335 516

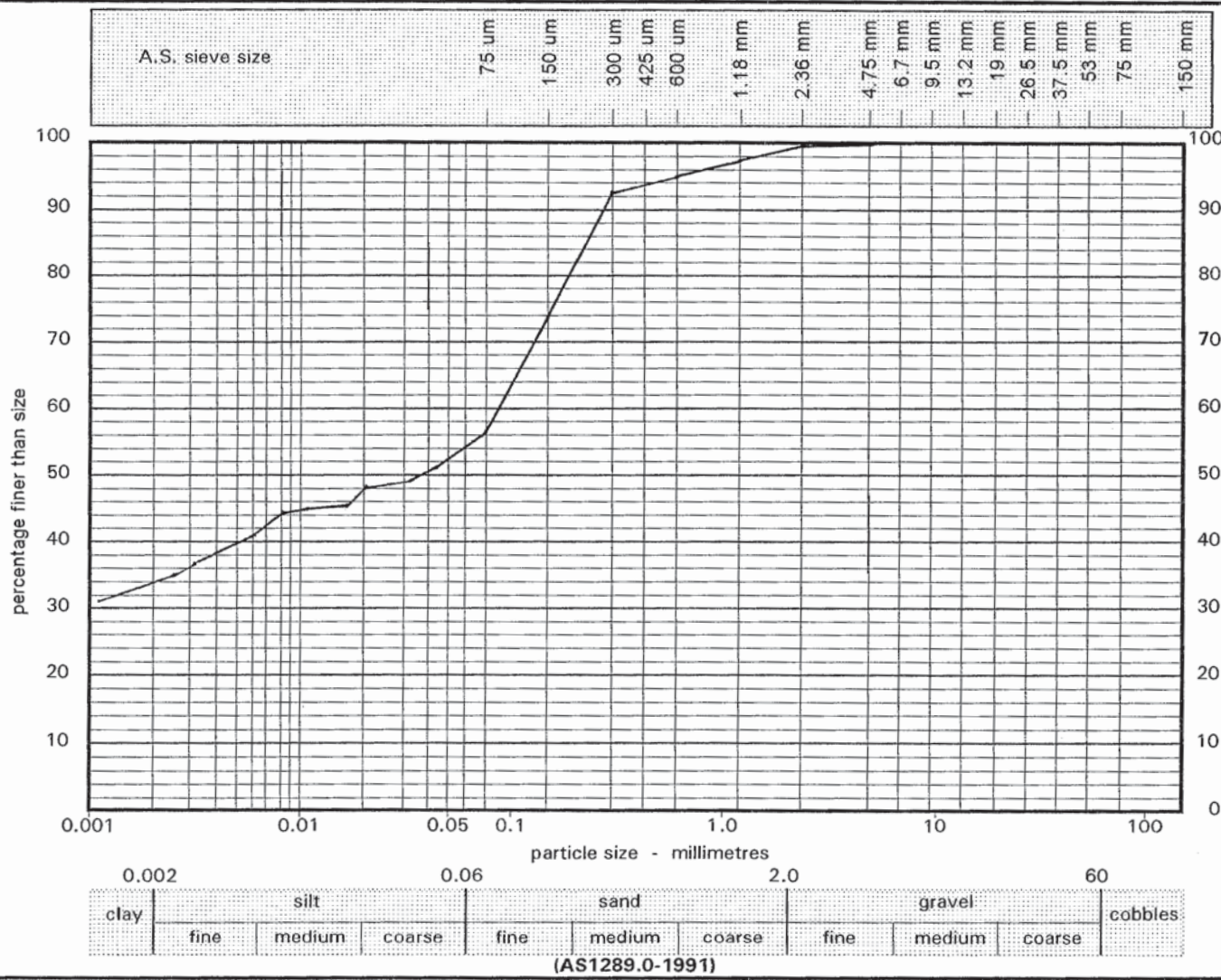
Geotechnical | **Resources** | Environmental | **Technical** | Project Management

142 Wicks Road, North Ryde, NSW, 2113
Ph:(02) 9888 7444 Fax (02) 9878 8155

particle size distribution

client : *GEOENVIRO CONSULTANCY PTY LTD.*
job no : *SL4260/1*
principal :
laboratory : *SYDNEY*
project : *MATERIAL ASSESSMENT - JOB No.JC040331A*
report date : *March 16, 2004*
location : *CURRANS HILL*
test report : -

test procedure : *AS1289.3.6.1,3.6.3*
depth : *1.00 to 1.20m*
sample no : *T.P No 40*
sample identification: *Sample supplied by the client on the 5/03/04.*



Atterberg Limit :

liquid limit	%	-
plastic limit	%	-
plasticity index	%	-
linears hrinkage	%	-
natural moisture	%	-

Sample History

- natural state ☐
- aird ried ☐
- oven dried ☐
- other ☐

Preparation Method

- dry sieving ☐
- wet sieving ☐

LinearS hrinkage

- Mould size mm
- crumbing ☐
- curling ☐

classification :

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NATA Accredited Laboratory No. 431

Date : *16 March, 2004*

Authorised Signature:
James Russell
Laboratory Manager

Coffey Geosciences Pty Ltd A.C.N.0 56 335 516

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

142 Wicks Road, North Ryde, NSW, 2113
Ph:(02) 9888 7444 Fax (02) 9878 8155

particle size distribution

client : *GEOENVIRO CONSULTANCY PTY LTD.*

job no : *SL4260/1*

principal :

laboratory : *SYDNEY*

project : *MATERIAL ASSESSMENT - JOB No.JC040331A*

report date : *March 16, 2004*

location : *CURRANS HILL*

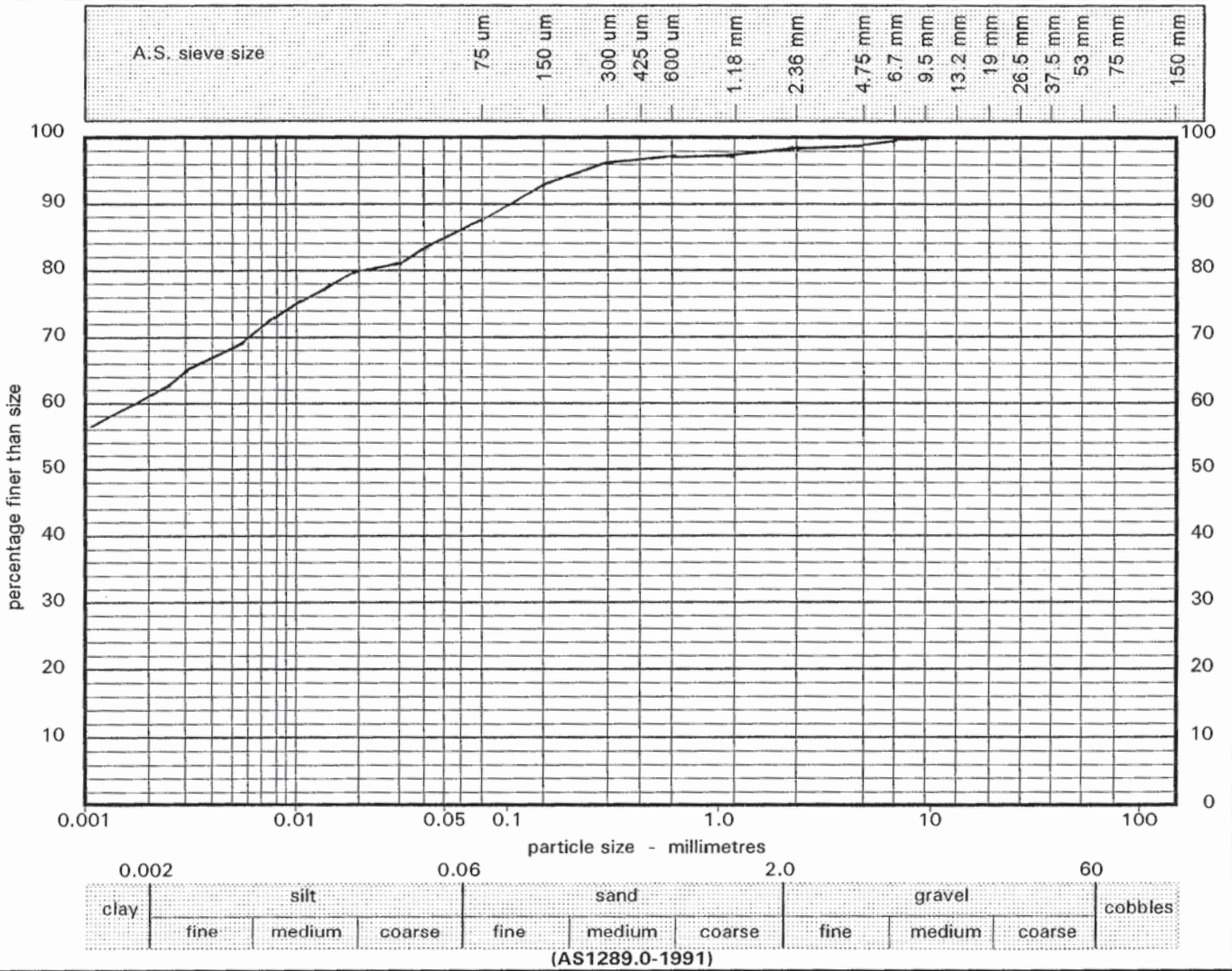
test report : -

test procedure : *AS1289.3.6.1,3.6.3*

depth : *0.50 to 0.70m*

sample no : *T.P No 191*

sample identification: *Sample supplied by the client on the 5/03/04.*



Atterberg Limit :

liquid limit	%	-
plastic limit	%	-
plasticity index	%	-
linears hrinkage	%	-
natural moisture	%	-

Sample History

- natural state ☐
- aird ried ☐
- oven dried ☐
- other ☐

Preparation Method

- dry sieving ☐
- wet sieving ☐

LinearS hrinkage

- Mould size mm
- crumbing ☐
- curling ☐

classification :

Thet ests, calibrations or measurements covered by this documenth ave been performed in accordance with NATA requirements whichi nclude the requirements of ISO/IEC 17025 and are traceable to national standards of measurement. This document shall not be reproduced except in full.

