Appendix H: PID Calibration Certificate

Appendix I: Waterloo Sample Construction and Method

Appendix J: EPA Public Register Information

enr 1003/95

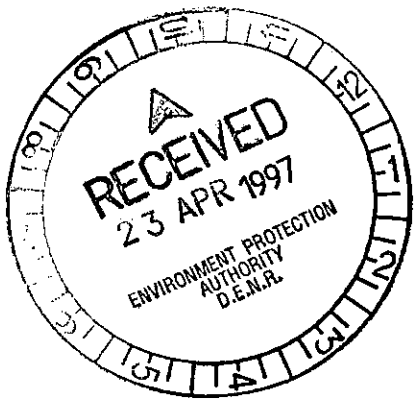
403

CONSULTING ENGINEERS

BC TONKIN & ASSOCIATES

CIVIL / STRUCTURAL / LOCAL GOVERNMENT / ENVIRONMENTAL / BUILDING SURVEYING / TRANSPORTATION
55 Queen Street Adelaide South Australia 5000 / Facsimile (08) 223 5237 Telephone (08) 223 5583

97.0307/AMDH/DI



18 April 1997

Mr Lee Morgan
Environment Protection Officer
Environment Protection Authority
GPO Box 2607
ADELAIDE SA 5001

Dear Lee

FRANKLIN STREET BUS STATION, ADELAIDE
ADVICE OF ENGAGEMENT AS ENVIRONMENTAL AUDITOR

This to inform you that I have been engaged as Environmental Auditor for the above site. Details are as follows:

1. SITE IDENTIFICATION

The address of the site is 85-129 Franklin Street, Adelaide, SA 5000.

The site comprises two parcels of land located on the eastern and western sides of Bowen Street with frontages to Franklin Street. Each of the parcels comprises a number of allotments which are described under different Certificates of Title as follows:

a) Eastern side of Bowen Street

CT Reference, Volume / Folio	Land Description
226/124	Town Acre 263
1639/119	Town Acre 310
1663/99	Town Acre 309
1751/37	Town Acre 311
1922/48	Town Acre 263
5060/608	Allotment 1 in DP 32560
5317/61	Allotment 12 in DP 546
5317/62	Allotment 91 in FP 166443
5317/63	Allotment 92 in FP 166444
5317/64	Allotment 93 in FP 166445
5317/65	Allotment 91 in FP 170401

b) Western side of Bowen Street

CT Reference, Volume / Folio	Land Description
2023/96	Town Acre 311
2128/45	Town Acre 311
2201/187	Town Acre 311
3479/180	Town Acre 261& 262
3582/78	Town Acre 261
3582/79	Town Acre 262
3582/80	Town Acre 261& 262
3841/122	LTRO Plan 546

The total area of the site is approximately 1.41 hectares.

2. NAME OF PERSON REQUESTING SITE AUDIT REPORT

Mr Matthew Adcock, the Corporation of the City of Adelaide.

3. COUNCIL AREA

The Corporation of the City of Adelaide.

4. NAME OF PRIMARY CONSULTANT

Rust PPK, contact: Mr Stuart Taylor.

5. PREVIOUS, CURRENT AND INTENDED LAND USE

Previous uses of the site have been mainly residential, with known commercial premises and small light industries including a factory, garages, forges, stables, printing works, workshops, shops, offices, bakehouse and a private road.

There are currently a number of passenger and freight operators on the site, including those associated with bus transport. The Corporation of the City of Adelaide also operates two public car parks on the site.

Possible future land uses include high density residential development.

6. ANTICIPATED COMPLETION DATE

At this stage, the completion date is expected to be 30 June 1997.

I trust that this information is sufficient for your requirements at this stage.

If you have any queries or comments regarding this advice, please contact me on (08) 8223 5583.

Yours faithfully
BC TONKIN & ASSOCIATES

A.M.D. Hall

AMD Hall, MIE Aust
Chartered Professional Engineer
Associate Director

10016 - Vol: 1 of 1

Corporation of the City of Adelaide

FRANKLIN STREET BUS STATION AND CAR PARKS

SITE AUDIT REPORT

Report No. 97.0307/1 **31 July 1997**

BC TONKIN & ASSOCIATES
Consulting Engineers
55 Queen Street
ADELAIDE SA 5000

ACN 007 860 586

Telephone: (08) 8223 5583
Facsimile: (08) 8223 5237
Email: reception@bctonkin.com.au

Corporation of the City of Adelaide
Franklin Street Bus Station and Car Parks
Site Audit Report

CONTENTS

	Page
1. SUMMARY INFORMATION	1
2. INTRODUCTION	4
3. SUMMARY OF ENVIRONMENTAL SITE ASSESSMENT	6
3.1 Background Studies	6
3.1.1 Site Identification and Description	6
3.1.2 Site History	6
3.1.3 Geology and Hydrogeology	7
3.1.4 Potential Site Contamination Issues	7
3.2 Site Investigations	7
3.2.1 Soil Sampling	7
3.2.2 Soil Conditions Encountered	8
3.2.3 Laboratory Analysis Programme	8
3.2.4 Field Observations and Headspace Analysis	9
3.2.5 Assessment Criteria	9
3.2.6 Contamination Assessment Results	10
3.2.7 Quality Assurance/Quality Control (QA/QC)	10
3.2.8 Data Validation	10
3.2.9 Findings and Conclusions	11
3.2.10 Recommendations	12
4. AUDITOR REVIEW OF ENVIRONMENTAL SITE ASSESSMENT	14
4.1 General	14
4.2 Background Studies	14
4.3 Sampling Frequency	14
4.4 Laboratory Analysis Programme	15
4.5 Assessment Criteria	15
4.6 Quality Assurance/Quality Control (QA/QC)	16
4.7 Findings and Recommendations	17
5. CONCLUSIONS	18
6. REFERENCES	22

APPENDICES

A. Rust PPK Pty Ltd, 1997, *Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide,* for the Corporation of the City of Adelaide, 6 March 1997

B. Rust PPK Pty Ltd, 1997, *Environmental Site Assessment, Franklin Street Bus Station and Car Parks,* for the Corporation of the City of Adelaide, 30 June 1997

1. SUMMARY INFORMATION

This audit report has been prepared for the Franklin Street Bus Station and Car Parks, located at 85-129 Franklin Street, Adelaide (see Location Plan, Figure 1.1). The report has been prepared in accordance with guidelines provided in the South Australian Environment Protection Authority (EPA) Special Bulletin No. 1, 20 October 1995, *The Use of Environmental Auditors: Contaminated Land,* and the Victorian Environment Protection Authority (VicEPA) *Guidelines for Environmental Auditors Contaminated Land, Issue of Certificates of Environmental Audit,* WH 91/14, May 1992.

The Site Audit Report is based on site conditions at the time of issue of the report. The environmental auditor cannot be responsible for future activities on the site, or off site impacts, which may result in subsequent contamination of the site.

The purpose of the Site Audit Report is to present the auditor's opinion on the environmental condition of the site.

Summary information is set out as follows:

- **Name of auditor**

  Mr Adrian Hall of BC Tonkin & Associates

- **Date of appointment as an Accredited Environmental Auditor under the Environment Protection Authority Act, 1970, Victoria**

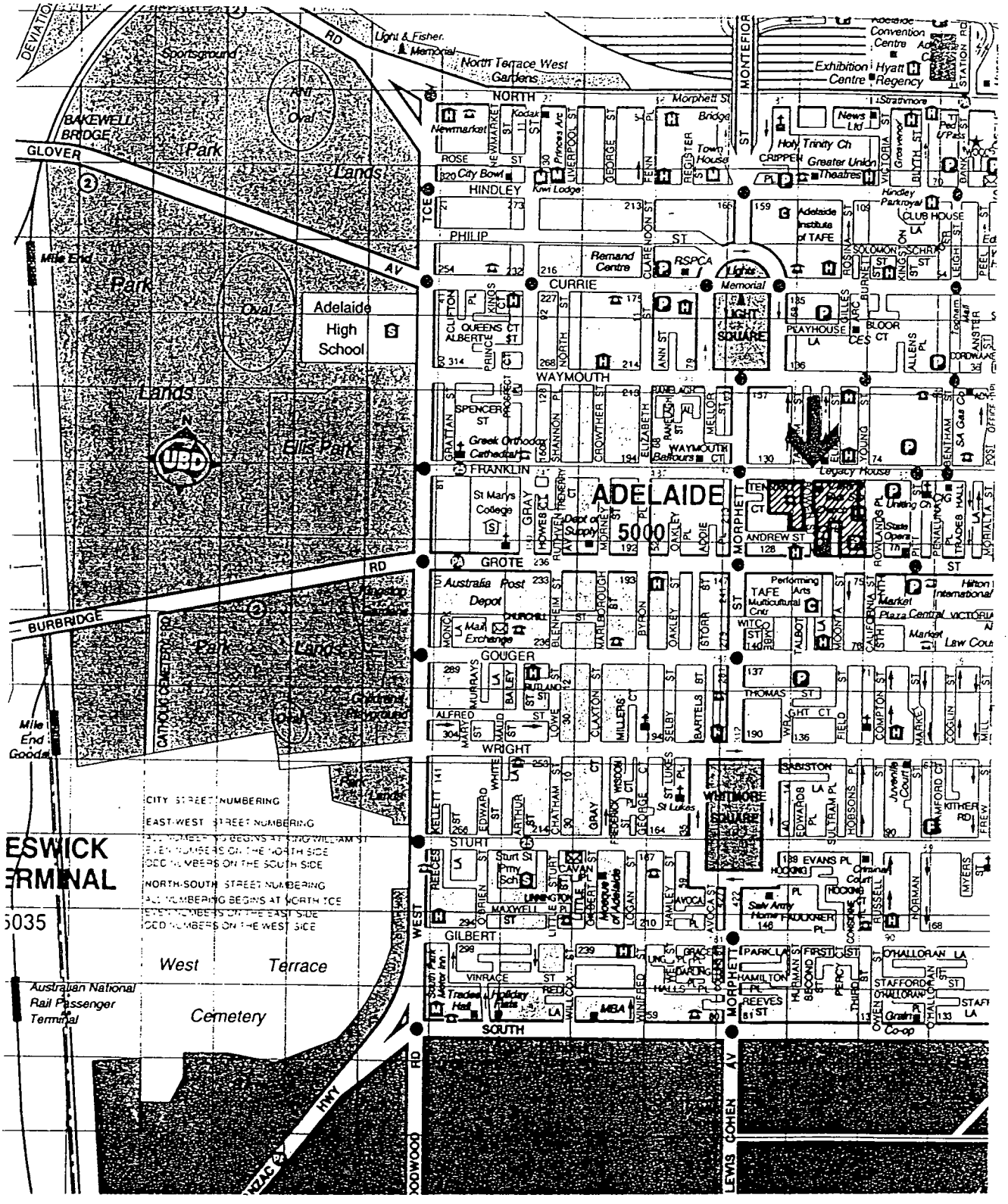
  7 January 1997

- **Name of person making a request for a Site Audit Report**

  Mr Brian Fitzpatrick, Corporation of the City of Adelaide

- **Address of the site being audited**

  85-129 Franklin Street, Adelaide



MAP COURTESY OF UNIVERSAL PRESS

Figure 1-1

CORPORATION OF THE CITY OF ADELAIDE

FRANKLIN STREET BUS STATION AND CARPARKS
SITE AUDIT REPORT
LOCATION PLAN

JOB No	97.0307
SCALE	N.T.S.
DRAWN	A.M.
CHECKED	A.M.D.H.
DATE	July 1997
	A4

B.C. TONKIN & ASSOCIATES
CONSULTING ENGINEERS
55 QUEEN STREET, ADELAIDE, 5000
TELEPHONE 223 5583 FAX 223 5237

- **Lands Title Information**

Allotment details are as follows:

Eastern Side of Bowen Street

Certificate of Title	Part Town Acre/Plan No	Area (m^2)
Volume 226, Folio 124	Town Acre 263	1983.80
Volume 1639, Folio 119	Town Acre 310	2760.50
Volume 1663, Folio 99	Town Acre 309	83.60
Volume 1751, Folio 37	Town Acre 311	648.80
Volume 1922, Folio 48	Town Acre 263	986.26
Volume 5060, Folio 608	Allotment 1 in DP 32560	580.00
Volume 5317, Folio 61	Allotment 12 in DP 546	149.60
Volume 5317, Folio 62	Allotment 91 in FP 166443	348.69
Volume 5317, Folio 63	Allotment 92 in FP 166444	271.50
Volume 5317, Folio 64	Allotment 93 in FP 166445	526.90
Volume 5317, Folio 65	Allotment 91 in FP 170401	816.37
	TOTAL	**9156.02**

Western Side of Bowen Street

Certificate of Title	Part Town Acre/Plan No	Area (m^2)
Volume 2023, Folio 96	Town Acre 311	260.67
Volume 2128, Folio 45	Town Acre 311	257.80
Volume 2201, Folio 187	Town Acre 311	259.70
Volume 3479, Folio 180	Town Acres 261 & 262	1744.00
Volume 3582, Folio 78	Town Acre 261	509.70
Volume 3582, Folio 79	Town Acre 262	490.04
Volume 3582, Folio 80	Town Acres 261 & 262	1122.90
Volume 3841, Folio 122	LTRO Plan 546	340.60
	TOTAL	**4985.41**

- **Land Use Zoning**

The site is part of the F8 Franklin Street East Precinct

- **Names of current site owner and occupier**

The Corporation of the City of Adelaide

- **Documentation reviewed**

  Rust PPK Pty Ltd, 1997, *Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide,* for the Corporation of the City of Adelaide, 6 March 1997

  Rust PPK Pty Ltd, 1997, *Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide,* for the Corporation of the City of Adelaide, 30 June 1997

2. INTRODUCTION

Mr Adrian Hall of BC Tonkin & Associates has been appointed by the Corporation of the City of Adelaide to act as an environmental auditor for the Franklin Street Bus Station and Car Parks.

The site is described on the current Certificates of Titles as listed above. The current Certificates of Title show the site to be owned by the Corporation of the City of Adelaide.