NATA Accredited Laboratory No. 431

Date : *16 March, 2004*

Authorised Signature:

James Russell
Laboratory Manager

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

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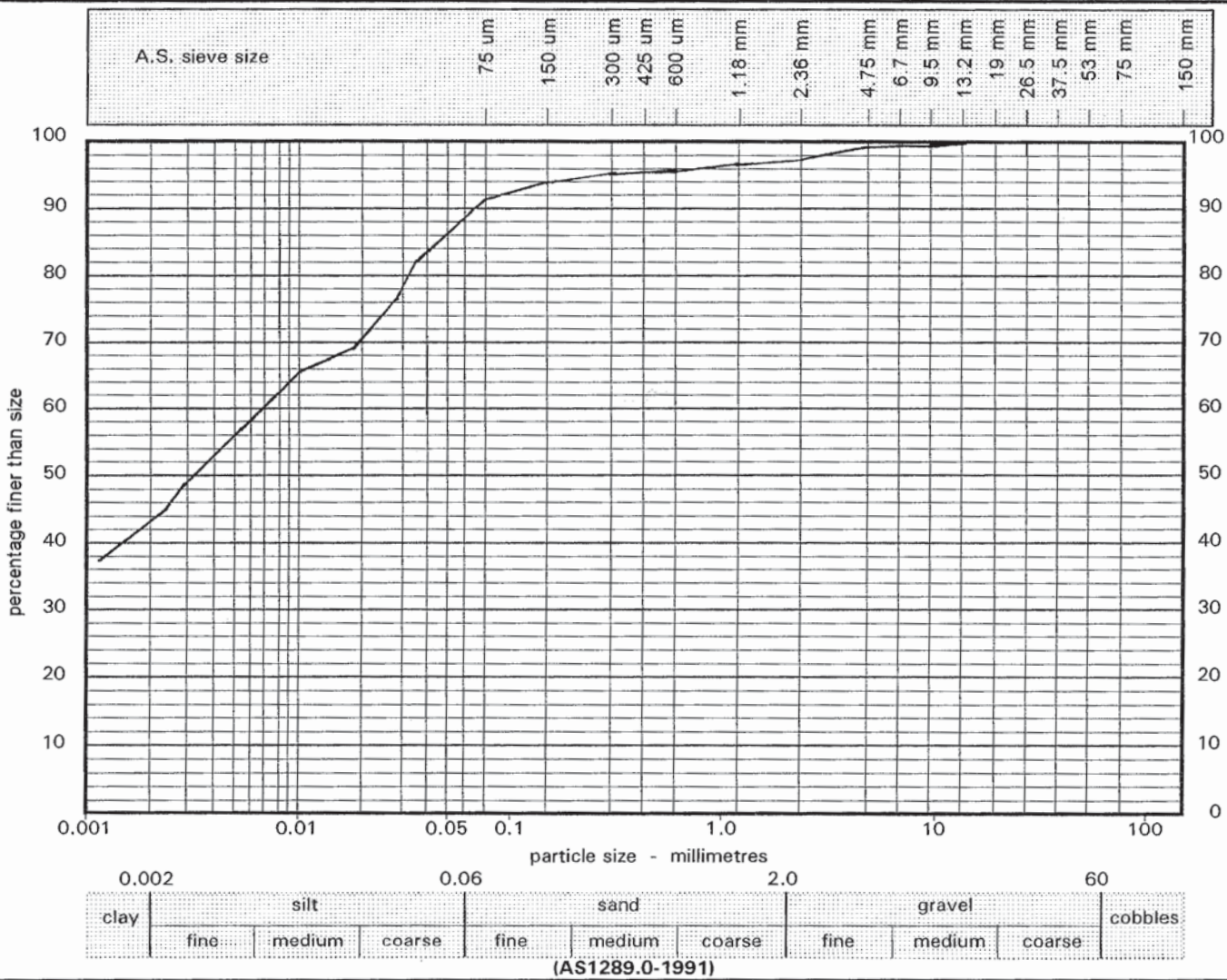
particle size distribution

client : *GEOENVIRO CONSULTANCY PTY LTD.*
job no : *SL4260/1*
principal :
laboratory : *SYDNEY*
project : *MATERIAL ASSESSMENT - JOB No.JC040331A*
report date : *March 16, 2004*
location : *CURRANS HILL*
test report : -

test procedure : *AS1289.3.6.1,3.6.3*
depth : *1.00 to 1.20m*
sample no : *T.P No 171*
sample identification: *Sample supplied by the client on the 5/03/04.*



Atterberg Limit :

liquid limit	%	-
plastic limit	%	-
plasticity index	%	-
linears hrinkage	%	-
natural moisture	%	-

Sample History

- natural state ☐
- aird ried ☐
- oven dried ☐
- other ☐

Preparation Method

- dry sieving ☐
- wet sieving ☐

LinearS hrinkage

- Mould size mm
- crumbing ☐
- curling ☐

classification :

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Laboratory Manager

Form Number L1.8R2 Version 5.2

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142 Wicks Road, North Ryde, NSW, 2113
Ph:(02) 9888 7444 Fax (02) 9878 8155

particle size distribution

client : *GEOENVIRO CONSULTANCY PTY LTD.*

job no : *SL4260/1*

principal :

laboratory : *SYDNEY*

project : *MATERIAL ASSESSMENT - JOB No.JC040331A*

report date : *March 16, 2004*

location : *CURRANS HILL*

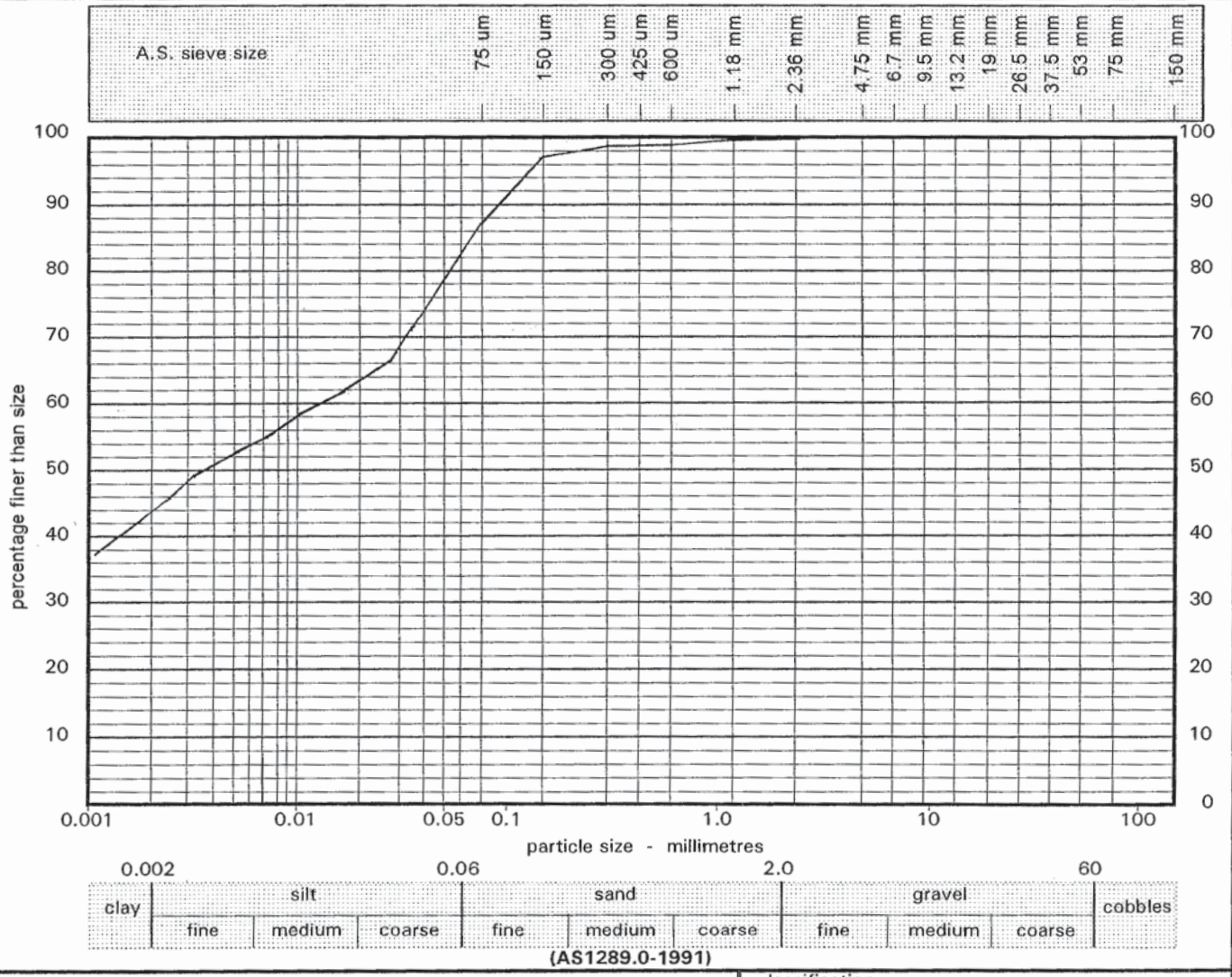
test report : -

test procedure : *AS1289.3.6.1,3.6.3*

depth : *1.80 to 2.00m*

sample no : *T.P No 146*

sample identification: *Sample supplied by the client on the 5/03/04.*



(AS1289.0-1991)

Atterberg Limit :

liquid limit	%	-
plastic limit	%	-
plasticity index	%	-
linears hrinkage	%	-
natural moisture	%	-

Sample History

- natural state ☐
- aird ried ☐
- oven dried ☐
- other ☐

Preparation Method

- dry sieving ☐
- wet sieving ☐

LinearS hrinkage

- Mould size mm
- crumbing ☐
- curling ☐

classification :

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NATA Accredited Laboratory No. 431

Date : *16 March, 2004*

Authorised Signature:

James Russell
Laboratory Manager

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

142 Wicks Road, North Ryde, NSW, 2113
Ph:(02) 9888 7444 Fax (02) 9878 8155

particle size distribution

client : *GEOENVIRO CONSULTANCY PTY LTD.*

job no : *SL4260/1*

principal :

laboratory : *SYDNEY*

project : *MATERIAL ASSESSMENT - JOB No.JC040331A*

report date : *March 16, 2004*

location : *CURRANS HILL*

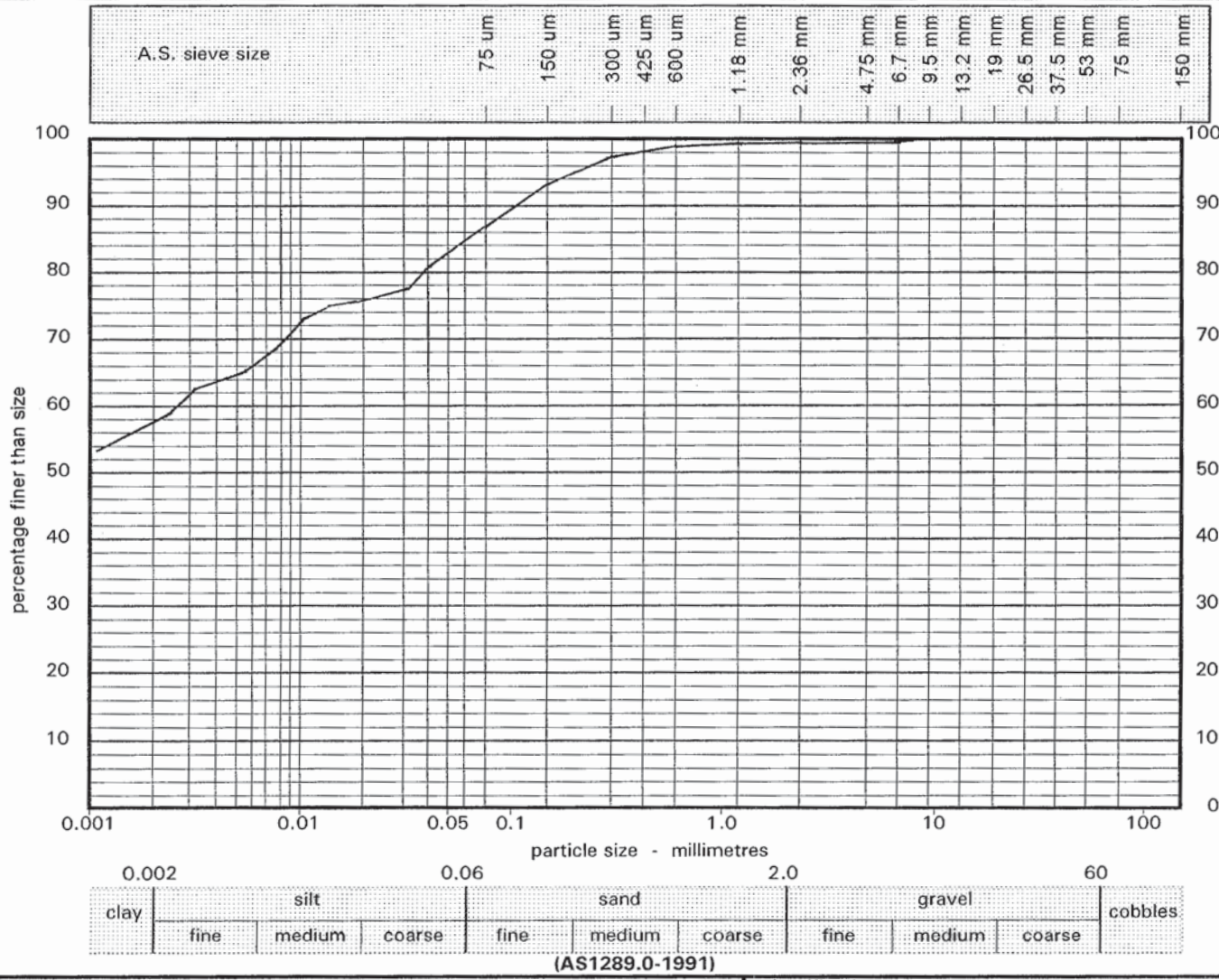
test report : -

test procedure : *AS1289.3.6.1,3.6.3*

depth : *0.50 to 0.70m*

sample no : *T.P No 122*

sample identification: *Sample supplied by the client on the 5/03/04.*



Atterberg Limit :

liquid limit	%	-
plastic limit	%	-
plasticity index	%	-
linears hrinkage	%	-
natural moisture	%	-

Sample History

- natural state ☐
- aird ried ☐
- oven dried ☐
- other ☐

Preparation Method

- dry sieving ☐
- wet sieving ☐

LinearS hrinkage

- Mould size mm
- crumbing ☐
- curling ☐

classification :

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Laboratory Manager

Form Number L1.8R2 Version 5.2

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142 Wicks Road, North Ryde, NSW, 2113
Ph:(02) 9888 7444 Fax (02) 9878 8155

particle size distribution

client : *GEOENVIRO CONSULTANCY PTY LTD.*

job no : *SL4260/1*

principal :