The site contains the following features

Eastern Side of Bowen Street

- the Greyhound and McCafferty's Express bus terminals and canopy, on the north eastem side of Bowen Street (referred to collectively as 'Bus Depot 1')

- a single storey house, a private car park, a toilet block and a two storey building and adjacent car park, all utilised by the Adelaide Central Mission, on the eastern side of Bowen Street, in the south of the site (referred to collectively as '104 Grote Street')

- two bitumen sealed public car parks in the east of the site, owned and operated by the Corporation of the City of Adelaide (referred to as the Grote Street Car Park and the Franklin Street Car Park, respectively)

Western Side of Bowen Street

- the Premier Stateline bus terminal, canopy and private car park on the north west of the site (referred to collectively as 'Bus Depot 2')

- the Coachfreight parcel collection and drop off point, including storage shed, on the west of the site

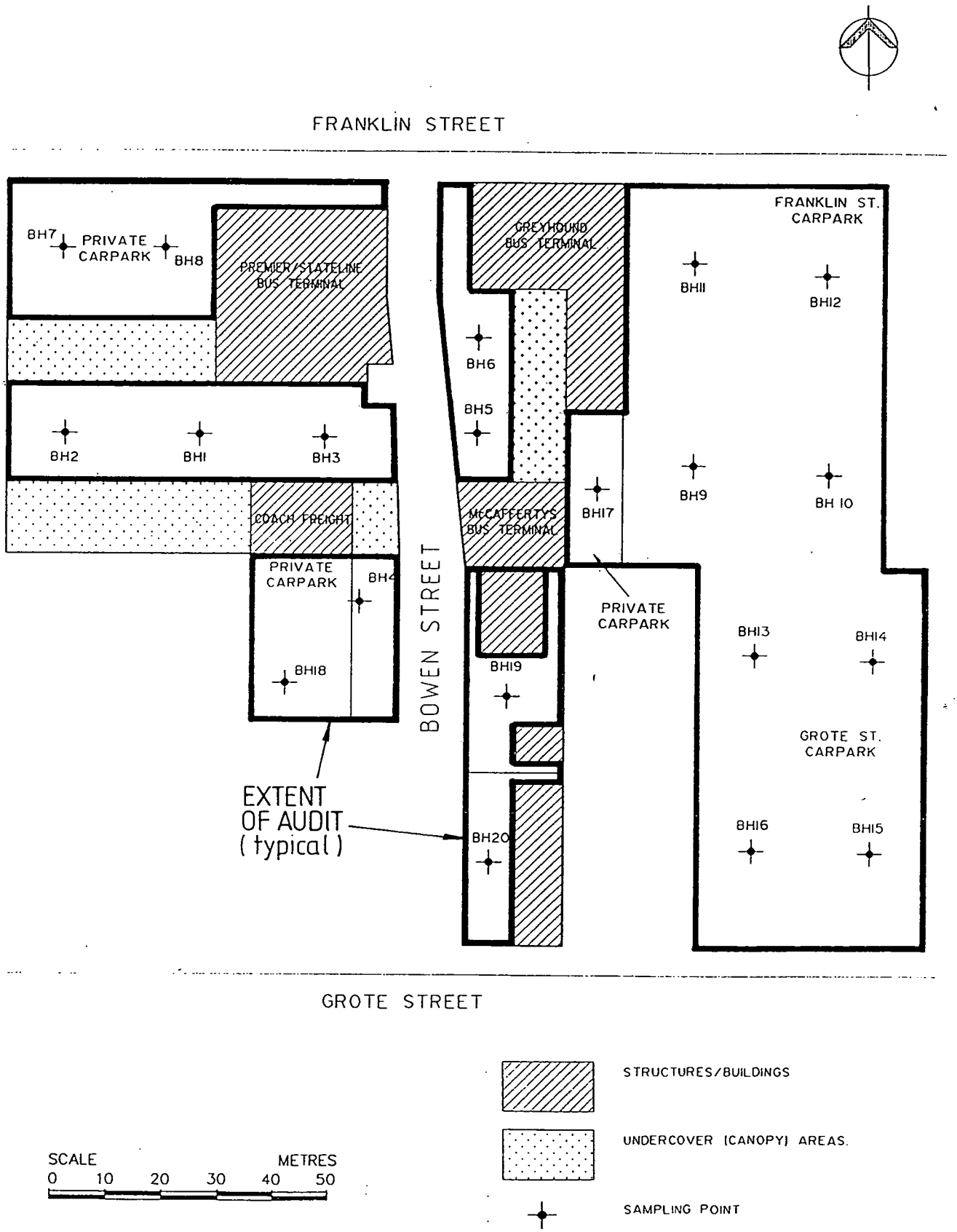
- a bitumen sealed private car park in the south west of the site

A Site Plan, including sampling locations, is given in Figure 2.1.

The extent of the audit is also shown on Figure 2.1. It should be noted that as no soil testing was undertaken under the canopies, or under the floor slabs of the buildings, the extent of this audit has necessarily been confined to the open space areas of the site, with a total areal extent of approximately 0.98 hectares.

The site is surrounded by the following properties

- Dreamland Furniture and a disused warehouse to the east
- light industrial facilities to the west
- Franklin Street to the north
- Andrews Street, the Grote Street Church of Christ and Grote Street to the south.



SOURCE: RUST PPK DRAWING No. 27J097A4

Figure 2.1

CORPORATION OF THE CITY OF ADELAIDE

FRANKLIN STREET BUS STATION AND CARPARKS
SITE AUDIT REPORT
SITE PLAN

JOB No	97.0307
SCALE	1:1000
DRAWN	A.M.
CHECKED	A.M.D.H.
DATE	July 1997

B.C. TONKIN & ASSOCIATES
CONSULTING ENGINEERS
55 QUEEN STREET, ADELAIDE, 5000
TELEPHONE 223 5583. FAX 223 5237

A4

Further background information on the Franklin Street Bus Station and Car Parks site is contained in the Site History Report prepared by Rust PPK. A copy of the document is provided in Appendix A.

Rust PPK Pty Ltd was commissioned by the Corporation of the City of Adelaide to undertake a comprehensive environmental assessment of the Franklin Street Bus Station and Car Parks site. The results of this work have been reported in the following document:

> Rust PPK Pty Ltd, 1997, *Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide,* for the Corporation of the City of Adelaide, 30 June 1997

A copy of the above document is provided in Appendix B. The assessment report should be read in conjunction with this audit.

The role of BC Tonkin & Associates in the audit of this site involved

- inspections of the site
- liaison with Rust PPK during their investigations
- assessment of the information provided in the above report.

No additional fieldwork was conducted by BC Tonkin & Associates during this audit.

3. SUMMARY OF ENVIRONMENTAL SITE ASSESSMENT

3.1 Background Studies

3.1.1 Site Identification and Description

This section of the assessment carried out by Rust PPK consisted of the following components

- site identification
- site description
- site ownership
- site topography
- local soil types
- local and regional groundwater.

Site identification and ownership have been described in Section 2.

The Rust PPK report provides comment on site topography and local soil types.

Comments on soil types and groundwater are provided in Section 3.1.3.

3.1.2 Site History

The site history section of the assessment incorporates the following elements

- historical overview
- summary of potential site contamination issues.

According to the site history prepared by Rust PPK

- from 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises, including a garage, forge, workshop, bakehouse, and a private road

- from the 1920s a number of small light industries were established on the site; these included a factory, garages, forges, stables, printing works, workshops, shops and offices

- during the 1960s a large proportion of the residential land in the western part of the site had been cleared, and was used as an open lot car park

- by 1972 the Corporation of the City of Adelaide had acquired most of the land comprising the site, except for 104 Grote Street; the land was then cleared, and by 1979 the majority of the existing bus terminals and car parks had been constructed

- the residences on the 104 Grote Street site were acquired by the Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission; the

front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking

- between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.

3.1.3 Geology and Hydrogeology

The Rust PPK report suggests that the soil profile at the site can be expected to include in the order of 1.0 m of surface fill, consisting of various reworked soils and building rubble. Underlying this the profile is likely to resemble a Brown Solonised Soil Type BS classification. Such profiles consist of brown sandy to clayey soils with abundant earthy lime and calcrete in the subsoil. Such soils vary from a thin layer to up to 3 m thick, and the layer overlies Hindmarsh Clay.

MESA records indicate regional standing groundwater levels at depths ranging from approximately 6 m to up to 40 m. No groundwater was encountered during the on-site drilling programme to a maximum depth of 2.3 m.

3.1.4 Potential Site Contamination Issues

Based on information obtained from the Site History investigation, Rust PPK considered that the following potential contamination may be present on site as a result of past on-site and adjacent activities

- Polycyclic Aromatic Hydrocarbon (PAH) contamination from the tar based subbase materials that may have been used beneath bitumen in the past, and from possible waste products associated with coal fires or furnaces

- Organochlorine Pesticide (OCP) contamination from the possible use of white ant treatments beneath former buildings

- possible petroleum contamination from the leakage of fuel or oil from vehicles

- possible heavy metal contamination from activities associated with a plumbing business, forging, oxy-welding, radio and electrical companies, wrecking and auto-mechanics or printing works, all of which existed on the site in the past.

3.2 Site Investigations

3.2.1 Soil Sampling

Rust PPK's sampling locations were based on a nominal grid across the site, and comprised 20 boreholes (refer to Figure 2.1). Sampling locations were agreed on site between Rust PPK and the auditor.

In general, 3 - 4 soil samples were collected from the top 1.0 m of the soil core, with an additional 1 - 3 samples recovered between 1.0 m and 2.0 m, and 1 sample below 2.0 m if the

borehole was drilled past 2.0 m. The specific sample depths were however dependent on the soil profile at each location.

3.2.2 Soil Conditions Encountered

Rust PPK reported that the soil conditions encountered during drilling could be summarised as follows

fill materials

- surface layer of yellow silty sand with some gravel overlying dark brown silty clays to depths ranging from 0.5 m to 1.2 m
- brick fragments and cinders in 13 out of the 20 boreholes, and fragments of vesicular slag were identified in one of the boreholes

natural sediments

- calcareous silty clays with some calcareous gravel to about 2.0 m
- at some boreholes the soil became greenish brown at around 2.0 m as it became Hindmarsh Clay.

Environmental soil monitoring borelogs are presented in Appendix D of the Rust PPK report. A site plan showing the approximate area of fill materials containing ash, cinders and/or slag is contained in Appendix E of the Rust PPK report.

3.2.3 Laboratory Analysis Programme

A total of 22 soil samples was submitted to the primary laboratory (AGAL) for analysis. 2 inter-laboratory duplicates were sent to the secondary laboratory (MGT) for analysis.

The samples were analysed for a range of chemical analytes, including

- pH
- heavy metals
- polycyclic aromatic hydrocarbons (PAHs)
- organochlorine pesticides (OCPs)
- total petroleum hydrocarbons (TPH)
- monocyclic aromatic hydrocarbons (BTEX)
- polychlorinated biphenyls (PCBs), phenols, chlorinated hydrocarbons, cyanide, fluoride.

Table 3.1 shows the full range of soil samples taken from each borehole, and the chemical analytes for each sample analysed.

In particular, 2 field duplicate samples and the 2 inter-laboratory duplicate samples were analysed for the full Victorian EPA screen.

The primary laboratory was Australian Government Analytical Laboratories (AGAL).

TABLE 3.1 SUMMARY OF SAMPLING AND ANALYSIS

Borehole	Sample	Min	Max	Soil Type	Field Claaa	pH	Sb	As	Ba	Cd	Cr tot	Cr VI	Co	Cu	Pb	Mn	Hg	Mo	NI	Se	Sn	Zn	PAHs	OCPa	PCBs	BTEX	TPH	Phenols	Flouride	Cyanide	VOC	Cresols
BH1		60	300	FILL	0	x		x		x	x			x	x		x					x										
		40	500	FILL	0																											
		800	1000	Silty Clay	0																											
		1400	1550	Silty Clay	0																											
		2000	2100	Silty Clay	0																											
	D	2000	2100	Silty Clay	0																											
BH2		100	300	FILL	0																											
	D	100	300	FILL	0																											
		400	500	FILL	0																											
		800	1000	Silty Sandy Clay	0																											
		1350	1500	Silty Sandy Clay	0																											
		1800	2000	Silty Clay	0			x		x	x			x	x		x					x										
BH3		100	300	FILL	0																											
	D	100	300	FILL	0																											
		400	500	FILL	0																											
		800	1000	Silty Clay	0	x		x		x	x			x	x		x					x										
		1400	1550	Silty Clay	0																											
		2000	2100	Silty Clay	0																											
BH4		100	300	FILL	0																											
		450	600	FILL	1		-x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	
	D - BD2?	450	600	FILL	1																											
		800	1000	FILL	1																											
		1550	1700	Silty Clay	0																											
		2000	2100	Silty Clay	0																											
BH5		100	300	FILL	0																											
		400	500	FILL	0																											
	D	400	500	FILL	0	/																										
		700	800	FILL	1	/																										
		800	1000	Silty Clay	0	x																	x									
		1350	1500	Silty Clay	0																											
		1700	1800	Silty Clay	0																											
		2000	2100	Silty Clay	0																											
BH6		100	300	FILL	0																											
		400	500	FILL	0																											
		650	750	FILL	1	x		x		x	x			x	x		x					x	x									
		1000	1200	Silty Clay	0																											
	D	1000	1200	Silty Clay	0																											
		1700	1800	Clay	0																											
BH7		100	300	FILL	0																											
		400	500	FILL	0	x-		x		x	x			x	x		x					x										
		800	1000	Silty Clay	0																											
		1350	1500	Silty Clay	0																											
	D	1350	1500	Silty Clay	0																											
		1800	2000	Silty Clay	0																											
BH8		100	300	FILL	0																											
		400	500	FILL	0																											
	D	400	500	FILL	0																											
		800	1000	Silty Clay	0	x		x		x	x			x	x		x					x										
		1350	1550	Silty Clay	0																											
		1800	2000	Silty Clay	0																											
BH9		100	300	FILL	0																											
		350	500	FILL	0																											
		700	900	Silty Clay	0																											
	D	700	900	Silty Clay	0																											
		1300	1450	Silty Clay	0																											
		2000	2100	Silty Clay	0			x		x	x			x	x		x					x										
BH10		100	300	FILL	0																											
		350	500	FILL	0																											
		700	850	Silty Clay	0	x		x		x	x			x	x		x					x										
	D	700	850	Silty Clay	0																											
		1000	1200	Silty Clay	0																											
		1400	1550	Silty Clay	0																											
		1800	2000	Silty Clay	0																											

TABLE 3.1 SUMMARY OF SAMPLING AND ANALYSIS

Borehole	Sample	Min	Max	Soil Type	Field Class	pH	Sb	As	Ba	Cd	Cr tot	Cr VI	Co	Cu	Pb	Mn	Hg	Mo	Ni	Se	Sn	Zn	PAHs	OCPs	PCBs	BTEX	TPH	Phenols	Fluoride	Cyanide	VOC	Cresols
BH11		100	300	FILL	0																											
		350	500	FILL	0																											
	D	350	500	FILL	0																											
		800	1000	Silty Clay	0	x		x		x	x			x	x		x					x										
		1300	1450	Silty Clay	0																											
		1800	2000	Silty Clay	0																											
BH12		150	300	FILL	0																											
		550	700	FILL	1	x		x		x	x			x	x		x					x	x									
	D	550	700	FILL	1		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		850	1000	Silty Clay	0																											
		1550	1700	Silty Clay	0																											
		1850	2000	Silty Clay	0																											
BH13		50	150	FILL	0																											
		200	350	FILL	0																											
		350	500	FILL	0																											
		700	900	FILL	1		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	
	D - BD6?	700	900	FILL	1																											
		1350	1500	Silty Clay	0																											
		1800	2000	Silty Clay	0																											
BH14		50	150	FILL	0																											
		150	300	FILL	1																											
		550	700	FILL	1	x		x		x	x			x	x		x					x	x									
		700	850	FILL	0																											
		1000	1200	FILL	0																											
		1850	2000	Silty Clay	0																											
	D	1850	2000	Silty Clay	0																											
BH15		150	300	FILL	0																											
		300	500	FILL	0																											
		700	850	Silty Clay	0	x		x		x	x			x	x		x					x										
	D	700	850	Silty Clay	0		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		1500	1600	Silty Clay	0																											
		2000	2100	Silty Clay	0																											
BH16		100	300	FILL	0																											
	D	100	300	FILL	0																											
		400	500	FILL	1	x		x		x	x			x	x		x					x	x									
		850	1000	Silty Clay	0																											
		1750	1850	Silty Clay	0																											
BH17		100	300	FILL	0																											
		350	500	FILL	0																											
	D	350	500	FILL	0																											
		800	1000	Silty Clay	0	x		x		x	x			x	x		x					x										
		1800	2000	Silty Clay	0																											
BH18		50	150	FILL	0																											
		150	300	FILL	0																											
		400	500	FILL	1	x																	x									
		800	1000	Silty Clay	0																											
		1450	1600	Silty Clay	0																											
		2150	2300	Silty Clay	0																											
BH19		100	300	FILL	0																											
		550	700	FILL	1	x		x		x	x			x	x		x					x	x			x	x					
		950	1100	Silty Clay	0																											
		1850	2000	Silty Clay	0																											
BH20		50	200	FILL	1	x		x		x	x			x	x		x					x	x			x	x					
		200	350	FILL	0																											
		450	550	FILL	1																											
	D	450	550	FILL	1																											
		850	1000	Silty Clay	0																											
		1800	1950	Silty Clay	0																											
	BD2					x		x		x	x			x	x		x					x	x									
	BD6					x		x		x	x			x	x		x					x										
	ER1							x		x	x			x	x		x					x	x			x	x					
	ER2							x		x	x			x	x		x					x	x			x	x					
				Number of Samples Analysed		18	4	24	4	24	24	4	4	24	24	4	24	4	4	4	4	24	15	4	4	8	8	4	2	2	4	2

The secondary laboratory was MGT Environmental Consulting Pty Ltd (MGT).