laboratory : *SYDNEY*

project : *MATERIAL ASSESSMENT - JOB No.JC040331A*

report date : *March 16, 2004*

location : *CURRANS HILL*

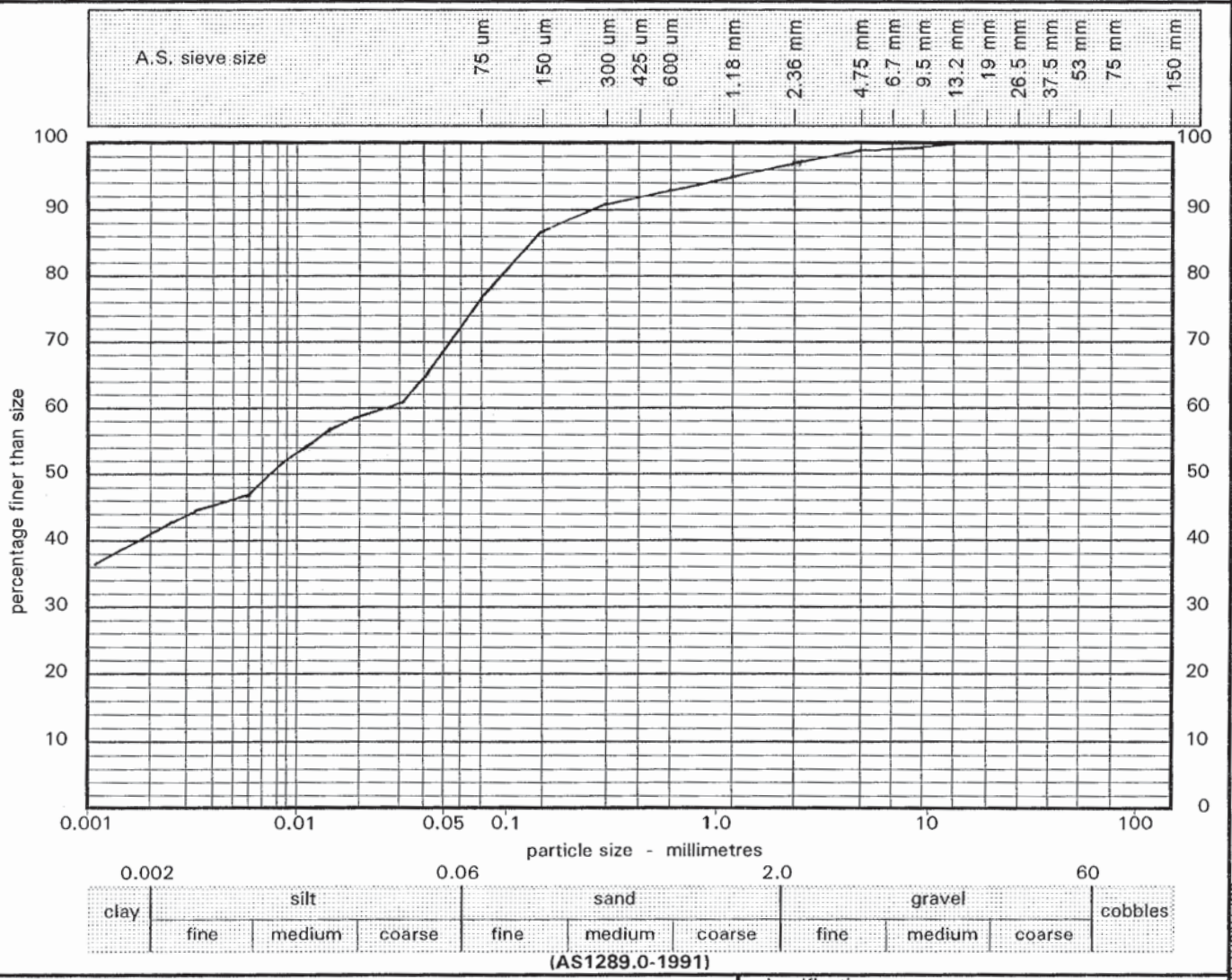
test report : -

test procedure : *AS1289.3.6.1,3.6.3*

depth : *1.00 to 1.20m*

sample no : *T.P No 98*

sample identification: *Sample supplied by the client on the 5/03/04.*



(AS1289.0-1991)

Atterberg Limit :

liquid limit	%	-
plastic limit	%	-
plasticity index	%	-
linears hrinkage	%	-
natural moisture	%	-

Sample History

- natural state ☐
- aird ried ☐
- oven dried ☐
- other ☐

Preparation Method

- dry sieving ☐
- wet sieving ☐

LinearS hrinkage

- Mould size mm
- crumbing ☐
- curling ☐

classification :

NATA Accredited Laboratory No. 431

Authorised Signature:

James Russell
Laboratory Manager

Date : *16 March, 2004*

Coffey Geosciences Pty Ltd A.C.N.0 56 335 516

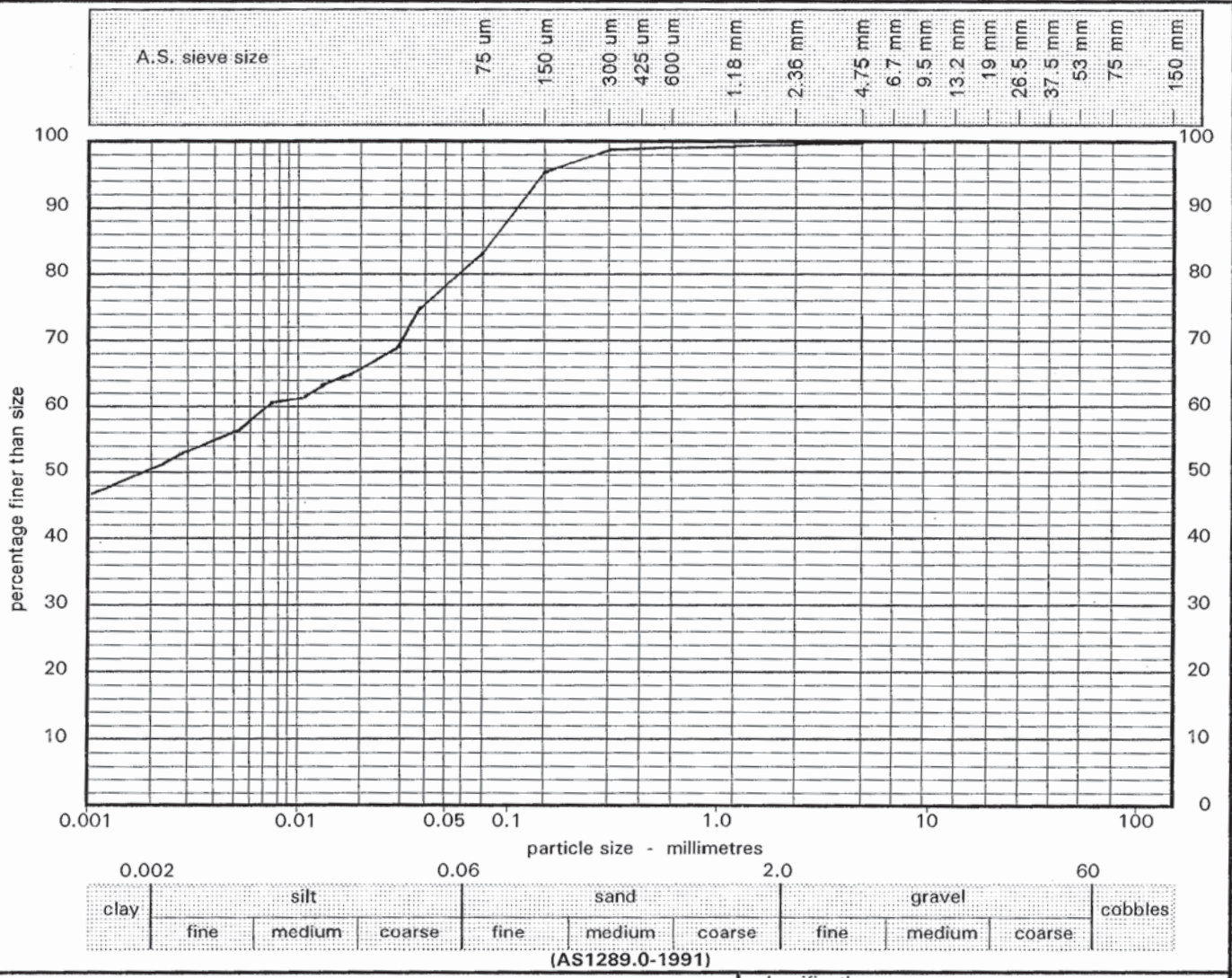
Geotechnical | **Resources** | Environmental | **Technical** | Project Management

142 Wicks Road, North Ryde, NSW, 2113
Ph:(02) 9888 7444 Fax (02) 9878 8155

particle size distribution

client : *GEOENVIRO CONSULTANCY PTY LTD.*
job no : *SL4260/1*
principal :
laboratory : *SYDNEY*
project : *MATERIAL ASSESSMENT - JOB No.JC040331A*
report date : *March 16, 2004*
location : *CURRANS HILL*
test report : -

test procedure : *AS1289.3.6.1,3.6.3*
depth : *0.50 to 0.70m*
sample no : *T.P No 51*
sample identification: *Sample supplied by the client on the 5/03/04.*



Atterberg Limit :

liquid limit	%	-
plastic limit	%	-
plasticity index	%	-
linears hrinkage	%	-
natural moisture	%	-

Sample History

- natural state ☐
- aird ried ☐
- oven dried ☐
- other ☐

Preparation Method

- dry sieving ☐
- wet sieving ☐

LinearS hrinkage

- Mould size mm
- crumbing ☐
- curling ☐

classification :

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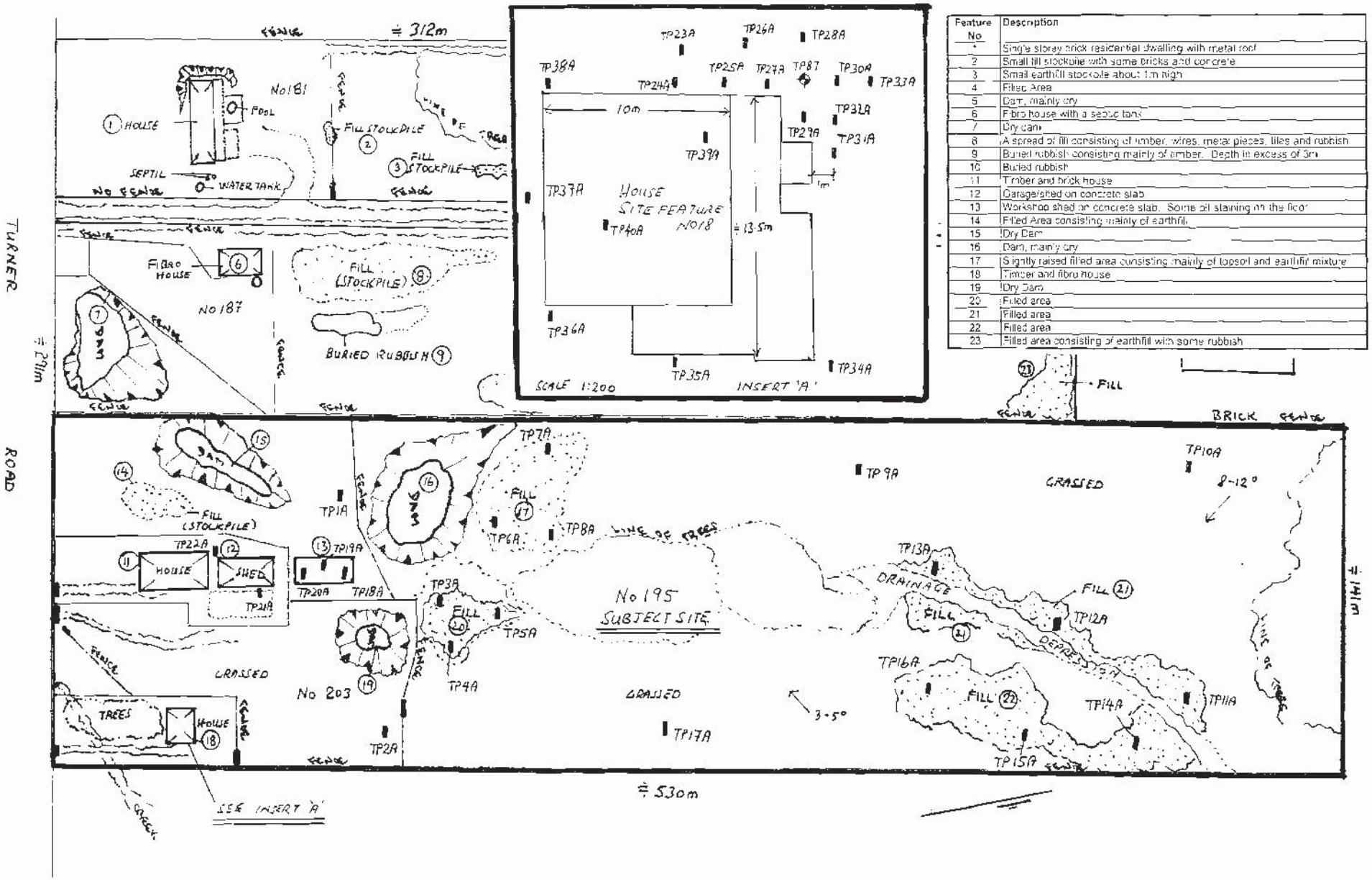
NATA Accredited Laboratory No. 431

Date : *16 March, 2004*

Authorised Signature:

James Russell
Laboratory Manager



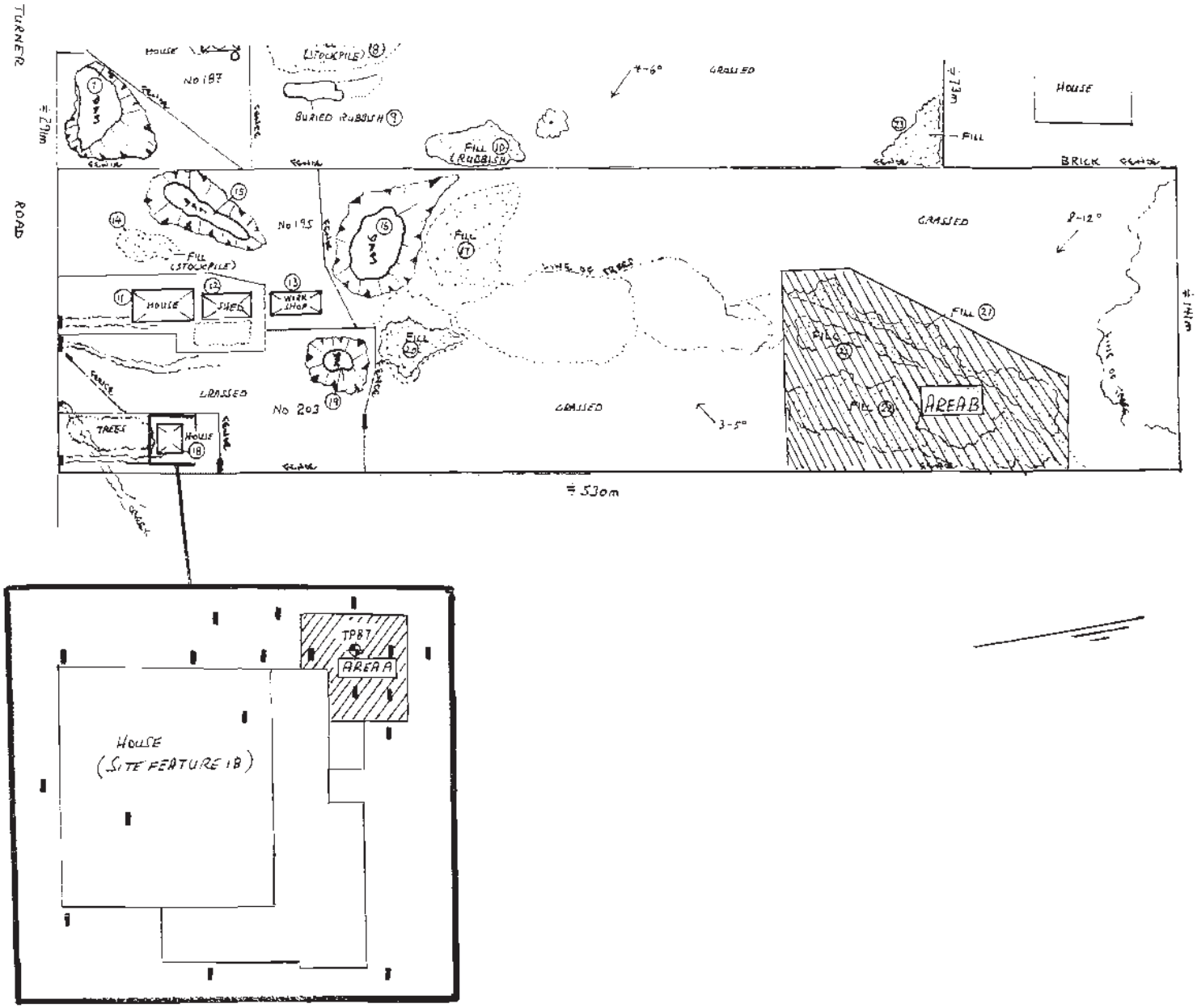
Feature No	Description
1	Single storey brick residential dwelling with metal roof
2	Small fill stockpile with some bricks and concrete
3	Small earthfill stockpile about 1m high
4	Filled Area
5	Dam, mainly dry
6	Fibro house with a septic tank
7	Dry dam
8	A spread of fill consisting of timber, wires, metal pieces, tiles and rubbish
9	Buried rubbish consisting mainly of timber. Depth in excess of 3m
10	Buried rubbish
11	Timber and brick house
12	Garage/shed on concrete slab
13	Workshop shed on concrete slab. Some oil staining on the floor
14	Filled Area consisting mainly of earthfill
15	Dry Dam
16	Dam, mainly dry
17	Slightly raised filled area consisting mainly of topsoil and earthfill mixture
18	Timber and fibro house
19	Dry Dam
20	Filled area
21	Filled area
22	Filled area
23	Filled area consisting of earthfill with some rubbish

Legend

- Test Pit
- (10) SITE FEATURE No 10
- PREVIOUS TEST PIT 2004

GeoEnviro Consultancy

Drawn By: SL	Date: 16/3/09	Mr Jim and Ms Vanessa Driver	
Checked By: SL	Date: 16/3/09	Nos 195-203 Turner Road Currans Hill	
Revision By:	Date:	Sampling Location Plan	
Scale: Proportional	A3	Project No: JC04031A-r5	Drawing No: 1A



Legend

Remediation Area B

GeoEnviro Consultancy

Drawn By: SL	Date: 16/3/09	Mr Jim and Ms Vanessa Driver	
Checked By: SL	Date: 16/3/09	Nos 195-203 Turner Road Currans Hill	
Revision By:	Date:	Remediation Area Plan	
Scale: Proportional	A3	Project No: JC04031A-rS	Drawing No: 2A