Both laboratories are NATA certified for all the nominated soil analyses.

3.2.4 Field Observations and Headspace Analysis

Rust PPK have advised that during the drilling and sampling programme, headspace testing was undertaken on soil from various depths at the majority of the boreholes drilled. A second set of between 2 and 5 samples was collected from each borehole, and transferred to labelled, resealable plastic bags. These samples were then left for approximately 20 minutes before the headspace analysis was undertaken, to determine the presence of volatile organic hydrocarbons, using a photoionisation detector (PID).

Due to operational difficulties with the PID during the sampling programme, PID readings were not taken at every borehole.

Rust PPK advised that the concentrations of VOCs detected by the PID were generally quite low (< 20 ppm); however, where the concentrations detected were elevated (e.g. > 50 ppm), the soil sample from around that depth was analysed for TPH/BTEX.

No visible or olfactory evidence of hydrocarbon contamination was recorded within the surface or subsurface soils at any of the boreholes.

3.2.5 Assessment Criteria

For the purpose of assessing potential long term human health risks, Rust PPK adopted the SAHC (1993) Health Investigation Levels as the initial investigation levels.

For the purpose of assessing potential environmental risks, Rust PPK adopted the ANZECC/NH&MRC (1992) Environmental Investigation Levels as the initial investigation levels.

As a preliminary aid in the evaluation of site specific health based risk analysis, the SAHC (1996) Proposed Health Based Soil Guidelines were used as reference criteria.

For the purpose of the preliminary contamination assessment, the criteria nominated within SAHC (1993) and ANZECC/NH&MRC (1992) were referenced as the primary assessment criteria.

For the purpose of the preliminary health risk assessment, the SAHC (1996) Proposed Health Based Soil Guidelines Exposure Settings D (residential with restricted soil access) and F (commercial/industrial) were used as the reference criteria.

In the case of analytes not covered by the nominated criteria, the Dutch Investigation and Intervention values were referenced. The former Dutch C levels and the NSW EPA Guidelines for Assessing Service Station Sites were used as guidelines for TPH/BTEX.

3.2.6 Contamination Assessment Results

Laboratory results from the soil analyses are presented in tabulated form in Appendix H of the Rust PPK report. Full certified laboratory test reports are provided in Appendix I of the Rust PPK report.

Selected results are presented in Table 3.2, in which they are compared against the various assessment criteria.

3.2.7 Quality Assurance/Quality Control (QA/QC)

QA/QC sampling and analysis procedures are documented in the Rust PPK report.

Of the 24 soil samples analysed, 2 were a blind field duplicates, and 2 were inter-laboratory duplicates.

In addition 2 equipment rinsate samples were analysed, as a check on the push tube decontamination procedures.

The laboratory QC programme comprised surrogate recoveries and replicate analyses.

3.2.8 Data Validation

Rust PPK assessed all analytical data for soil to ensure validation. Results of internal laboratory QC checks, including the results of surrogate recoveries and replicate analyses, are included within the Laboratory reports in Appendix I of the Rust PPK report. Tabulated results of all laboratory replicate analyses and field duplicate analyses are presented in Appendix J of the Rust PPK report.

The precision of the results for each analyte for both the laboratory replicate and field duplicate samples was determined by calculating the relative percentage difference (RPD) between the replicates and duplicates. The acceptance criterion for laboratory replicates was set at an RPD of 20%; the acceptance criterion for field duplicates was set at an RPD of 30%. These criteria were based on Rust PPK QA protocols, which were developed with regard to USEPA regulations. The percentage RPD values for the laboratory replicates and the field duplicates are presented in Appendix K of the Rust PPK report.

In order to obtain a measure of the overall precision, a relative standard deviation (RSD) was determined for each analyte. This involved normalising each sample result and the corresponding replicate/duplicate results, and then calculating the standard deviation of the complete set of normalised values for that analyte. The RSD was calculated as a percentage and is included in Appendix K of the Rust PPK report. For soil sampling programmes an RSD below 30% is considered satisfactory.

Table 3.2 Laboratory Results : Soil - pH, Heavy Metals, PAHs

Contaminents (mg/kg)	Detection Limit (mg/kg)	Assessment Criteria: ANZECC/ NHMRC[1]	ANZECC/ NHMRC[2]	SAHC HIL[3]	NEHF[4] D	NEHF[5] F	Borehole No	BH1	BH2	BH3	BH4		BH5	BH6	BH7	BH8	BH9	BH10	BH11	BH12	
							Sample No														
							Sample Depth (min)	60	1800	800	450	450	800	850	400	800	2000	700	800	550	550
							Sample Depth (max)	300	2000	1000	600	800	1000	750	500	1000	2100	850	1000	700	700
							Soil Type	FILL	FILL	FILL	FILL	FILL LR	Silty Clay	FILL	FILL	Silty Clay	Silty Clay	Silty Clay	Silty Clay	FILL	FILL ILD
							QA/QC														
pH	0.1			>5 <9				9.5[3]	-	9.5[3]	-	-	9.5[3]	9.8[3]	9.8[3]	10[3]	-	8.8	9.3[3]	9.2[3]	-
Metals																					
Antimony	5	-	20	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	<10
Arsenic	5	100	20	100	400	500		nd	9.4	7.4	7.6	7.5	-	5.6	nd	10	9.3	5	8.9	nd	2.8
Beryllium	1	-	-	-	80	100		-	-	-	1.2	1.2	-	-	-	-	-	-	-	-	<2
Cadmium	1	20	3	20	80	100		nd	nd	nd	nd	nd	-	nd	nd	nd	nd	nd	nd	nd	<0.5
Chromium	2	-	50	-	-	-		9.2	29	31	31	29	-	22	13	17	18	46	11	29	26
Cobalt	1	-	-	-	-	-		-	-	-	8	7.6	-	-	-	-	-	-	-	-	8.5
Copper	2	-	60	100	4,000	5,000		9.5	7	7.3	32	28	-	24	4.8	9	5.5	18	5.7	10	14
Lead	5	300	300	300	1,200	1,500		nd	7.5	10	448[1,2,3]	670[1,2,3]	-	4	nd	5.3	5.3	13	nd	11	14
Manganese	10	-	500	-	6,000	7,500		-	-	-	200	nd	-	-	-	-	-	-	-	-	220
Mercury	0.5	-	1	2	60	75		nd	nd	nd	nd	nd	-	nd	nd	nd	nd	nd	nd	nd	<0.1
Molybdenum	5	-	-	-	-	-		-	-	-	-	nd	-	-	-	-	-	-	-	-	<10
Nickel	1	-	60	-	2,400	3,000		-	-	-	15	14	-	-	-	-	-	-	-	-	14
Selenium	5	-	-	-	-	-		-	-	-	nd	nd	-	-	-	-	-	-	-	-	<0.5
Tin	2	-	50	-	-	-		-	-	-	28	28	-	-	-	-	-	-	-	-	<10
Zinc	2	-	200	500	28,000	35,000		8.7	19	21	280[2]	270[2]	-	89	17	15	14	30	9.8	17	28
Polycyclic Aromatic Hydrocarbons																					
Benzo(a)pyrene	0.1	1	-	1	4	5		-	-	-	0.1	-	nd	0.8	-	-	-	-	-	nd	<0.1
Total PAHs	0.1	20	-	20	60	100		-	-	-	nd	-	nd	5.3	-	-	-	-	-	nd	-

Notes:

1 - Table 1, Proposed Health Investigation Levels (ANZECC/NHMRC, 1992).
2 - Table 2, Environmental Soil Quality Guidelines - Environmental Investigation Levels (ANZECC/NHMRC, 1992).
3 - South Australian Health Commission (SAHC) Investigation Levels (SAHC 1993)
4 - NEHF Health Based Investigation Level Soil Guidelines, According to Exposure Setting D (Landuse), SAHC 1996
5 - NEHF Health Based Investigation Level Soil Guidelines, According to Exposure Setting F (Landuse), SAHC 1996
446 [1,2,3] the raised numbers indicate the guideline exceeded

nd - below AGAL detection limits
- - not analysed
ILD - Interlaboratory duplicate
LR - laboratory repeat

Table 3.2 Laboratory Results : Soil - pH, Heavy Metals, PAHs

Contaminents (mg/kg)	Detection Limit (mg/kg)	Aeeeesment Criterie: ANZECC/ NHMRC[1]	ANZECC/ NHMRC[2]	SAHC HIL [3]	NEHF [4] D	NEHF [5] F	Borehole No	BH13		BH14	BH15		BH16	BH17	BH16	BH19	BH20	BD2	BD6	
							Semple No	700	700	550	700	700	400	800	400	550	50			
							Semple Depth (mln)	900	900	700	850	650	500	1000	500	700	200			
							Semple Depth (mex)	FILL	FILL	FILL	Silty Cley	Silty Clay	FILL	FILL	FILL	FILL	FILL			
							Soil Type		LR			ILD						BH4/D ?	BH13/D ?	LR
							QA/QC													
pH	0.1			>5 <9				-	-	11 [3]	9.3 [3]	-	9.7 [3]	9.8 [3]	9.4 [3]	9.1 [3]	9.5 [3]	9.2 [3]	8.9	-
Metals																				
Antimony	5	-	20	-	-	-		-	-	-	-	<10	-	-	-	-	-	-	-	-
Arsenic	5	100	20	100	400	500		5.1	nd	19	nd	2.8	9.5	11	-	nd	7.8	8.5	nd	5
Beryllium	1	-	-	-	80	100		1.1	1.2	-	-	<2	-	-	-	-	-	-	-	-
Cedmium	1	20	3	20	80	100		nd	nd	nd	nd	<0.5	nd	nd		nd	nd	nd	nd	nd
Chromium	2	-	50	-	-	-		29	29	18	28	28	29	13		23	33	28	33	34
Cobelt	1	-	-	-	-	-		7.7	8.1	-	-	9.4	-	-	-	-	-	-	-	-
Copper	2	-	60	100	4,000	5,000		18	18	450 [2,3]	9.9	18	10	7.3	-	8.9	31	34	17	17
Leed	5	300	300	300	1,200	1,500		43	36	1600 [1,3]	11	15	11	nd	-	28	140	440 [1,2,3]	39	34
Mengenese	10	-	500	-	8,000	7,500		260	270	-	-	280	-	-	-	-	-	-	-	-
Mercury	0.5	-	1	2	60	75		nd	nd	nd	nd	<0.1	nd	nd	-	nd	nd	1.8 [2]	nd	nd
Molybdenum	5	-	-	-	-	-		nd	nd	-	-	<10	-	-	-	-	-	-	-	-
Nickel	1	-	60	-	2,400	3,000		15	15	-	-	11	-	-	-	-	-	-	-	-
Selenium	5	-	-	-	-	-		nd	nd	-	-	<0.5	-	-	-	-	-	-	-	-
Tin	2	-	50	-	-	-		2.8	2.8	-	-	<10	-	-	-	-	-	-	-	-
Zinc	2	-	200	500	28,000	35,000		32	32	2000 [2,3]	14	28	21	11	-	17	410 [2]	270 [2]	32	32
Polycyclic Aromatic Hydrocerbone																				
Benzo(e)pyrene	0.1	1	-	1	4	5		nd	0.1	0.1	-	<0.1	nd	-	nd	nd	1.7 [1,3]	nd	-	-
Totel PAHs	0.1	20	-	20	80	100		nd	1.4	nd	-	-	nd	-	nd	nd	15	nd	-	-

3.2.9 Findings and Conclusions

Based on the laboratory results, and field observations, the findings of the environmental site assessment were reported by Rust PPK to be as follows (refer to the Executive Summary of the Rust PPK report):

"The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- *the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);*
- *the north east corner of the Grote Street public car park (BH14); and*
- *the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).*

"An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.

"Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

"The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC environmental guidelines.

"The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

"As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial land uses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both land uses."

3.2.10 Recommendations

The recommendations arising from the environmental site assessment are presented by Rust PPK as follows (refer to Section 5 of the Rust PPK report):

Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

"In accordance with the continued use of these areas for commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within these areas. This recommendation is with the exception of a site specific risk assessment required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

"If these areas of the site are to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials at nine out of the eleven sampling locations in these areas. If this land is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in these areas. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

104 Grote Street

"The investigation program has identified no requirements for any subsequent site characterisation or remedial works within this area (which includes the house, private car park, storage building and adjacent car park) provided the current uses are maintained. If this portion of the site is to be developed for a more sensitive landuse (for example residential), it is recommended that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area, and so

that the soil can be further characterised in those areas not covered in this investigation. Similarly to the other areas of the site, if this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation.

Coachfreight and adjacent car park

"If the current use of the land in this area is to be maintained, there are no requirements for remedial works in this area of the site. This is contingent upon the adequate maintenance and management of the bitumen surfaces. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area. If this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation (as described previously).

Bus Depot 2 (Premier Stateline)

"No contamination was identified in this area (which includes the bus parking area and the car park adjacent the terminal building) and so no remedial works or further site characterisation works are required provided the site use remains as at present. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, in order to further characterise the soil in those areas not covered in this investigation."

4. AUDITOR REVIEW OF ENVIRONMENTAL SITE ASSESSMENT

4.1 General

In order to assess whether the environmental consultant's report is satisfactory, the auditor has to determine whether

- the site history adequately defines the potential contaminants
- the sample density and testing frequency gives a representative picture of site conditions
- the selection of analytes adequately represents the potential contamination
- the selection of acceptance criteria is appropriate.

In determining the condition of the site, the auditor has to give consideration to defining the beneficial uses of the site. This includes issues relating to

- the health and wellbeing of humans, on or off the site
- environmental impacts to flora and fauna
- impacts of soil contamination on surface water and groundwater.

The EPA has indicated that the Site Audit Report should provide a concluding statement incorporating one of the following:

- the condition of the site is such that the site is suitable for unrestricted use

- the condition of the site is such that it is suitable only for certain stated uses; any conditions pertaining to the use of the site must be specified

- the condition of the site presents an unacceptable health and/or environmental risk, and is not suitable for any use unless remediated.

4.2 Background Studies

The background studies conducted by Rust PPK as part of the environmental assessment of the site were assessed by the auditor as being adequate to determine the potential for site contamination.