Test Pit Number	Depth (m)	Profile Type	Description
100	0.0-0.5	Topsoil/Fill	Clayey silt mixed with silt and some gravel, light grey and brown, dry
	0.5-0.9	Natural	(CI-CH) Silty Clay: medium to high plasticity, red and grey, MC<=PL, PP>600kPa
101	0.0-0.7	Topsoil/Fill	Silt with gravel and some clayey silt, grey, dry to moist
	0.7-1.0	Natural	(CI) Silty Clay: medium plasticity, yellow and red/brown, MC<=PL, hard
102	Dam Embankment	Fill	Clayey silt and silty clay high plasticity and some gravel, brown, moist
103	0.0-0.3	Topsoil/Fill	Clayey silt with some gravel, brown, dry to moist
	0.3-0.7	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown, dry, hard
104	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, dry
	0.4-1.4	Natural	(CH) Silty Clay: high plasticity, red and brown, with some gravel, dry to moist, hard, MC<=PL, PP>600kPa
105	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry
	0.3-1.0	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
	1.0-1.9	Natural	(CI) Gravelly Silty Clay: medium plasticity, brown, very hard, MC<PL, PP>600kPa
106	0.0-0.8	Fill	Silty clay and some silt mixed with some gravel, grey and brown, dry
	0.8-1.0	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, dry, hard
107	Dam Embankment	Fill	Mixture of clayey silt, silty clay of high plasticity and some gravel, yellow/brown and dark brown/grey, moist
108	Dam Embankment	Fill	Mixed clayey silt, silty clay of high/medium to high plasticity, some gravel, yellow and brown and dark brown/grey, moist
109	Dam Embankment	Fill	Mixture of silty clay and clayey silt, silty clay of high plasticity with some gravel, yellow/brown and dark grey and dark brown, moist
110	0.0-0.7	Fill	Silty clay of medium plasticity mixed with gravel, some silt, some clayey silt, some sandstone cobbles, brown, dry to moist
	0.7-1.0	Topsoil	Silt, low liquid limit, light grey, dry
	1.0-1.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, yellow and brown, MC<=PL, hard
111	0.0-0.8	Fill	Mixed silty clay with silt and sandstone gravel/cobbles, brown, moist
	0.8-1.0	Topsoil	Silt, with some clayey silt, grey, dry
	1.0-1.3	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and yellow, hard, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

TABLE 1 (Page 10 of 11)
SUMMARY OF SOIL PROFILE

Test Pit Number	Depth (m)	Profile Type	Description
112	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, dry
	0.4-0.7	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard, PP>600kPa
113	0.0-0.4	Topsoil	Clayey Silt, low liquid limit, dark brown, dry to moist
	0.4-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, moist, MC<=PL, hard, PP>600kPa

Note: PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

TABLE 1 (Page 11 of 11)
SUMMARY OF SOIL PROFILE

GeoEnviro Consultancy

Preliminary Contamination, Geotechnical and Salinity Investigation
No. 181, 187, 195-203 Turner Road , Currans Hill

Test Pit Number	Depth (m)	Profile Type	Description
1A	0.0-0.1	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry
	0.1-0.6	Fill	Silty Clay: medium to high plasticity, brown loose
	0.6-0.7	Natural	Clayey Silt, low liquid limit, brown dry
	0.7-1.7	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
	1.7-2.7	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey brown, moist to wet with a trace of fine gravel
	2.7-3.3	Natural	(CI) Silty Clay: medium plasticity, brown and grey some minor groundwater seepage at about 3.0m
2A	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.3-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, MC<=PL, hard, PP>600kPa
	1.2-2.1	Natural	As above but pale brown, MC<PL, hard, PP>600kPa
	2.1-3.1	Natural	(CI) Gravelly Silty Clay: medium plasticity, grey brown, with some ironstone gravel, MC<PL
	3.1-3.5	Natural	(CH) Silty Clay: high plasticity, red and brown, MC<=PL, hard, PP>600kPa
3A	0.0-0.2	Fill	Clayey Silt, low liquid limit, brown and grey, dry, a trace of fine gravel
	0.2-0.8	Natural	(CI-CH) Silty Clay/Gravelly Silty Clay: medium to high plasticity, some sand, dark red and brown, MC<PL, PP>600kPa
4A	0.0-0.3	Fill	Mixture of silty clay medium plasticity with some gravel and with some silt, yellow brown and grey, moist to wet
	0.3-0.9	Natural	(CI-CH) Silty Clay: medium to high plasticity, some sand, dark red and brown, MC<PL, PP>600kPa
5A	0.0-0.4	Fill/Topsoil	Mixture of silty clay medium plasticity with some gravel and with some silt, yellow brown and grey, moist to wet
	0.4-1.1	Natural	(CI-CH) Silty Clay: medium to high plasticity, some sand, brown, very stiff
6A	0.0-0.2	Fill/Topsoil	Clayey Silt with gravel and some sand, some clayey silt, grey and red/brown, dry
	0.2-0.5	Fill	Silty Clay: medium plasticity, red brown and dark brown , MC<PL
	0.5-1.1	Natural	(CI) Sillty Clay: medium plasticity, orange brown , MC<PL, PP>600kPa
7A	0.0-0.2	Fill/Topsoil	Clayey Silt/Silty Clay: low liquid limit, low plasticity with gravel dry
	0.2-0.5	Fill	Silty Clay: medium plasticity, red brown , a trace of gravel
	0.5-1.2	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, MC<PL, PP>600kPa
8A	0.0-0.2	Fill/Topsoil	Silty clay with gravel and some sand, some clayey silt, grey and red/brown, dry
	0.2-0.8	Fill	Silty Clay/Clayey Silt : low to medium plasticity, red brown , a trace of gravel and sand
	0.8-1.7	Natural	(CI-CH) Silty Clay: medium to high plasticity, dark brown and red, MC<PL, PP>600kPa

Note:
PP = Pocket Penetrometer
MC = Moisture Content
PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1A (Page 1 of 4)
SUMMARY OF SOIL PROFILE

Mr Jim and Vanessa Driver

Proposed Residential Development

Nos 195-203 Turner Street Elderslie

Prepared By: SL 23/03/2009
Checked By:_____Date:_____

Test Pit Number	Depth (m)	Profile Type	Description
9A	0.0-0.35	Topsoil	Clayey Silt, low liquid limit, dark brown, moist
	0.35-1.3	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.3-2.0	Natural	(CI) Silty Clay/Gravelly Silty Clay: medium plasticity, grey, with some shale fragments, MC<=PL, hard, PP>600kPa
	2.0-3.0	Natural	(CI) Gravelly Shaley Clay: medium plasticity, grey, with layers/bands of extremely weathered shale
	3.0-3.5	Natural	As above but medium to high plasticity, brown grey MC=PL
10A	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.3-1.2	Natural	(CH) Silty Clay: high plasticity, yellow and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.2-2.0	Natural	(CI-CH) Silty Sandy Clay/Gravelly Silty Clay: medium to high plasticity, dark red and brown, dry, MC<PL, PP>600kPa
	2.0-2.4	Natural	(CI) Silty Clay: medium plasticity, grey, with some shale fragments, MC<=PL, hard, PP>600kPa
	2.4-3.0	Natural	(CI) Gravelly Shaley Clay: medium plasticity, grey, with layers/bands of extremely weathered shale
	3.0-3.7	Bedrock	Shale/Siltstone: extremely weathered, extremely low strength, grey and brown
11A	0.0-0.2	Fill	Gravelly Silty Clay: medium plasticity, brown with some of sandstone and a trace of asphalt
	0.2-0.35	Topsoil	Silt and Clayey Silt, brown and grey, dry
	0.35-0.8	Natural	(CH) Silty Clay: high plasticity, yellow and brown, very hard, dry
12A	0.0-0.6	Fill	Mixture of silty clay and sandstone gravel, some shale and roadbase
	0.6-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, MC<PL
13A	0.0-0.7	Fill	Silty Clay/Clayey Silt: low to medium plasicity, brown with a trace of concrete fragments
	0.7-1.5	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, MC<PL
14A	0.0-0.6	Fill	Gravelly Silty Clay: medium plasticity, brown with some of sandstone and a trace of asphalt
	0.6-1.0	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, MC<PL
15A	0.0-0.4	Fill	Gravelly Silty Clay: medium plasticity, brown with some of sandstone and a trace of asphalt
	0.4-0.5	Topsoil	Silt and Clayey Silt, brown and grey, dry
	0.5-1.3	Natural	(CI-CH) Silty Sandy Clay/Gravelly Silty Clay: medium to high plasticity, dark red and brown, dry, MC<PL, PP>600kPa
	1.3-2.4	Natural	(CI) Silty Clay: medium plasticity, grey, with some shale fragments, MC<=PL, hard, PP>600kPa
	2.4-3.1	Natural	(CI) Gravelly Shaley Clay: medium plasticity, grey, with layers/bands of extremely weathered shale

Note:

PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1A (Page 2 of 4)