4.3 Sampling Frequency

A total of 20 soil boreholes was drilled to up to 2.3 m depth. This is equivalent to an average nominal grid spacing of about 22 m across the site.

The overall sampling frequency (i.e. the borehole spacing and the selection of samples) is considered by the auditor to be acceptable.

4.4 Laboratory Analysis Programme

The analytical requirements for the assessment were determined by Rust PPK in consultation with the auditor, and were based on an understanding of previous site activities and associated potential contaminants, together with the requirements of the Victorian EPA guidelines to provide a general screen for inorganic and organic compounds for a representative number of samples.

The analytical parameters are considered by the auditor to be sufficient to adequately characterise the level of contamination on the site.

4.5 Assessment Criteria

Selection of site specific assessment criteria can include the adoption of published criteria from regulatory authorities and from overseas publications, or the conduct of human health and ecological risk assessments.

For this environmental site assessment, Rust PPK adopted the SAHC (1993) Health Investigation Levels and the ANZECC/NH&MRC (1992) Environmental Investigation Levels, for assessing potential long term human health risks, and environmental risks, respectively. For the purpose of site specific health based risk analysis, the SAHC (1996) Proposed Health Based Soil Guidelines Exposure Settings D (residential with restricted soil access) and F (commercial/industrial) were used as reference criteria. In the case of analytes not covered by the nominated criteria, the Dutch Investigation and Intervention (Swartjes FA et al, 1993) values were referenced. The former Dutch C (ANZEC/NH&MRC, 1990), levels and the NSW EPA (1994) Guidelines for Assessing Service Station Sites were used as guidelines for TPH/BTEX.

The ANZECC/NH&MRC (1992) Environmental Investigation Levels are based on threshold levels for phytotoxicity and uptake of contaminants which may result in impairment of plant growth or reproduction, or unacceptable residue levels. These levels represent conservative values that protect the most sensitive receptor in the environment (i.e. plant life).

The proposed new Dutch Investigation and Intervention Levels are based on an integration of ecotoxicological and human-toxicological intervention values. These have not yet been adopted in Australia.

The former Dutch B and C criteria were developed for the protection of groundwater, which is the main source of potable water in the Netherlands.

The SAHC (1996) Proposed Health Based Soil Guidelines Exposure Setting D apply to residential developments with minimal opportunities for soil access, e.g. high rise apartments and flats. A 70 year exposure period has been assumed, except for those contaminants for which exposures over a much shorter period during childhood are critical.

The SAHC (1996) Proposed Health Based Soil Guidelines Exposure Setting F apply to commercial/industrial developments including shops, offices, factories and industrial sites. A 30 year exposure period has been assumed.

Given the nature and the findings of the environmental site assessment, and the proposed redevelopment strategy, adoption of the above assessment criteria is considered by the auditor to be appropriate.

4.6 Quality Assurance/Quality Control (QA/QC)

The QA/QC procedures undertaken for this assessment are documented in the Rust PPK report.

The quality assurance procedures adopted by Rust PPK included

- use of appropriate field sampling protocols
- use of appropriate sample containers, and sample preservation procedures (e.g. use of chilled esky) during transportation to the laboratory
- use of chain of custody forms, signed by the receiving laboratory
- laboratory quality control tests, including a field duplicate, an inter-laboratory duplicate, surrogate recoveries and replicate analyses
- quality assurance testing of a sample of rinse water.

The auditor was satisfied that these procedures were correctly implemented.

The laboratory analysis programme included the analysis of 4 field duplicates and 8 laboratory replicates.

The RPD was greater than 30% for the inter-laboratory duplicate results for copper and zinc. The RSD was also greater than 30% for copper. The Rust PPK report comments that the extraction methods used by the primary and the secondary laboratories were identical, and the analysis methods were compatible (ICP-AES/Flame Atomic Absorption Spectrometry). Therefore it was most likely that the difference in values for the inter-laboratory duplicates would be due to the heterogeneous nature of the soil, and the consequent difficulty in obtaining a true field duplicate sample. This explanation is accepted by the auditor.

One of the RPDs was greater than 20% for the laboratory replicate results for lead. The Rust PPK report comments that this could also be due to the heterogeneous nature of the soil, and the difficulty in obtaining two replicate samples from the soil sample in the laboratory. High RPDs can also be due to the relatively low quantities of analytes detected. This explanation is accepted by the auditor. The RSDs were within the accepted criteria for all of the replicates.

4.7 Findings and Recommendations

The detailed findings and recommendations presented by Rust PPK in their Environmental Site Assessment Report are endorsed by the auditor.

There was no background sampling or testing carried out. However, given the nature and the findings of the environmental site assessment, the absence of background data was not considered to pose a problem.

Groundwater was not intersected at the site to a depth of 2.3 m. While no leachability testing was conducted as part of this assessment, the alkaline nature and generally low permeability of the soils underlying the site should preclude leaching of contaminants.

5. CONCLUSIONS

A Site Audit Report has been prepared by Mr Adrian Hall of BC Tonkin & Associates for the Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide. An Environmental Site Assessment was performed by Rust PPK Pty Ltd.

As no soil testing was undertaken under the canopies, or under the floor slabs of the buildings, the extent of this audit has necessarily been confined to the open space areas of the site, with a total areal extent of approximately 0.98 hectares, as shown in Figure 2.1.

In the opinion of the auditor, the investigations have satisfactorily defined the nature and extent of contamination at the site.

The conclusions of this Site Audit Report are set out as follows:

1. The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only)
- the north east corner of the Grote Street public car park (BH14)
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).

2. An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.

3. Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

4. The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC

environmental guidelines. The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

5. As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial land uses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both land uses.

On the basis of the above conclusions, the auditor's considerations regarding the condition of the open space areas of the site are set out separately for the following four zones:

- Zone A - Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks
- Zone B - 104 Grote Street
- Zone C - Coachfreight and Adjacent Car Park
- Zone D - Bus Depot 2 (Premier Stateline).

Zone A - Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

The auditor considers that this zone is suitable for continued existing use provided that the conditions as specified below are satisfied:

1. Generally, the findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within this zone.

2. The exception is that a site specific risk assessment is required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of this area providing the bitumen surfaces are maintained and managed appropriately.

If this zone is to be developed for a more sensitive landuse, then further site characterisation is required, the extent of which will be dependent on the future land use, due to the presence of ash and cinders within the fill materials.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.

2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone B - 104 Grote Street

The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works.

If this zone is to be developed for a more sensitive landuse (for example residential), then it is required that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials in this zone.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.

2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone C - Coachfreight and Adjacent Car Park

The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works. This is contingent upon the adequate maintenance and management of the bitumen surfaces.

If this zone is to be developed for a more sensitive landuse (for example residential), it is required that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials in this zone.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.

2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone D - Bus Depot 2 (Premier Stateline)

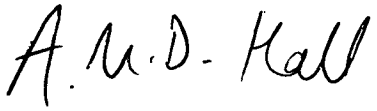
The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works.

If this zone is to be developed for a more sensitive landuse (for example residential), it is required that more extensive site characterisation is carried out prior to the redevelopment, the extent of which will be dependent on the future landuse.

It is also a requirement of this audit that the auditor be kept informed of the progress of any site redevelopment activities, and that opportunity be given to the auditor to ensure that the above conditions are adhered to.

If any part of the site is redeveloped, then a report, containing evidence by way of checks and test surveys that the above requirements have been met, is to be submitted to the auditor for approval.

Signed:



AMD Hall, MIE Aust
Chartered Professional Engineer
Associate Director
Environmental Auditor (Contaminated Land)

BC TONKIN & ASSOCIATES

Date: 1 August 1997

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APPENDIX A

Rust PPK Pty Ltd, 1997,
Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide,
for the Corporation of the City of Adelaide, 6 March 1997

Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide

The Corporation of the City of Adelaide

Rust PPK Pty Ltd
Environment & Infrastructure

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A NATA Certified Quality Company

11 March 1997
27J062A 97/143

Our Reference 2735/2905/27J062A

1 July 1997

Mr Brian Fitzpatrick
The Corporation of the City of Adelaide
GPO Box 2252
ADELAIDE SA 5001

Dear Sir

Site History Report for the Franklin Street Car Park

We are pleased to provide the Draft Site History report for the Franklin Street Bus Station. Potential contamination issues have been identified and we have made recommendations accordingly. If you have any queries regarding the content of this report, or would like to engage our services in carrying out the recommendations, please contact the undersigned.

Yours faithfully

John Iddles
Senior Environmental Consultant
Rust PPK Pty Ltd

Contents

Page Number

Executive Summary iii

1. Introduction 1

2. Background Information

2.1 Site Identification 2
2.2 Ownership 3
2.3 Party Responsible for Assessment 3
2.4 Environmental Consultant 3
2.5 Proposed Land Use 3
2.6 Operator of Site 3

3. Site History

3.1 Site Location 4
3.2 Site History of Land East of Bowen Street 4
3.3 Site History of Land West of Bowen Street 12
3.4 Information Sources 16

4. Site Inspection

4.1 Topography 17
4.2 Local Soil Types and Groundwater 17
4.3 General Observations - East of Bowen Street 17
4.4 General Observations - West of Bowen Street 18

5. Summary of Potential Contamination Issues

5.1 Potential Contamination Issues Associated with Previous Uses of the Site 20
5.2 Potential Contamination Issues Associated with the Current Use of the Site 21

6. Recommendations 23

7. Statement of Limitations 23

List of Tables

		Page Number
Table 2.1	Allotment Details for the Eastern Side of Bowen Street	2
Table 2.2	Allotment Details for the Western Side of Bowen Street	2
Table 3.1	History of Ownership - Part Town Acre 310, Grote Street	4
Table 3.2	History of Ownership - Part Town Acre 263, Off Rowlands Place	5
Table 3.3	History of Ownership - Part Town Acre 263, Franklin Street	5
Table 3.4	History of Ownership - Part Town Acre 263, Franklin Street	5
Table 3.5	History of Ownership - Part Town Acre 262, Allotment 4	6
Table 3.6	History of Ownership - Part Town Acre 262, Allotment 12	6
Table 3.7	History of Ownership - Part Town Acres 262 and 263	6
Table 3.8	History of Ownership - Part Town Acre 262	7
Table 3.9	History of Ownership - Part Town Acre 310, Allotment 1	7
Table 3.10	History of Ownership - Part Town Acre 311, Allotment 1	8
Table 3.11	List of Aerial Photographs Examined	10
Table 3.12	History of Ownership - Part Town Acre 311, Andrew Street	12
Table 3.13	History of Ownership - Part Town Acre 311, Andrew Street	12
Table 3.14	History of Ownership - Part Town Acre 311, Andrew Street	12
Table 3.15	History of Ownership - Part Town Acres 261 and 262, Franklin Street	13
Table 3.16	List of Aerial Photographs Examined	15

Appendices

Appendix A	Location Map
Appendix B	Site Plan
Appendix C	Current Zoning Regulations
Appendix D	Borelogs from the Surrounding Area
Appendix E	Aerial Photographs
Appendix F	Photographs

Executive Summary

Rust PPK Pty Ltd was commissioned by The Corporation of the City of Adelaide, to investigate and report on potential site contamination, environmental and other related issues arising from historical and current site activities on a 0.5 hectare section of land on the western side of Bowen Street, and a 0.9 hectare section of land on the eastern side of Bowen Street, Adelaide. The purpose of this report is to identify potential contaminants in the soil and other environmental issues.

Site Description

The site currently contains the following features:

- *the Premier Stateline bus terminal and canopy on the north-west of the site;*
- *the Coachfreight parcel collection and drop off point (including storage shed) in the west of the site;*
- *a bitumen-sealed private car park in the south-west of the site;*
- *the Greyhound and McCafferty's Express bus terminals and canopy on the north-east of Bowen Street;*
- *a single storey house, a private car park, a toilet block and a two-storey building occupied by the Adelaide Central Mission on the south-east of Bowen Street; and*
- *two bitumen sealed public car parks in the east of the site owned and operated by The Corporation of the City of Adelaide.*

Historic Overview

- *From 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises, a garage, forge, workshop, bakehouse, and a private road.*
- *From the 1920s a number of small light industries were established on the site. These included a factory, garages, forges, stables, printing works, workshops, shops and offices. Some of the occupants included the Franklin Wrecking Co, J.W. Turner, a plumber, Oxy-welders Ltd, the O'Donnell Brothers Ltd, and a number of radio and electrical companies.*
- *During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park by Dimet Corrosion Prevention Pty Ltd and I. and M. Jedynak.*
- *The Corporation of the City of Adelaide had acquired most of the land comprising the site by 1972, excepting the land contained in Certificates of Title 5060/608 and 1751/37. The land was then cleared and by 1979 the majority of the existing bus terminals and car parks had been constructed.*
- *The residences on land contained in Certificates of Title 5060/608 and 1751/37 were acquired by The Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission to store furniture. The front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking.*
- *Between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.*

Potential Contamination Associated with Previous Land Uses

- *Polycyclic aromatic hydrocarbons (PAHs) may be potential contaminants from residential land uses where coal and ashes may have been disposed of on-site.*
- *Benzoyl peroxide, polycyclic aromatic hydrocarbons (PAHs) (due to the disposal of coal and ashes on-site) and hydrocarbons (due to the storage of fuels on-site) are potential contaminants associated with bakeries, and therefore may be present in the north-eastern part of the site.*
- *J.W. Turner operated a plumbing business in the north-east of the site. A range of contaminants are associated with plumbing supplies and their usage, including acids, solvents, lead, silver, zinc and arsenic.*
- *Two forges were established on the site at various times. Potential contaminants that may have been generated by their operation include a broad range of metals and heavy metals, solvents, cyanides, phenols, phosphorous, halogenated compounds, polychlorinated biphenyls (PCBs), hydrocarbons, monocyclic aromatic hydrocarbons (MAHs) and polycyclic aromatic hydrocarbons (PAHs).*
- *An oxy-welding company was established in a warehouse in the north-east of the site, and remained in operation for at least 10 years. Similar contaminants would have been generated by the welding processes, as in the forge, however specific contaminants may include chromium, fluorides, nitrogen, thorium, titanium, vanadium, zinc and benzene.*
- *A number of radio and electrical companies occupied a warehouse in the south-eastern part of the site. Potential contaminants from these businesses may include metals, PCBs, MAHs, halogenated compounds, boron, chlorinated naphthalenes, chlorodiphenyls, phthalates and hydrocarbons.*
- *A wrecking company and two garages have also been in operation on the site. Contaminants associated with these businesses include petroleum hydrocarbons, a range of heavy metals including lead, volatile organic compounds, degreasing solvents, anti-freeze compounds, PCBs, asbestos, MAHs and other organic compounds. Underground fuel storage tanks may possibly have been used to store the fuels. It could not be ascertained whether these have ever existed on the site.*
- *Printing works may have caused contamination with heavy metals (in particular chromium, magnesium, and zinc), other metals (particularly silver), alkalis, inorganic acids, petroleum hydrocarbons, solvents, MAHs, halogenated compounds, ethyl acetate, ethanol, and isopropanol.*
- *Dimet Corrosion Pty Ltd also owned some land in the north-west of the site, however the aerial photographs did not indicate any structures on the site at that time. If corrosion inhibitors were used or manufactured on the site then the potential contaminants may include heavy metals (including Boron associated with Borax), other metals (including tin, lead, copper, and zinc), and amines, phosphates and nitrates.*

There were also various leases on some of the properties to occupants whose business could not be ascertained, therefore there may be contaminants present in addition to those already mentioned above.

Potential Contamination Associated with Current Land Uses

- *There may be polycyclic aromatic hydrocarbons (PAHs) in the soil underlying the bitumen due to tar based sub-base materials used in the past.*
- *Hydrocarbon spillages and leaks from cars and buses may have leached through the bitumen into the soil strata where there are cracks in the bitumen surface.*
- *Power switchboards in a number of the terminal buildings may contain asbestos.*
- *A rubber conveyor belt in the Coachfreight storage shed may contain asbestos.*
- *Asbestos may exist in the building materials of the old houses on the eastern side of Bowen Street that are currently used by The Adelaide Central Mission.*
- *White ant treatments may have used on the soil beneath the buildings and on surfaces prior to sealing with bitumen. Potential contaminants associated with this may include, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs) and heavy metals such as arsenic.*

1. Introduction

Rust PPK Pty Ltd was commissioned by The Corporation of the City of Adelaide, to investigate and report on potential site contamination, environmental and other related issues arising from historical and current site activities at The Franklin Street Bus Station, some residential properties and two associated public car park sites. The site is divided into two irregularly shaped parcels of land located on the eastern and western sides of Bowen Street. The section to the east of Bowen Street has an area of approximately 0.9 hectares and incorporates 85-107 Franklin Street, 2-40 Bowen Street, 84-94 Grote Street, 102-106 Grote Street, and an access road from Rowlands Place. The section to the west of Bowen Street has an area of approximately 0.5 hectares, and incorporates 111-129 Franklin Street, 4-8 Andrew Street, and 1-29 Bowen Street, Adelaide.

2. Background Information

2.1 Site Identification

The subject site comprises two irregularly shaped parcels of land to the east and west of Bowen Street. Each of these parcels comprises a number of allotments which are described under different Certificates of Title, as listed in Table 2.1 and Table 2.2 below.

The Locality Plan for the site is contained in Appendix A, and the site plans showing the current layout of the site are contained in Appendix B.

The total area of the site is approximately 1.41 hectares.

Table 2.1
Allotment Details for the Eastern Side of Bowen Street

Certificate of Title Reference	Land Description	Area (m^2)
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.60
1751/37	Town Acre 311	648.80
1922/48	Town Acre 263	986.26
5060/608	Allotment 1 in DP 32560	580.00
5317/61	Allotment 12 in DP546	149.60
5317/62	Allotment . 91 in FP166443	348.69
5317/63	Allotment 92 in FP166444	271.50
5317/64	Allotment 93 in FP166445	526.90
5317/65	Allotment 91 in FP170401	816.37
TOTAL		9156.02

Table 2.2
Allotment Details for the Western Side of Bowen Street

Certificate of Title Reference	Land Description	Area (m^2)
2023/96	Town Acre 311	260.67
2128/45	Town Acre 311	257.80
2201/187	Town Acre 311	259.70
3479/180	Town Acres 261 & 262	1744.00
3582/78	Town Acre 261	509.70
3582/79	Town Acre 262	490.04
3582/80	Town Acres 261 & 262	1122.90
3841/122	LTRO Plan 546	340.60
TOTAL		4985.41

2.2 Ownership

The current Certificates of Title show the site to be owned by The Corporation of the City of Adelaide.

2.3 Party Responsible for Assessment

The Corporation of the City of Adelaide
GPO Box 2252
ADELAIDE SA 5001.

2.4 Environmental Consultant

Rust PPK Pty Ltd
100 North Terrace
Adelaide SA 5000.

2.5 Proposed Land Use

At the time of the report, the proposed land use was unknown.

2.6 Operator of Site

There are currently a number of passenger and freight transport operators on the site. These include Premier Stateline, Coachfreight, Greyhound Pioneer Australia, McCafferty's Express Coaches, as well as The Adelaide Central Mission. The Corporation of the City of Adelaide also operates two public car parks on the site.

3. Site History

3.1 Site Location

The site is divided into two irregularly shaped parcels of land located on the eastern and western sides of Bowen Street. The street addresses for the section to the east of Bowen Street includes 85-107 Franklin Street, 2-40 Bowen Street, 84-94 Grote Street, 102-106 Grote Street, and an access road from Rowlands Place. The section to the west of Bowen Street has an area of approximately 0.5 hectares, and incorporates 111-129 Franklin Street, 4-8 Andrew Street, and 1-29 Bowen Street, Adelaide.

To the east, the site is bordered by the Dreamland Furniture store on Grote Street, and a disused warehouse on Franklin Street. Some light industrial facilities exist to the west of the site, such as the Jaguar Daimler Service Centre on Andrew Street. The Grote Street Church of Christ, and the accompanying church hall divide the south-eastern part of the site into two portions. These latter two buildings are included on the Register of the City of Adelaide Heritage Items.

The Corporation of the City of Adelaide have advised that the site is part of the F8 Franklin Street East Precinct. Any proposed development must comply with the zoning regulations specified by the Council which apply to this area. These regulations, which are contained within Appendix C, specify the desired and non-complying land uses. Desired uses include general offices, consulting rooms, cafes, shops, ancillary retail services, licensed premises, leisure studios, showrooms, passenger terminals and minor transport depots.

3.2 Site History of Land East of Bowen Street

3.2.1 History of Ownership

The following tables summarise the land ownership on the eastern side of Bowen Street from the early 1900's to the present, as documented in Certificates of Title which are held at the Land Titles Office.

Table 3.1
History of Ownership - Part Town Acre 310, Grote Street

Date	Ownership	CT Reference
15/3/1935	Goode Durrant and Company Limited, of Grenfell Street, Adelaide.	1639/119 (Current)
22/2/1935	Company name change to Goode Durrant and Murray Limited.	
27/7/1938	Portion leased to A.Z. Radio Pty Ltd, for 5 years. Lease number 1269127.	
28/11/1947	Leased to National Radio Corporation Ltd for 3 years. Lease number 1521372.	
7/2/1955	Portion leased to Servex Electrical Company Pty Ltd for 5 years. Lease number 1874445.	1639/119

Date	Ownership	CT Reference
23/12/1957	Name change to Goode Durrant and Murray (Consolidated) Ltd of 45 Grenfell Street, Adelaide.	1639/119 (Contd)
12/5/1964	Goode Durrant and Murray (Australia) Limited of Durrant house, Cheswell Street, London.	
29/10/1968	The Corporation of the City of Adelaide.	

Table 3.2
History of Ownership - Part Town Acre 263, Off Rowlands Place

Date	Ownership	CT Reference
	This title is for a right of way from Rowlands Place to the land contained in Certificate of Title 1639/119. Leases and transfers as for 1639/119, above.	1663/99 (Current)
29/10/1968	The Corporation of the City of Adelaide.	

Table 3.3
History of Ownership - Part Town Acre 263, Franklin Street

Date	Ownership	CT Reference
3/1/1947	John William Turner, Plumber, of 85 Franklin Street, Adelaide.	1922/48 (Current)
21/11/1946	Abraham Silk and Hyman Silk, Merchants, of Queen Victoria Markets, Melbourne.	
24/6/1947	Portion of land leased to J.W. Turner.	
1/10/1962	Death of Hyman Silk.	
16/2/1970	The Corporation of the City of Adelaide.	

Table 3.4
History of Ownership - Part Town Acre 263, Franklin Street

Date	Ownership	CT Reference
18/5/1876	Albert Ogilvie Laffer and Henry Laffer, Drapers, of Adelaide. Various leases (no occupations given) until 10/9/1938.	226/124 (Current)
10/9/1938	Lease to O'Donnell Brothers Ltd.	
14/8/1948	Death of last owner.	
6/4/1970	Caveat lodged over the land by O'Donnell Brothers Pty Ltd (No 3091291).	
23/5/1972	Transfer of land, subject to the above caveat, to The Corporation of the City of Adelaide.	

Table 3.5
History of Ownership - Part Town Acre 262, Allotment 4
(corner of Franklin Street and Bowen Street)

Date	Ownership	CT Reference
19/7/1944	Trustees: -E.H. Bakewell, pastoralist; -A.F. Gray, out of business; and -Sir W. Goodman, General Manager of Tramways Trust	1833/140
29/6/1944	Vested in Gray, Goodman and L.Walter (co-director)	
5/9/1958	As trustees of an Estate: -L.W. Walter, co-director; -H.Pickering, chartered accountant; and -Executor Trustee and Agency Co of SA Ltd.	2608/122
15/2/1968	The Corporation of the City of Adelaide.	
15/2/1968	The Corporation of the City of Adelaide	5317/65 (current)

Table 3.6
History of Ownership - Part Town Acre 262, Allotment 12
(Private Road)

Date	Ownership	CT Reference
7/11/1871	James Smith, Daniel Kekwick and George Shaw, Gentlemen of Adelaide. Various transfers of potions of land. In DP546, this road was redesignated as allotment 12.	160/22
20/1/1972	Private road closed (announced in the Gazette of this date).	
18/10/1989	Private Road acquired by the Corporation of the City of Adelaide.	
12/2/1990	The Corporation of the City of Adelaide	4353/276
	The Corporation of the City of Adelaide	5317/61 (current)

Table 3.7
History of Ownership - Part Town Acres 262 and 263

Date	Ownership	CT Reference
23/9/1880	Alfred Simpson and Alfred Muller Simpson, Manufacturers.	343/35
11/5/1892	Alfred Muller Simpson and Violet Laura Simpson, his wife.	
16/7/1913	Alfred Muller Simpson, manufacturer (as above).	
19/3/1936	Alfred Allen Simpson, Frederick Neighbour Simpson, Alfred Moxon Simpson (manufacturer).	
5/2/1957	Alfred Moxon Simpson, Thomas Bridge Simpson, David Owen Crompton.	
12/1/1960	Portion of lot sold to Auriga Limited (Certificate of Title 2762/199, which is now Certificate of Title 5317/64, refer below). Remaining portion changed to Certificate of Title 2762/200, now Certificate of Title 5317/62.	
6/6/1960	Auriga Limited of 47 Waymouth Street, Adelaide.	2762/199
16/1/1968	The Corporation of the City of Adelaide.	

Date	Ownership	CT Reference
	The Corporation of the City of Adelaide.	5317/64 (Current)
6/6/1960	-A.M. Simpson, manufacturer, of Pirie Street, Adelaide -T.B. Simpson, merchant, of Pirie Street, Adelaide -D.O. Crompton of 149 Barton Terrace, North Adelaide, Medical Practitioner.	2762/200 (from 343/35)
23/5/1966	The Corporation of the City of Adelaide	
	The Corporation of the City of Adelaide.	5317/62 (Current)

Table 3.8
History of Ownership - Part Town Acre 262

Date	Ownership	CT Reference
8/1/1872	William Bloor of Adelaide, Cooper	161/121
28/9/1896	After W. Bloor's death, transfer to M.Bloor (widow), C. Bloor (spinster), and E. Hague (storekeeper of Truro).	
22/1/1903	C.Bloor, M. A. Bloor, and S. Bloor, all spinsters of Park Street, Unley.	
12/12/1907	The Church of Christ, Grote Street, Adelaide Incorporated.	
21/4/1970	The Corporation of the City of Adelaide.	
	The Corporation of the City of Adelaide	5317/63

Table 3.9
History of Ownership - Part Town Acre 310, Allotment 1

Date	Ownership	CT Reference
11/12/1888	William Bloor of Adelaide, Cooper	94/119
28/9/1896	After W. Bloor's death, transfer to M.Bloor (widow), C. Bloor (spinster), and E. Hague (storekeeper).	
22/1/1903	C.Bloor, M. Bloor, and S. Bloor, all spinsters of Park Street, Unley.	
12/12/1907	The Church of Christ, Grote Street, Adelaide Incorporated.	
	This is a small 8 foot wide strip of land at the southern end of the main block (Certificate of Title 94/119).	1751/38
6/6/1940	The Church of Christ, Grote Street, Adelaide Incorporated .	
	This Certificate of Title includes previous Certificate of Titles 1751/38 and 94/119.	4391/861
20/11/1991	The Church of Christ, Grote Street, Adelaide Incorporated.	
	The Corporation of the City of Adelaide	5060/608 (current)

Table 3.10
History of Ownership - Part Town Acre 311, Allotment 1

Date	Ownership	CT Reference
6/6/1940	May E.A. Leditschke of 9 South Terrace, Adelaide, married woman.	1751/37 (Current Title, from original title 134/49)
19/3/1970	The Churches of Christ Evangelistic Union Incorporated, of 189 Gawler Place, Adelaide.	
30/9/1988	The Corporation of the City of Adelaide	
30/9/1988	Leased to The Churches of Christ Evangelistic Union Incorporated for 2 years from 30/9/1988. Lease Number 6611267.	

3.2.2 Adelaide City Council Archives

The Assessment Books at the Adelaide City Council Archives were reviewed on the basis of the relevant Town Acre reference, to provide an indication of the occupation, ownership and use of the properties on the eastern side of Bowen Street in 1850, 1900, 1922, 1934, 1939 and 1949. This information correlates well with that provided by the review of the Certificate of Titles as summarised in Section 3.2 above.

- In 1850; the site was being established as a residential area, with some existing houses, a few houses in the construction phase, and some vacant land.
- In 1900 the eastern side of Bowen Street contained a number of houses, some vacant land, a few shops, a bakehouse (off Franklin Street) and the United Disciples Church. These premises were all owned by various Adelaide residents.
- The land use had not changed significantly by 1922, however a number of families owned significant portions of the land, for example the Simpson family owned two houses, two shops and some vacant land. The family retained ownership of the houses, shops and vacant land on Bowen Street at least until 1949. The shop on Bowen Street was occupied by the Franklin Wrecking Co. in 1949, and a marine store and shed had been built on the vacant land (also on Bowen Street) by that year.
- In 1922 Albert and Henry Laffer owned the following which were leased out to various tenants; workshop, stables, forge, showroom, shop, offices, a house and some vacant land. There was no longer evidence of the forge and stables in 1934, however the Laffer's retained ownership of the offices, workshops, showroom, house and yard until 1949.
- In 1922, the Church of Christ, Grote Street, Adelaide Incorporated owned a church, a school, a house at 22 Bowen Street, a trap (a term used in the assessment books), a shed and some vacant land on Bowen Street. By 1934, the Church had built some additional buildings on the land that they owned. At this point in time in addition to the structures listed above, the Union owned two houses at 24 and 26 Bowen Street, printing offices and works, a yard and some sheds, and offices and rooms which were leased out to various occupants at least up until 1949.

- By 1934, Goode, Durrant and Co Ltd owned a warehouse on Grote Street. The warehouse was unoccupied in 1934, and was leased out to the National Radio Corporation Ltd in 1939. The Education Department were also using some of the offices in the building in 1949.
- The Grays Estate (Bakewell, Gray and Goodman) owned a garage, workshop and offices at 101-111 Franklin Street at least from 1934 to 1949.
- J.W. Turner had acquired a house, workshop and offices by 1934. Oxy-welders Ltd occupied part of the workshop at least from 1934 until 1949. Turner himself occupied the remainder of the workshop for at least the same period. Ownership of this property had been transferred to A. and H. Silks by 1949, however the occupants remained unchanged.

3.2.3 Aerial Photographs

Aerial photographs of the site were examined from 1949 and thereafter at ten year intervals. The most recent photograph available was also examined. The features noted in each photograph for the section of the site to the east of Bowen Street are detailed below.