SUMMARY OF SOIL PROFILE

Mr Jim and Vanessa Driver

Proposed Residential Development

Nos 195-203 Turner Street Elderslie

Prepared By: SL 23/03/2009

Checked By:_____Date:_____

Test Pit Number	Depth (m)	Profile Type	Description
16A	0.0-0.2	Fill	Gravelly Silty Clay: medium plasticity, brown with some of sandstone and a trace of asphalt
	0.2-0.6	Natural	(CH) Silty Clay: high plasticity, yellow and brown, hard, MC<PL
17A	0.0-0.3	Topsoil	Clayey Silt, low liquid limit, brown and dark brown, moist
	0.3-1.0	Natural	(CH) Silty Clay: high plasticity, red and brown, some gravel, MC<=PL, hard, PP>600kPa
	1.0-1.7	Natural	(CI) Silty Clay: medium plasticity, grey, some shale gravel, MC<=PL, PP>600kPa
	1.7-1.8	Bedrock	Shale: extremely weathered/Interbedded with gravelly shaley clay, grey and brown, dry to moist
18A	0.0-0.15	Slab	Concrete : 150mm thick
	0.15-0.3	Subbase	Sand: fine to medium grained, brown
	0.3-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown MC<PL, some gravel
	0.6-0.7	Natural	(CI) Gravelly Shaley Clay: medium plasticity, grey
19A	0.0-0.07	Slab	Concrete : 150mm thick
	0.07-0.5	Fill	Silty Clay: medium plasticity, brown, MC<PL some gravel
	0.5-0.9	Fill	Gravelly Silty Clay: medium plasticity, some ironstone gravel,
20A	0.0-0.11	Slab	Concrete : 150mm thick
	0.11-0.25	Fill	Gravelly Silty Clay: medium plasticity, some ironstone gravel,
21A	0.0-0.1	Fill	Silty Sandy Gravel
	0.1-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, hard, PP>600kPa
22A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard
23A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa
24A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity,grey mottled brown, MC<=PL, hard
25A	0.0-0.1	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.1-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa

Note:

PP = Pocket Penetrometer

MC = Moisture Content

PL = Plastic Limit

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TABLE 1A (Page 3 of 4)

SUMMARY OF SOIL PROFILE

Mr Jim and Vanessa Driver

Proposed Residential Development

Nos 195-203 Turner Street Elderslie

Prepared By: SL 23/03/2009

Checked By:_____Date:_____

Test Pit Number	Depth (m)	Profile Type	Description
26A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa
27A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, red brown, MC<=PL, hard
28A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard
29A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, grey brown, hard, PP>600kPa
30A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, red brown and grey, MC<=PL, hard, PP>600kPa
31A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and red brown
32A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa
33A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.45	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and red brown
34A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown and red brown
35A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.45	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard
36A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.45	Natural	(CI-CH) Silty Clay: medium to high plasticity, grey brown, hard, PP>600kPa
37A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa
38A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.4	Natural	(CI-CH) Silty Clay: medium to high plasticity, grey brown, hard, PP>600kPa
39A	0.0-0.2	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.2-0.5	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa
40A	0.0-0.15	Topsoil	Clayey Silt, low liquid limit, brown and grey, dry to moist
	0.15-0.6	Natural	(CI-CH) Silty Clay: medium to high plasticity, brown, MC<=PL, hard, PP>600kPa

Note:

PP = Pocket Penetrometer

MC = Moisture Content
PL = Plastic Limit

GeoEnviro Consultancy

TABLE 1A (Page 4 of 4)

SUMMARY OF SOIL PROFILE

Mr Jim and Vanessa Driver

Proposed Residential Development

Nos 195-203 Turner Street Elderslie

APPENDIX C

Important Information About Your Environmental Site Assessment
Explanatory Notes

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IMPORTANT INFORMATION REGARDING YOUR ENVIRONMENTAL SITE ASSESSMENT

This Environmental Assessment Report was performed in general conformance with our understanding of the guidelines by the Australian and New Zealand Conservation Council (ANZECC), the Office of Environment and Heritage (OEH) and the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (amended 2013).

These accompanying notes have been prepared by GeoEnviro Consultancy Pty Ltd, using guidelines prepared by ASFE; The Association of Engineering Firms Practising in the Geosciences. The notes are offered as an aid in the interpretation of your environmental site assessment report.

REASONS FOR AN ENVIRONMENTAL SITE ASSESSMENT

Environmental site assessments are typically, though not exclusively, performed in the following circumstances:

- As a pre- acquisition assessment on behalf of either a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has change, eg from a factory to a residential subdivision
- As a pre-development assessment of greenfield sites, to establish baseline conditions and assess environmental, geological and hydrological constraints to the development of, eg, a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to the assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible, quantify the risks which unrecognised contamination poses to the ongoing or proposed activity. Such risk may be both financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination within a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which did not show signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur, only the most likely contaminants are screened.

AN ENVIRONMANTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

Your environmental assessment report should not be used;

- When the nature of the proposed development is changed, eg, if a residential development is proposed, rather than a commercial development
- When the size or configuration of the proposed development is altered, eg, if a basement is added
- When the location or orientation of the proposed structure is modified
- When there is a change of land ownership, or
- For application to an adjacent site

In order to avoid costly problems, you should ask your consultant to assess any changes in the project since the assessment and the implications, if any, to recommendations made in the assessment.

ENVIRONMENTAL SITE ASSESSMENT FINDINGS ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual sub-surface conditions only at those points where samples are taken, when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientist and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on any proposed development and appropriate remediation measures. Actual conditions may differ from those inferred, because no professional, no matter how qualified and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, however, steps can be taken to help minimise the impact. For this reason, site owner should retain the services of their consultants throughout the development stage of the project in order to identify variances, conduct additional tests which may be necessary and to recommend solutions to problems encountered on site.

Soil and groundwater contamination is a field in which legislation and interpretation of legislation by government departments is changing rapidly. Whilst every attempt is made by GeoEnviro Consultancy Pty Ltd to be familiar with current policy, our interpretation of the investigation findings should not be taken to be that of the relevant authority. When approval from a statutory authority is required for a project, that approval should be directly sought.

STABILITY OF SUB-SURFACE CONDITIONS

Sub-surface conditions can change by natural processes and site activities. As an environmental site assessment is based on conditions existing at the time of the investigation, project decisions should not be based on environmental site assessment data which may have been affected by time. The consultant should be requested to advise if additional tests are required.

ENVIRONMENTAL SITE ASSESSMENTS ARE PERFORMED FOR SPECIFIC PURPOSES AND CLIENTS

Environmental site assessments are prepared in response to a specific scope of work required to meet the specific needs or specific individuals. An assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another civil engineer.

An assessment should not be used by other persons for any purpose, or by the client for a different purposes. No individual, other than the client, should apply an assessment, even for its intended purposes, without first conferring with the consultant. No person should apply an assessment for any purposes other than that originally contemplated, without first conferring with the consultant.

MISINTERPRETATION OF ENVIRONMENTAL SITE ASSESSMENTS

Costly problems can occur when design professionals develop plans based on misinterpretation of an environmental site assessment. In order to minimise problems, the environmental consultant should be retained to work with appropriate design professionals, to explain relevant findings and to review the adequacy of plans and specifications relative to contamination issues.

LOGS SHOULD NOT BE SEPARATED FORM THE REPORT

Borehole and test pit logs are prepared by environmental scientists, engineers or geologist, based upon interpretation of field conditions and laboratory evaluation of field samples. Field logs normally provided in our reports and these should not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however, contractors can still misinterpret the logs during bid preparation if separated from the test of the assessment. Should this occur, delays and disputes , or unanticipated costs may result.

To reduce the likelihood of boreholes and test pit logs misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of sub-surface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations, such as contractors.

READ RESPONSIBILITY CLAUSES CLOSELY

An environmental site assessment is based extensively on judgement and opinion, therefore, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claim being lodged against consultants. In order to aid in prevention of this problem, model clauses have been developed for use in written transmittals. These are definitive clauses, designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment and you are encouraged to read them closely. Your consultant will be happy to give full and frank answers to any questions you may have.

EXPLANATORY NOTES

Introduction

These notes have been provided to amplify the geotechnical report with regard to investigation procedures, classification methods and certain matters relating to the Discussion and Comments sections. Not all notes are necessarily relevant to all reports.

Geotechnical reports are based on information gained from finite sub-surface probing, excavation, boring, sampling or other means of investigation, supplemented by experience and knowledge of local geology. For this reason they must be regarded as interpretative rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods
The methods the description and classification of soils and rocks used in this report are based on Australian standard 1726, the SSA Site investigation Code, in general descriptions cover the following properties - strength or density, colour, structure, soil or rock type and inclusions. Identification and classification of soil and rock involves to a large extent, judgement within the acceptable level commonly adopted by current geotechnical practices.

Soil types are described according to the predominating particle size, qualified by the grading or other particles present (eg sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	Less than 0.002mm
Silt	0.002 to 0.6mm
Sand	0.6 to 2.00mm
Gravel	2.00m to 60.00mm

Soil Classification	Particle size
Clay	less than 0.002mm
Silt	0.002 to 0.06mm
Sand	0.06 to 2.00mm
Gravel	2.00mm to 60.00mm

Cohesive soils are classified on the basis of strength, either by laboratory testing or engineering examination. The strength terms are defined as follows:

Classification	Undrained Shear Strength kPa
Very Soft	Less than 12
Soft	12 - 25
Firm	25 - 50
Stiff	50 - 100
Very Stiff	100 - 200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer test (CPT), as below:

Relative Dense	SPT 'N' Value (blows/300mm)	CPT Cone Value (q_c-Mpa)
Very Loose	Less than 5	Less than 2
Loose	5 - 10	2 - 5
Medium Dense	10 - 30	5 - 15
Dense	30 - 50	15 - 25
Very Dense	> 50	> 25

Rock types are classified by their geological names, together with descriptive terms on degrees of weathering strength, defects and other minor components. Where relevant, further information regarding rock classification, is given on the following sheet.