1949
This photograph was difficult to discern, however the layout of the buildings seemed to adhere approximately to the boundaries set by the current Certificates of Title. In some cases fences were visible along the allotment boundaries.

There was clearly a large warehouse type building in the south-east corner of the site. In the south west corner there were a number of smaller buildings, and possibly some small private parking lots, and vacant land.

There were a number of buildings ranging in size from small buildings (possibly houses) to warehouses, across the northern part of the site. Especially distinct was a large warehouse in the north-west corner. There was also some vacant space around the northern part of the site which appeared to be used as a car park.

1959
The layout of the site in this photograph was very similar to the photograph taken in 1949, however the images were much more distinct.

1968
There were only a few changes to the layout of the site from the earlier photographs. There was a small change in some of the fencelines in the south-western part of the site, and a car park in the central part of the site (accessed from Bowen Street) appeared to have been bitumenised.

1979
The entire site has been completely restructured. The current bus terminals and car parks were clearly visible.

1989
As above.

1995
A new terminal building had been constructed just off Bowen Street, on the current Certificate of Title 5317/63. This area was previously used as either car or bus parking space.

Aerial photographs examined are listed in Table 3.11 below:

Table 3.11
List of the aerial photographs examined

Photo No	Survey No	Scale	Month	Year
661	5001	1:20000	26/9/95	1995
190	4091	1:20000	6/9/89	1989
19	2408	1:16000	19/3/79	1979
0151	1126	1:15800	15/11/68	1968
9396	326	1:16000	3/1/59	1959
106	7	1:15840	18/1/49	1949

3.2.4 Historical Overview

The following information summarises the knowledge gleaned from the Certificate of Titles, the Assessment Books at the Adelaide City Council Archives, and the aerial photographs, for the section of the site located to the east of Bowen Street.

- From 1850 up until the early 1900s, the land was used generally for residential purposes, with a few shops, and a bakehouse, and a private road.
- In 1900 the eastern side of Bowen Street was generally used as private premises, containing a number of houses, some vacant land, a few shops, a bakehouse (off Franklin Street) and the United Disciples Church. These premises were all owned by various Adelaide residents.
- The land use had not changed significantly by 1922, however a number of families had begun to own significant portions of the land, these are discussed further below.
- The property in the north-western corner of the site, which appeared to be a large warehouse in the early photographs, included a garage, workshop and offices. This property was transferred between a number trustees from 1934 to 1968, when it was transferred to The Corporation of the City of Adelaide.
- From 1880, the Simpson family owned property in the northern part of the site, including two houses, two shops and some land. The shop on Bowen Street was occupied by the Franklin Wrecking Co. in 1949, and a marine store and shed had been built on the vacant land (also on Bowen Street) by that year. The family retained ownership of most of the land on Franklin Street until 1966, when it was transferred to The Corporation of the City of Adelaide, however the land on Bowen

Street was sold to Auriga Ltd in 1960, and then transferred to The Corporation of the City of Adelaide in 1968.

- In 1876 Albert and Henry Laffer, drapers, owned some land in the north-central part of the site. By 1922 this land included the following which were leased out to various tenants; workshop, stables, forge, showroom, shop, offices, a house and some vacant land. There was no longer evidence of the forge and stables in 1934, however the Laffers retained ownership of the offices, workshops, showroom, house and yard until 1949. The O'Donnell Brothers Ltd were leased the property, from 1938 until the death of the last owner in 1948. They lodged a caveat over the land in 1970, and in 1972, ownership was transferred to The Corporation of the City of Adelaide.
- J.W. Turner, a plumber, had acquired a house, workshop and offices in the north-east corner of the site by 1934. Oxy-welders Ltd occupied part of the workshop at least from 1934 until 1949. Turner himself occupied the remainder of the workshop for at least the same period. Ownership of this property was transferred to A. and H. Silks in 1946, however the occupants remained unchanged. This land was then handed over to The Corporation of the City of Adelaide in 1970.
- The Bloor family owned a house and some vacant land on Bowen Street from 1872 until 1907 when it was transferred to the Church of Christ, Grote Street, Adelaide Incorporated. By 1934 the church owned three houses (at 22, 24 and 26 Bowen Street), printing works, a yard and sheds, and various offices and rooms which were leased out to various occupants at least up until 1949. In 1940 Mrs M.A. Leditschke owned a house on the corner of Bowen and Grote Streets which was also transferred to The Churches of Christ Evangelistic Union Incorporated in 1970. By 1991, Certificates of Title 5060/608, 5317/63 and 1751/37 had been transferred to The Corporation of the City of Adelaide. These allotments are currently occupied by The Adelaide Central Mission and used to store furniture. The building at 104 Grote Street has recently been condemned by the Council due to cracking and rust problems, and is therefore disused.
- By 1934, Goode, Durrant and Co Ltd owned a factory in the south-east of the site on Grote Street which was later expanded to include some offices and a warehouse. The factory was unoccupied in 1934, however from 1938 to approximately 1960, a number of radio and electrical companies occupied the warehouse. The Education Department were also using some of the offices in the building in 1949. This land was then handed over to The Corporation of the City of Adelaide in 1968.
- The Corporation of the City of Adelaide had acquired most of the land on the eastern side of Bowen Street by 1972, excepting Certificates of Title 5060/608 and 1751/37. The land was then cleared and by 1979 the existing bus terminal (which is currently occupied by Greyhound Pioneer Australia) and car parks had been constructed.
- Between 1989 and 1995, a new terminal building was constructed on Bowen Street, on what was previously either car or bus parking space. This building is currently occupied by McCafferty's Express Coaches.

3.3 Site History of Land West of Bowen Street

3.3.1 History of Ownership

The following tables summarise the land ownership on the western side of Bowen Street from the early 1900's to the present, as documented in Certificates of Title which are held at the Land Titles Office.

Table 3.12
History of Ownership - Part Town Acre 311, Andrew Street

Date	Ownership	CT Reference
29/4/1952	Eva Marjory Halliday, widow, of Forest Gardens.	2201/187 (Current, from 248/83)
12/7/1966	E.M. Halliday and Malcolm G. Halliday of the same address, Engineer	
12/7/1966	Lease to R.H. Halliday Engineers Pty Ltd from 1/6/1966 to 31/5/1971.	
13/7/1971	The Corporation of the City of Adelaide.	

Table 3.13
History of Ownership - Part Town Acre 311, Andrew Street

Date	Ownership	CT Reference
17/5/1949	Robert H. Halliday, Engineer, of Forest Gardens, Engineer.	2128/45 (Current - from 276/248
28/3/1952	After the death of R.H. Halliday, ownership was transferred by Public Trustee to Eva M. Halliday, widow.	
12/7/1966	E.M. Halliday and M.G. Halliday	
12/7/1966	Lease to R.H. Halliday Engineers Pty Ltd from 1/6/1966 to 31/5/1971.	
13/7/1971	The Corporation of the City of Adelaide.	

Table 3.14
History of Ownership - Part Town Acre 311, Andrew Street

Date	Ownership	CT Reference
17/5/1949	Robert Harold Halliday, Engineer, of Andrew Street, Adelaide (the first of the three adjacent blocks acquired by the Halliday's). Transfers as per Certificate of Titles 2128/45 and 2201/187.	2023/96 (Current - from 318/55)
13/7/1971	The Corporation of the City of Adelaide.	

Table 3.15
History of Ownership - Part Town Acre 261 and 262, Franklin Street

Date	Ownership	CT Reference
	This Certificate of Title refers to Lots 1,2,3,5 and 6 of Town Acres 261 and 262.	249/169
10/5/1877	Andrew Tennant, Gentleman of Adelaide.	
19/7/1913	Death of A. Tennant.	
10/8/1919	-John Tennant, Sheep Farmer -Frederick Augustus Tennant, of Adelaide, Solicitor -John Tennant Love, of Adelaide, Stock Salesman	
21/11/1937	F.A. Tennant died.	
13/7/1938	J.Tennant, J.Tennant Love, Andrew Tennant	
3/5/1940	-Richard George Hawker of Bungaree, Clare -Andrew Tennant of Stony Gap, Pastoralist.	249/169 (Old)
24/2/1967	Izydor Jedynak and Maria Jedynak purchased lots 5 and 6, which then became Certificate of Title 3479/180.	
7/3/1967	Tennant Industries Pty Ltd retain ownership of Lots 1,2 and 3, which then became Certificate of Title 3479/181.	
3/4/1967	Tennant Industries Pty Ltd own Lots 1, 2 and 3 of Town Acres 261 and 262	3479/181
16/8/1968	Dimet Corrosion Prevention Pty Ltd purchased Lot 1, which then became Certificate of Title 3582/78 (refer below).	
16/8/1968	Ownership of Lots 2 and 3 is divided amongst several stakeholders: -Dimet Corrosion Prevention Pty Ltd (3/9) -Oak Pty Ltd (3/9) -Clive Langdon Bonython (1/9) -Richard Martin Bonython (1/9) -James Langdon Bonython (1/9) This then became Certificate of Title 3582/79 and 3582/80, refer below.	
1/3/1971	Dimet Corrosion Pty Ltd of Cawley Rd, Brooklyn, Victoria.	3582/78 (Current)
1/3/1971	The Corporation of the City of Adelaide.	
1/3/1971	Transfer from the Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L, R.M. and J.L. Bonython to the Corporation of the City of Adelaide.	3582/79 (Current)
1/3/1971	Transfer from the Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L, R.M. and J.L. Bonython to the Corporation of the City of Adelaide.	3582/80

3.3.2 Adelaide City Council Archives

The Assessment Books at the Adelaide City Council Archives were reviewed on the basis of the relevant Town Acre reference, to provide an indication of the occupation, ownership and use of the properties in 1850, 1900, 1922, 1934, 1939 and 1949. This data correlates well with that provided by the review of the Certificate of Titles as summarised in Section 3.6 above.

- In 1850, the site was being established as a residential area, with some existing houses, a few houses in the construction phase, and some vacant land.
- In 1900, the western side of Bowen Street was basically used as a residential area.
- The land use had not changed significantly by 1922, however a number of families had begun to own significant portions of the land. The Tennant Estate owned several houses on Bowen Street, Franklin Street and Little Bowen Street (a private road

which later became known as Tennant Court), which they maintained at least until 1949. J.E. Bateup owned 3 houses and a garage on Andrew Street.

- No significant changes had occurred in 1934.
- By 1939, the houses owned by J.E. Bateup had been transferred to R.H. Halliday, however Bateup retained ownership of the garage at least until 1949. Halliday had constructed a forge by 1939, probably on current Certificate of Title 2128/45.
- By 1949 Halliday had also constructed a workshop on one of his Andrew Street properties.

3.3.3 Aerial Photographs

Aerial photographs of the site were examined from 1949 and thereafter at ten year intervals. The most recent photograph available was also examined. The features noted in the area to the west of Bowen Street in each photograph are detailed below.

1949
This photograph was difficult to discern, however there appeared to be a number of small buildings along Franklin Street, with a lot of vacant land, which may have been private gardens.

1959
The layout of the site in this photograph was similar to the photograph taken in 1949, however it was much clearer.

The land represented under Certificate of Title 3841/122 appears to be a road, which ran parallel to Franklin Street providing a throughway from Bowen Street to Morphett Street. This was originally known as Little Bowen Street, but later came to be known as Tennant Court.

There appeared to be a row of terraced houses fronting on to Bowen Street, south of Tennant Court, with additional buildings behind them. Three large buildings running parallel to Andrew Street existed on the southern-most section of the site. The land use of the remainder of the area was still unclear, but appeared to be either residential or vacant land.

1968
The north-western corner of the site has been cleared and replaced with a bitumen sealed open-lot car park. A number of buildings existed in the north-eastern corner of the site, although it is difficult to tell if these were new buildings, or the same ones that had appeared on the earlier photographs.

The terraced houses still exist on Bowen Street, however the area to the west of these buildings, south of Tennant Court had also been cleared for use as an open-lot car park.

The three large buildings to the south of the site were also still in existence.

1979
The entire site has been completely restructured. The current bus terminals and car parks were clearly visible.

1989
The layout of the site has not changed since the previous photograph.

1995
The layout of the site has not changed since the photograph taken 1979.

Aerial photographs examined are listed in Table 3.16 below:

Table 3.16
List of the Aerial Photographs Examined

Photo No	Survey No	Scale	Month	Year
661	5001	1:20000	26/9/95	1995
190	4091	1:20000	6/9/89	1989
19	2408	1:16000	19/3/79	1979
0151	1126	1:15800	15/11/68	1968
9396	326	1:16000	3/1/59	1959
106	7	1:15840	18/1/49	1949

3.3.4 Historical Overview

The following information summarises the knowledge gleaned from the Certificate of Titles, the Assessment Books at the Adelaide City Council Archives, and the aerial photographs, for the section of the site located to the west of Bowen Street.

- From 1850 up until the late 1960s, the land was used for residential purposes, with the exception of a garage owned by J.E. Bateup, and a forge and workshop operated by R.H. Halliday, both on Andrew Street.
- During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park, as is evident in the aerial photograph taken in 1968. This change probably corresponded with the transfer of land from the Tennant Estate to J. and M. Jedynak in 1967, and to Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L., R.M., and J.L. Bonython in 1968.
- By 1971, The Corporation of the City of Adelaide had acquired the entire site to the west of Bowen Street. The site was then cleared to allow for the construction of the current bus terminals, which were identifiable on the aerial photograph taken in 1979.
- There have been no significant changes of the layout of the allotment since the construction of the bus terminals was completed.

3.4 Information Sources

(a) Mapland - Department of Environment and Natural Resources, Land and Geographic Information Group, 282 Richmond Road, Netley. Aerial photographs were viewed.

(b) Lands Titles Office, 25 Pirie Street. History of Ownership was researched.

(c) Adelaide City Council Archives, Topham Mall off 55 Currie and 56 Waymouth Streets, Adelaide. Assessment Books were viewed to provide an indication of the occupation, ownership and use of properties.

(d) The Corporation of the City of Adelaide, Planning Department. Information with respect to site zoning provided by Greg Vincent.

(e) The Corporation of the City of Adelaide, Environmental Health Department. Information with respect to environmental health issues provided by Murray Phillips.

(f) Sue Park. The Adelaide Central Mission Inc.

(g) South Australian Health Commission:

- Publication "Identification and Assessment of Contaminated Land - Improving Site History Appraisal" by JW Edwards, M Van Alphen and A Langley, Contaminated Sites Monograph Series, No 3, 1994.

(h) The RPS Group plc (1994). The RPS Manual. Published by the RPS Group (UK).

(i) Shineblecker C.L. (1992) "Handbook of Environmental Contaminants: A Guide for Site Assessment". Lewis Publications, Michigan, America.

4. Site Inspection

4.1 Topography

The site was flat.

4.2 Local Soil Types and Groundwater

Published information and previous experience in the area suggests that the soil profile at the site can be expected to include in the order of 1.0m of surface fill, consisting of various reworked soils and building rubble. Underneath this, the natural soil profile is likely to resemble a Brown Solonised Soil type BS classification.

The natural profile can be expected to include a thin calcareous silt containing silts, sands and gravels overlying stiff plastic clay (Keswick Clay). Slickensided fissures are likely to be encountered within the Keswick Clay.

Borelogs for the surrounding area have been obtained from the Department of Mines and Energy and have been included in Appendix D.

References:

- Department of Mines, (1974) Soil Association Map of the Adelaide Region. Bulletin 46.
- Sheard M.J., and Bowman G.M. (1996) Soils, stratigraphy and engineering geology of near surface materials of the Adelaide Plains. Report Book 94/9.

4.3 General Observations - East of Bowen Street

The site, which was inspected on the 25th of February 1997, consisted of the McCafferty's Express Coaches and Greyhound Pioneer Australia bus terminals, 2 public car parks, a house, a private car park, a toilet block, and a two-storey building.

There were two public car parks operated by The Corporation of the City of Adelaide, on the eastern part of the site. The northern car park was accessed from Franklin Street, whilst the southern car park was accessed from Grote Street. Both car parks had a bitumen seal that was in a reasonable condition, with the exception of a few potholes, and heave around the trees which were dispersed throughout the site. The trees themselves, however, looked quite healthy. There appeared to be a number of underground services, including power in the vicinity of the car park. An old paint drum had been left in the northern car park next to a ticket vending machine.

The Greyhound Pioneer Australia bus terminal was located in the north western corner of this section of the site, and consisted of a two-storey building, and an attached canopy structure for the parking of passenger buses. The building housed a sales counter, booking office, waiting room and toilets on the ground floor, and a number of offices on the first floor. It was also noted that all cleaning and fuelling of coaches occurred off-site at Mile End. The attached canopy ran north-south, connecting the McCafferty's and Greyhound terminal buildings.

The McCafferty's terminal building contained similar features to the Greyhound Building, however it was only single storey.

The canopy was directly accessible from Bowen Street along it's entire length, and was sealed with a bitumen surface. The bitumen appeared to be in good condition, however there were a few small patches which had been replaced. All of the stormwater runoff from this area ran directly into the drains on Bowen Street.

There are two buildings on the south-western part of the site that are currently only used for storage purposes by the Adelaide Central Mission Incorporated. The building on the corner of Grote and Bowen Streets was a two-storey building with a single storey extension to the north. There was also a garage north of the building, and a small private car park west of the building. The car park was accessible from both streets, was lined with trees and bitumen sealed. There had been some illegal dumping of rubbish at the corner of the building.

Just north of the two-storey building was a fenced area containing public toilets and a private car park. There was a large pothole in the bitumen surface of the car park. An old brick wall along the rear of the lot provided evidence of a building which had previously existed on the site.

At 22 Bowen Street, between the private car park and McCafferty's bus terminal, was a small single storey dwelling which was boarded up and could not be accessed. This building is also occupied by the Adelaide Central Mission Incorporated, and is understood to only be used for storage purposes.

4.4 General Observations - West of Bowen Street

The site, which was inspected on the 25th of February 1997, consisted of a private car park, and the Coachfreight and Premier Stateline bus terminals.

The private car park was on the corners of Andrew and Bowen Streets. It was an open lot car park with a bitumen surface that was cracked in places but was otherwise in reasonable condition. The site was basically flat and any stormwater drainage would run into drainage pits in the kerb at the roadside. There was also an access road which ran parallel to Bowen Street from Andrew Street, to the Coachfreight parcel pick up point.

Coachfreight operated from a single storey office and storage shed off Bowen Street, on current Certificate of Title 3479/80. The floor in the shed was completely sealed with bitumen which was in good condition. No chemicals or fuels were stored on the site at the time of inspection, excepting some disinfectants and cleaning agents that were used by the cleaner. These chemicals were kept in a locked cage on a sealed bitumen floor. A conveyor belt ran along the length of the shed and into the office to convey heavy parcels from the storage point to the collection point. The motor and gear box which operated the belt was located at it's western end. The equipment was very greasy, and there were a few stains on the bitumen beneath it. It was also noted that a section of the bitumen floor had been replaced here.

To the north of the site was the Premier Stateline Bus Terminal. This comprised a two storey building at the eastern end of the site, an attached canopy structure which provided some shelter for the parking of passenger buses, and an open lot car park to the north of the canopy. The building housed the sales counter, a waiting room, cafe and public toilets on the first floor, and offices on the second floor. There was also a power unit on the ground floor. A cement swale guided any stormwater runoff from the site (which could possibly be contaminated with oil or fuels) into a stormwater drain at the western end of the canopy. The car park was also sealed with bitumen which seemed to be of a reasonable quality.

The central portion of this site was used as a roadway to allow access to the buses from Bowen Street. This area was completely covered with a bitumen seal. There were two large Collex waste disposal bins, two 44 gallon drums and one 45 Litre drum located at the western end of the site, next to a stormwater drain. The drums contained unknown substances.

5. Summary of Potential Contamination Issues

5.1 Potential Contamination Issues Associated with Previous Uses of the Site

Over the past 70 years a number of industries existed on the site which may have the potential to cause significant site contamination. The potential risk of contamination caused by the various land uses have been outlined below:

- Polycyclic aromatic hydrocarbons (PAHs) may be potential contaminants from residential land uses where coal and ashes may have been disposed of on-site.
- Benzoyl peroxide, polycyclic aromatic hydrocarbons (PAHs) (due to the disposal of coal and ashes on-site) and hydrocarbons (due to the storage of fuels on-site) are potential contaminants associated with bakeries, and therefore may be present in the north-eastern part of the site.
- J.W. Turner operated a plumbing business in the north-east of the site. A range of contaminants are associated with plumbing supplies and their usage, including acids, solvents, lead, silver, zinc and arsenic.
- Two forges were established on the site at various times. Potential contaminants that may have been generated by their operation include a broad range of metals and heavy metals, solvents, cyanides, phenols, phosphorous, halogenated compounds, polychlorinated biphenyls (PCBs), hydrocarbons, monocyclic aromatic hydrocarbons (MAHs) and polycyclic aromatic hydrocarbons (PAHs).
- An oxy-welding company was established in a warehouse in the north-east of the site, and remained in operation for at least 10 years. Similar contaminants would have been generated by the welding processes, as in the forge, however specific contaminants may include chromium, fluorides, nitrogen, thorium, titanium, vanadium, zinc and benzene.
- A number of radio and electrical companies occupied a warehouse in the south-eastern part of the site. Potential contaminants from these businesses may include metals, PCBs, MAHs, halogenated compounds, boron, chlorinated naphthalenes, chlorodiphenyls, phthalates and hydrocarbons.
- A wrecking company and two garages have also been in operation on the site. Contaminants associated with these businesses include petroleum hydrocarbons, a range of heavy metals including lead, volatile organic compounds, degreasing solvents, anti-freeze compounds, PCBs, asbestos, MAHs and other organic compounds. Underground fuel storage tanks may possibly have been used to store the fuels. It could not be ascertained whether these have ever existed on the site.
- Printing works may have caused contamination with heavy metals (in particular chromium, magnesium, and zinc), other metals (particularly silver), alkalis, inorganic acids, petroleum hydrocarbons, solvents, MAHs, halogenated compounds, ethyl acetate, ethanol, and isopropanol.
- Dimet Corrosion Pty Ltd also owned some land in the north-west of the site, however the aerial photographs did not indicate any structures on the site at that time. If corrosion inhibitors were used or manufactured on the site then the potential contaminants may include heavy metals (including Boron associated with Borax),

other metals (including tin, lead, copper, and zinc), and amines, phosphates and nitrates.

There were also various leases on some of the properties to occupants whose business could not be ascertained, therefore there may be contaminants present in addition to those already mentioned above.

5.2 Potential Contamination Issues Associated with the Current Use of the Site

The site currently contains a number of car parks, houses and bus terminals.

- If the bitumen was laid in the car park more than 15 years ago, the soil underlying the bitumen may contain some residues of polycyclic aromatic hydrocarbons (PAHs) due to tar based sub-base materials used in the past.
- The parking of the cars and buses has lead to some hydrocarbon staining of the bitumen surfaces. If the bitumen was cracked there is potential for these contaminants to be washed in the soil strata below. In addition, the contaminants may have been washed directly into the stormwater system.
- At the western end of Bowen Street there were a number of waste bins and large drums containing hydrocarbons located on a sealed surface next to a stormwater drain. Any leakage from either the drums or the waste bins would be washed directly into the stormwater system whenever it rains.
- Power switchboards were noted in a number of the terminal buildings. The switchboards may contain asbestos.
- There was a conveyor belt which ran the length of the Coachfreight storage shed. The rubber belt used to operate this system may potentially contain asbestos.
- Cleaning disinfectants were stored in a locked cage on a sealed floor in the Coachfreight storage shed. If a spillage did occur, there is potential for seepage directly into the stormwater drainage system.
- Asbestos may have been used in the building materials of the old houses on the eastern side of Bowen Street that are currently used by The Adelaide Central Mission.
- White Ant Treatments may have been used on the soil beneath the buildings and on the surfaces prior to sealing. Potential contaminants associated with this may include arsenic, organochlorine pesticides (OCPs), or organophosphate pesticides (OPPs).

6. Recommendations

The site history investigation has highlighted a number of past activities that have been undertaken at the site. It is likely that contaminants are present on site however given the current site use those do not present an immediate concern.

If future plans for the site include redevelopment to a more sensitive land use (ie residential housing), it is recommended that further soul samples are taken from within those areas identified as potentially being contaminated and analysed to determine if these areas of the site contain significant levels of contamination.

7. Statement of Limitations

This report has been prepared by the Consultant with all reasonable skill, care and diligence in accordance with the terms of agreement with the Client, and taking account of the human and other resources utilised by agreement with the Client.

The data in the report was derived by applying the methodology described in subsequent sections of this report. To the best of the Consultant's knowledge, the information contained in the report is accurate at the date of issue. However there should be a recognition of the limitations of the site environmental assessment process. These are referred to, for example in Section 4 of ASTM Practice E 1527-94. Clause 4.5 states the following:

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognised environmental conditions in connection with a property. This site assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for recognised environmental conditions in connection with a property, and both practices recognise limits of time and cost.

It should also be recognised that site conditions, including contaminant extent and concentrations, can change with time. This may be particularly relevant if the report is used after a protracted delay, such that further investigation of the site may be necessary.

In preparing this report, the Consultant has relied on and presumed accurate certain information provided by the Client or third parties. Unless otherwise stated in the report, the Consultant has not attempted to verify the accuracy or completeness of any such information.

The consultant has prepared this report for the Client in accordance with generally accepted consulting practice and the Consultant's Terms of Business. No other warranty, express or implied, is made as to the professional advice included in this report. The Consultant disclaims any responsibility in respect of any matters outside the scope of the terms of agreement with the Client.

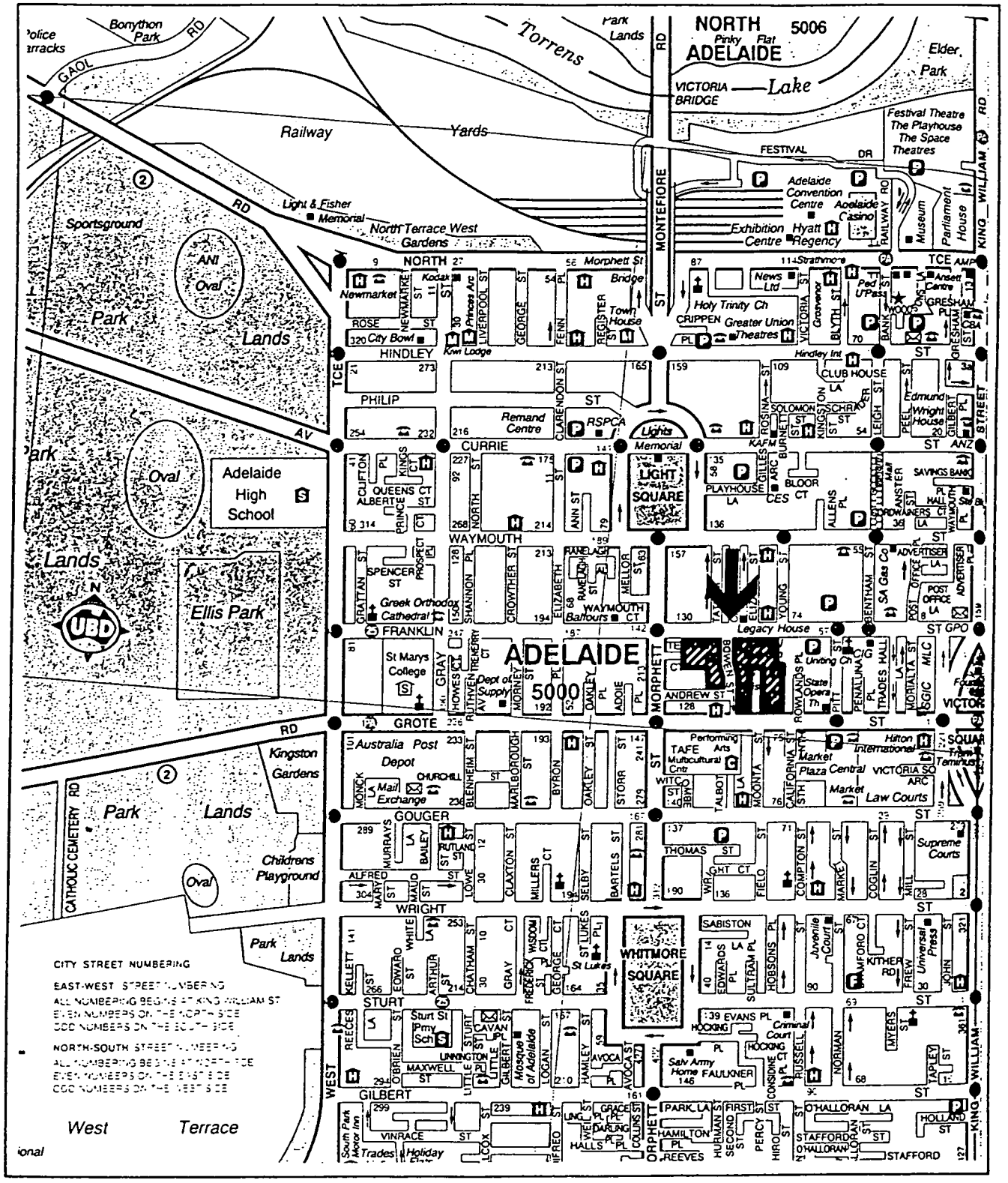
This report has not been prepared for use by parties other than the Client. It may or may not contain sufficient information for purposes of other parties or for other uses. The Consultant accepts no responsibility to third parties to whom this report, or any part thereof, is made known.

A third party relies upon the report at its own risk.

In accordance with standard practice, the assessment carried out is site specific. Consequently, the assessment does not address environmental liabilities which may or may not pertain to other properties either currently or previously owned or operated by the Client or other off-site environmental liabilities.

Appendix A

Location Map



Map courtesy of Universal Press

Location Map

Appendix B

Site Plan

FRANKLIN STREET

STREET

PITT STREET

GROTE STREET

MORPHETT

N

261

A

262

TA

3479/180

3479/180

3841/122

312

311

ANDREW STREET

5166/472

5007/442

5317/65

5317/62

5317/61

5317/64

5317/63

5060/65

226/124

TA 263

B

1922/418

6
4115/33

264

5229/375

5229/314

41
4391/862

1539/172

310

TA

39
4115/32

309

5229/47

5229/48

5229/49

56
1517/45

1751/53

5175/108

5252/887

ROWLANDS PL

84
4174/872

82
4174/873

85
4174/871

78
2538/198

5228/300

552/550

1701/182

1861/181

2286/188

501/76

329

97
5123/524

330

96
5099/85

331

94
4224/864

93
4224/865

92
4216/204

91
4216/203

CALIFORNIA ST

332

33

BOMTA STREET

90
5099/86

WITCOMBE ST

106
4296/630

Appendix C

Current Zoning Regulations

F8 FRANKLIN STREET EAST PRECINCT

The Franklin Street East Precinct should develop as a high quality low to medium intensity office area with a range of retail, ancillary retail and support activities at ground floor level. High-density residential and visitor accommodation is also appropriate. The substantial redevelopment opportunities which exist within the Precinct should be used to establish a new commercial character in the area, complemented by the upgrading of the public environment.