Sampling
Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provided information on plasticity, grained size, colour, type, moisture content, inclusions and depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin walled sample tube (normally know as U_{50}) into the soil and withdrawing a sample of the soil in a relatively undisturbed state. Such Samples yield information on structure and strength and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils. Details of the type and method of sampling are given in the report.

Field Investigation Methods
The following is a brief summary of investigation methods currently carried out by this company and comments on their use and application.

Hand Auger Drilling
The borehole is advanced by manually operated equipment. The diameter of the borehole ranges from 50mm to 100mm. Penetration depth of hand augered boreholes may be limited by premature refusal on a variety of materials, such as hard clay, gravels or ironstone.

Test Pits
These are excavated with a tractor-mounted backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3.0m for a backhoe and up to 6.0m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Care must be taken if construction is to be carried out near, or within the test pit locations, to either adequately recompact the backfill during construction, or to design the structure or accommodate the poorly compacted backfill.

Large Diameter Auger (eg Pengo)
The hole is advanced by a rotating plate or short spiral auger generally 300mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 05m) and are disturbed, but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers and is usually supplemented by occasional undisturbed tube sampling.

Continuous Spiral Flight Augers
The hole is advanced by using 90mm - 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling or insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the augers flights, but they are very disturbed and may be highly mixed with soil of other stratum.

Information from the drilling (as distinct from specific sampling by SPT or undisturbed samples) is of relatively low reliability due to remoulding, mixing or softening of samples by ground water, resulting in uncertainties of the original sample depth.

Continuous Spiral Flight Augers (continued)
The spiral augers are usually advanced by using a V - bit through the soil profile refusal, followed by Tungsten Carbide (TC) bit, to penetrate into bedrock. The quality and continuity of the bedrock may be assessed by examination of the recovered rock fragments and through observation of the drilling penetration resistance.

Non - core Rotary Drilling (Wash Boring)
The hole is advanced by a rotary bit, with water being pumped down the drill rod and returned up the annulus, carrying the cuttings, together with some information from the "feel" and rate of penetration.

Rotary Mud Stabilised Drilling
This is similar to rotary drilling, but uses drilling mud as a circulating fluid, which may consist of a range of products, from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg SPT and U_{50} samples).

Continuous Core Drilling
A continuous core sample is obtained using a diamond tipped core barrel. Providing full core recovery is achieved (which is not always possible in very weak rock and granular soils) this technique provides a very reliable (but relatively expensive) method of investigation. In rocks an NMLC triple tube core barrel which gives a core of about 50mm diameter, is usually used with water flush.

Portable Proline Drilling
This is manually operated equipment and is only used in sites which require bedrock core sampling and there is restricted site access to truck mounted drill rigs. The boreholes are usually advanced initially using a tricone roller bit and water circulation to penetrate the upper soil profile. In some instances a hand auger may be used to penetrate the soil profile. Subsequent drilling into bedrock involves the use of NMLC triple tube equipment, using water as a lubricant.

Standard Penetration Tests
Standard penetration tests are used mainly in non-cohesive soils, but occasionally also in cohesive soils, as a means of determining density or strength and of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289 "Methods of testing Soils for Engineering Purpose"- Test F31.

The test is carried out in a borehole by driving a 50mm diameter split sample tube under the impact of a 63Kg hammer with a free fall of 769mm. It is normal for the tube to be driven in three successive 150mm increments and the "N" value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rocks, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In a case where full penetration is obtained with successive blows counts for each 150mm of, say 4, 6, and 7 blows.

  as 4, 6, 7
  N = 13

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm.

  as 15,30/40mm

The results of the tests can be related empirically to the engineering properties of the soil. Occasionally the test methods is used to obtain samples in 50mm diameter thin walled samples tubes in clays. In these circumstances, the best results are shown on the bore logs in brackets.

Dynamic Cone Penetration Test
A modification to the SPT test is where the same driving system is used with a solid 60^0 tipped steel cone of the same diameter as the SPT hollow sampler. The cone can be continuously driven into the borehole and is normally used in areas with thick layers of soft clays or loose sand. The results of this test are shown as 'N_c' on the bore logs, together with the number of blows per 150mm penetration.

Cone Penetrometer Testing and Interpretation
Cone penetrometer testing (sometimes referred to as Dutch Cone-CPT) described in this report, has been carried out using an electrical friction cone penetrometer and the test is described in Australian Standard 1289 test F5.1.

In the test, a 35mm diameter rod with cone tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig, which is fitted with a hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130mm long sleeve, immediately behind the cone. Transducer in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20mm per second) the information is output on continuous chart recorders. The plotted results in this report have been traced from the original records. The information provided on the charts comprises:

- Cone resistance - the actual end bearing force divided by the cross sectional area of the cone, expressed in Mpa.
- Sleeve friction - the frictional force on the sleeve divided by the surface area, expressed in kPa.
- Friction ratio - the ratio of sleeve friction to cone resistance, expressed in percentage.

There are two scales available for measurement of cone resistance. The lower "A" scale (0-5Mpa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main "B" scale (0-50Mpa) is less sensitive and is shown as a full line.

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative frictions in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and very soft clays, rising to 4% to 10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:

$$q_c \text{ (Mpa)} = (0.4 \text{ to } 0.6)\ N \text{ (blows per 300mm)}$$

In clays the relationship between undrained shear strength and cone resistance is commonly in the range:

$$q_c = (12 \text{ to} 18)\ C_u$$

Interpretation of CPT values can also be made to allow estimate of modulus or compressibility values to allow calculation of foundation settlements. Inferred stratification, as shown on the attached report, is assessed from the cone and friction traces, from experience and information from nearby boreholes etc.

Cone Penetrometer Testing and Interpretation continued
This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties and where precise information or soil classification is required, direct drilling and sampling may be preferable.

Portable Dynamic Cone Penetrometer (AS1289)
Portable dynamic cone penetrometer tests are carried out by driving a rod in to the ground with a falling weight hammer and measuring the blows per successive 100mm increments of penetration.

There are two similar tests, Cone Penetrometer (commonly known as Scala Penetrometer) and the Perth Sand Penetrometer. Scala Penetrometer is commonly adopted by this company and consists of a 16mm rod with a 20mm diameter cone end, driven with a 9kg hammer, dropping 510mm (AS 1289 Test F3.2).

Laboratory Testing
Laboratory testing is carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedures are given on the individual report forms.

Engineering Logs
The engineering logs presented herein are an engineering and/or geological interpretation of the sub-surface conditions and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, however, this is not always practicable or possible to justify economically. As it is, the boreholes represent only a small sample of the total sub-surface profile. Interpretation of the information and its application to design and construction should take into account the spacing of boreholes, frequency of sampling and the possibility of other than "straight line" variations between the boreholes.

Ground water
Where ground water levels are measured in boreholes, there are several potential problems:
- In low permeability soils, ground water although present, may enter the hole slowly, or perhaps not at all, during the investigation period.
- A localised perched water table may lead to a erroneous indication of the true water table.
- Water table levels will vary from time to time, due to the seasons or recent weather changes. They may not be the same at the time of construction as indicated in the report.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole if any water observations are to be made.

More reliable measurements can be made by installing stand pipes, which are read at intervals over several days, or weeks for low permeability soils. Piezometers sealed in a particular stratum may be interference from a perched water table or surface water.

Engineering Reports
Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal is changed, say to a twenty storey building. If this occurs, the company will be pleased to review the report and sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of sub-surface conditions, discussions of geotechnical aspects and recommendations or suggestions for design and construction. However, the company cannot always anticipate or assume responsibility for:
- Unexpected variations in ground conditions. The potential for this will depend partly on bore spacing and sampling frequency.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of contractors responding to commercial pressures.

If these occur, the company will be pleased to assist with investigation or advice to resolve the matter.

Site Anomalies
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the company request immediate notification. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

Reproduction of Information for Contractual Purposes
Attention is drawn to the document “Guidelines for the Provision of Geotechnical Information trader Documents”, published by the Institute of Engineers Australia. Where information obtained for this investigation is provided for tender purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The Company would be pleased to assist in this regard and/or make additional copies of the report available for contract purpose, at a nominal charge.

Site Inspection

The Company will always be pleased to provide engineering inspection services for geotechnical aspect of work to which this report is related. This could range from a site visit to confirm that the conditions exposed are as expected, to full time engineering presence on site

Review of Design
Where major civil or structural developments are proposed, or where only a limited investigation has been completed, or where the geotechnical conditions are complex, it is prudent to have the design reviewed by a Senior Geotechnical Engineer.