The Precinct should remain highly accessible for both local and through traffic. Pedestrian links to the Central Market Precinct and the Western Core Precinct should be maintained and improved to provide for increasing numbers of pedestrians.

USE OF LAND

The primary activity in the Precinct should be general offices supported by ground floor retailing. The redevelopment of a comprehensive bus terminal and supporting facilities is appropriate in the Precinct. The Morphett Street frontage should accommodate offices and showroom activities. Showrooms will be considered elsewhere in the Precinct on their merits. Residential and visitor accommodation may also be appropriate at higher densities.

Public parking stations are ***non-complying*** on Franklin and Morphett Street frontages, but elsewhere will be considered on merit.

Desired Uses

general offices, consulting rooms
cafes
shops
licensed premises
ancillary retail services
leisure studios
showrooms (on Morphett Street frontages)
passenger terminals, minor transport depots

Non-complying and Other Uses - Indicated in Use Chart F.

BUILT-FORM

Density

Basic plot ratio: 2.4

Maximum plot ratio: 3.0

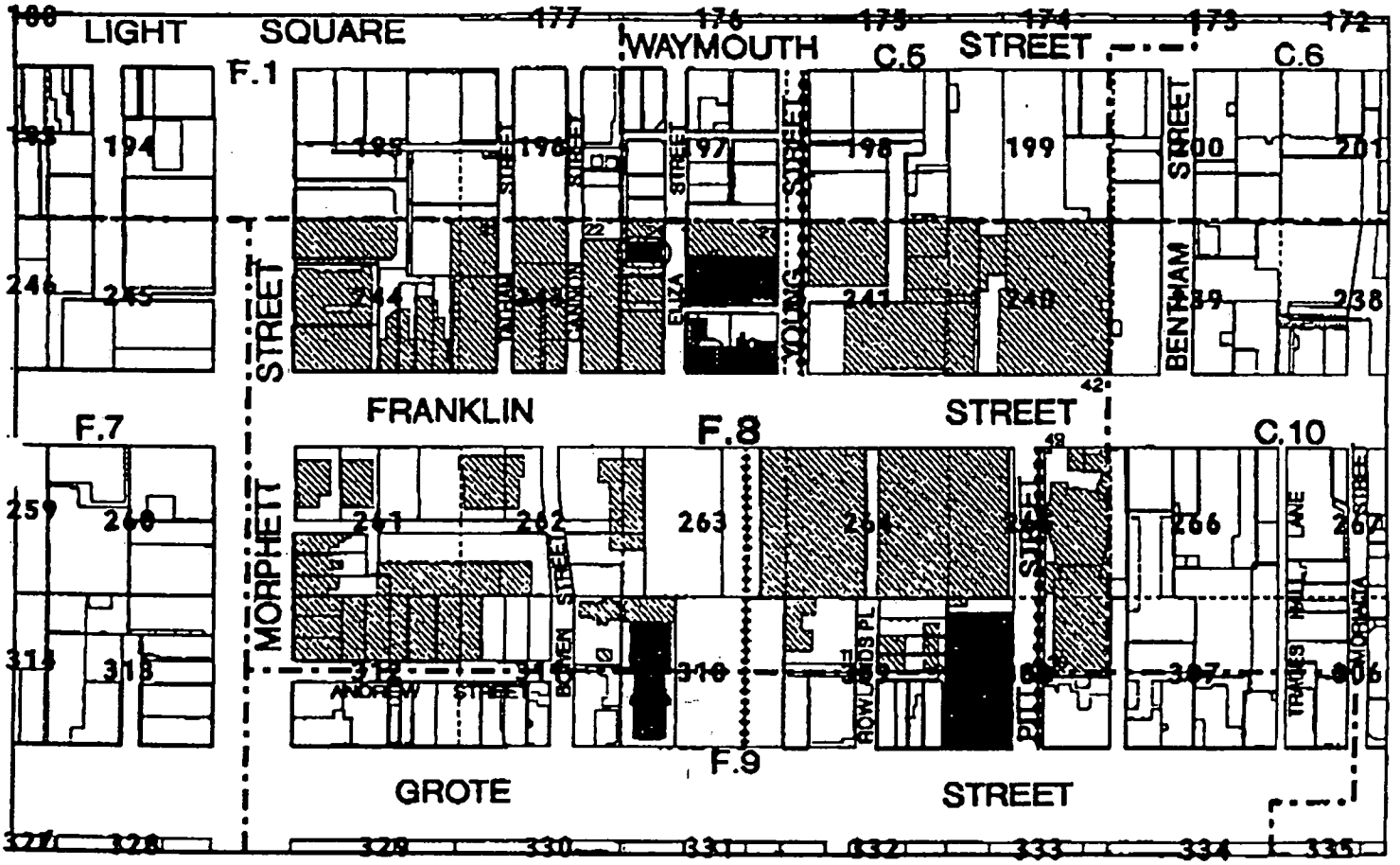
Bonus plot ratio of up to 0.6 can be achieved by the following means:

(a) by purchase of transferable floor area from a Local Heritage Item or an Item of City Heritage;

(b) for the provision of dwellings, multiple dwellings, institutional care, residential care accommodation, visitor accommodation or any combination of the above where the bonus floor area is equal to the floor area used exclusively for these purposes;

(c) for the provision of a child care centre and associated open space where the bonus floor area is equal to the area used exclusively for this purpose; and

(d) for the provision of a required pedestrian link on Town Acres 262 and 210 as indicated on Precinct Map F8. (The amount of floor area which may be achieved from the awarding of this bonus is equivalent to the site area devoted to the pedestrian link and multiplied by a factor of 2.0).



LEGEND

- PRECINCT BOUNDARY
- TOWN ACRE BOUNDARY
- TOWN ACRE NUMBER 528
- CT BOUNDARY
- REQUIRED PEDESTRIAN LINK (Existing)
- REQUIRED PEDESTRIAN LINK (Proposed)
- BUILDING (within Precinct)
- BUILDING (outside Precinct)
- HERITAGE ITEM
- LOCAL HERITAGE ITEM

PRECINCT MAP

F.8 FRANKLIN STREET EAST

12 December 1996

Height, Scale and Siting

The built-form in the Precinct should effect a transition from the higher intensity and scale of the Western Core to the lower scale of the Central Market Precinct.

Accordingly, the maximum building height in the Precinct is 21 metres or six storeys. Buildings on Franklin Street should achieve a minimum of two storeys. Front and side boundary set-backs should be minimal to Franklin and Morphett Streets, and be in accordance with the prevailing siting pattern in order to produce a largely continuous built-form wall along these major street frontages. On minor streets front and side set-backs may be varied to provide landscaped frontages to buildings.

Townscape Context

Development should relate well to neighbouring buildings and contribute to the development of a cohesive townscape. New buildings should respect the traditional scale, massing and architectural detail of the Franklin Hotel and adjacent buildings.

Heritage

Within the Franklin Street East Precinct the following items are included on the Register of City of Adelaide Heritage Items contained in Schedule 4 to these Principles:

Item 0961	Workshop, 25 Eliza Street;
Item 97	Young Street Chambers (former Printing House), 25 to 29 Young Street and 26-30 Eliza Street;
Item 98	Offices (former Houses), 82 to 86 Franklin Street;
Item 99	Church of Christ and Church Hall, rear of 96 to 100 Grote Street (part in F9 Precinct);
Item 100	Hotel Franklin, 88 to 92 Franklin Street;
Item 101	Her Majesty's Theatre, 54 to 58 Grote Street (part in F9 Precinct).

The location of the above buildings contained within the items is indicated on Precinct Map F8.

ENVIRONMENT AND AMENITY

Public Environment and Pedestrian Shelter

A high level of pedestrian amenity should be achieved in the public environment of the Precinct with large growing street-trees on the major streets and attractive paving where appropriate. Where footpath widths and existing or proposed street tree-planting allow, development may provide verandahs, awnings or balconies for pedestrian shelter.

Design of the public environment should contribute to the safety and security of pedestrians.

On-site Landscaped Open Space

On-site landscaped open space is not required, but the provision of landscaped pedestrian spaces such as arcades, malls and small pocket parks on pedestrian links is desirable.

Signs

The provision of signs should be in accordance with Principle 37 and Sign Chart F.

A variety of well-designed signs may be permitted in the Precinct. Illumination of signs and buildings is appropriate, providing there is no adverse impact on residential premises.

Within the indicated sign levels the following signs are appropriate:

(a) above canopy level - flat wall signs (at parapet height), vertical projecting signs;

(b) canopy level - fascia signs, flat wall signs, horizontal projecting signs;

(c) below canopy level - business plates, flat wall signs, horizontal projecting signs, under canopy signs; and

(d) ground level - low free-standing signs.

Within the indicated sign levels the following signs are ***non-complying***:

(a) roof level - all signs; and

(b) ground level - pylon signs.

All other signs and the animation of signs will be considered on their individual merits, but third party advertising is ***non-complying***.

MOVEMENT

Pedestrians

Existing through-site and on-street pedestrian links should be maintained and developed on Town Acres 241, 242, 263, 265, 308 and 310.

A new pedestrian link is required between Grote and Franklin Streets to run from Young Street to Moonta or California Streets through Town Acre 263 and 310 as shown on Precinct Map F8.

The pedestrian route along Bentham Street and Pitt Street should be developed as a key route linking the railway station with the Central Market. Pedestrian safety and security should also be improved along Young Street.

Vehicle Access and Servicing

Provision for vehicle access and servicing should be in accordance with Principles 44, 46 and 50.

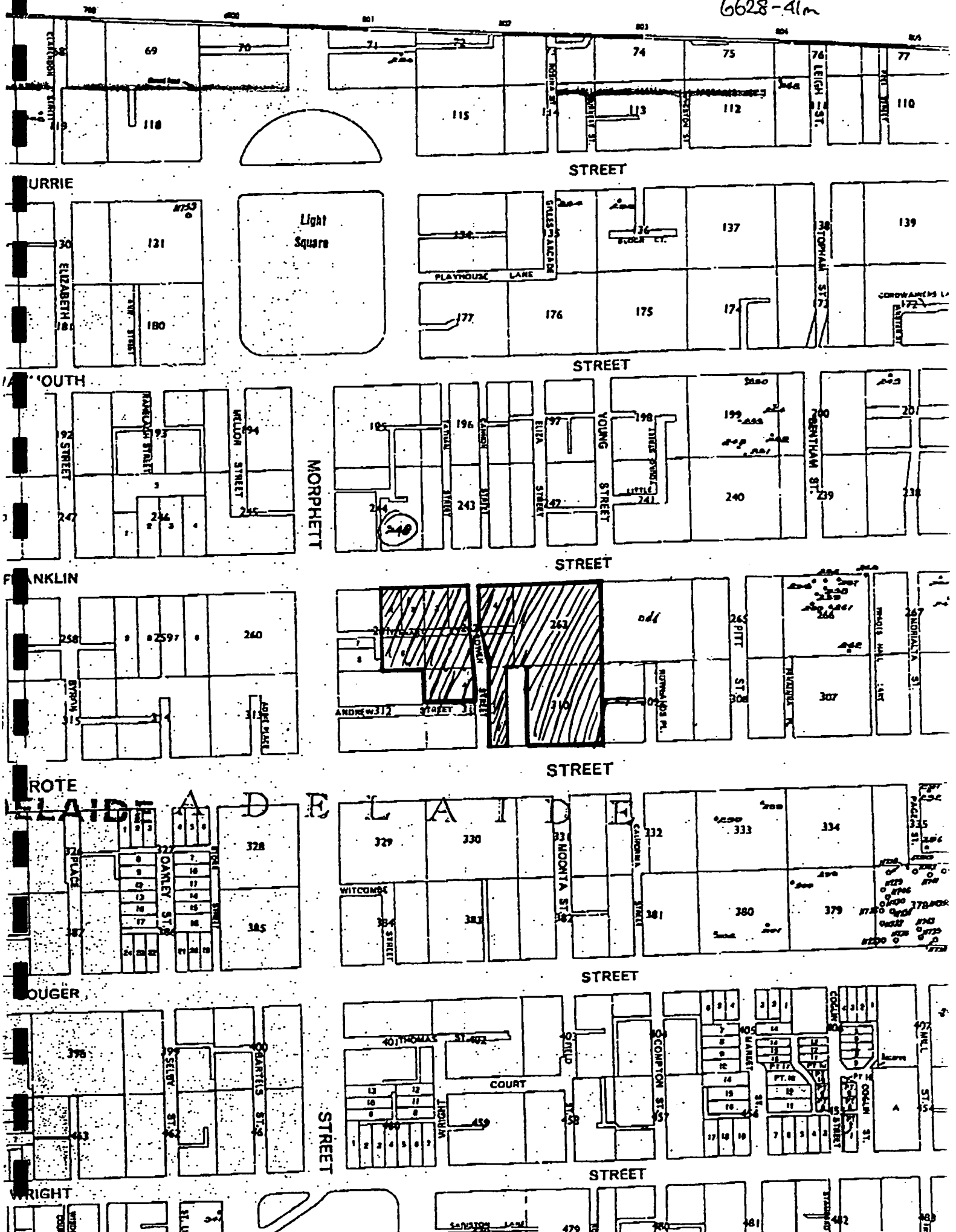
Parking

Provision for car parking should be in acoordance with Principles 48, 50, 52 and 53.

Appendix D

Borelogs from the Surrounding Area

6628-41m


STREET
URRIE
Light Square
PLAYHOUSE LANE
STREET
OUTH
MORPHETT
YOUNG STREET
STREET
ANKLIN
STREET
ROTE
ELAIDE
ELAIDE
STREET
OUGER
STREET
STREET
WRIGHT

South Australian Department of Mines and Energy

Radius 400 metres

Summary of Latest Water Information for Drillholes

Unit No	Cl	Max Drill Depth (m)	Orig Drill Date	Curr Drill Depth (m)	Curr Drill Date	Hundred	Section	SWL (m)	SWL Date	Well Yield (Gal/hr)	Well Yield Date	TDS (mg/l)	Sampl Date	pH	Permit	Cased To (m)	Full Chem Anal	Dril Log	Geol Log	Gphys Log	Aban Bckf Coll Plug
6628 41 m 230	NW	83.82	01/05	83.82	11/14	ADELAIDE	S 71	17.98	11/14	2502.37	01/14	1799	10/14				Y	Y	U	U	
6628 41 m 234	EW	12.95	11/61	12.95	11/61	ADELAIDE	S 135										U	U	Y	U	
6628 41 m 235	NW	27.43	06/14	27.43	06/14	ADELAIDE	S 136	21.34	06/14	1203.67	01/14	1428	06/14				Y	Y	U	U	
6628 41 m 243	SW	13.72	04/62	13.72	04/62	ADELAIDE	S 201	10.97	04/62								U	U	Y	U	
6628 41 m 248	NW	21.95	03/60	21.95	03/60	ADELAIDE	S 264										U	Y	U	U	
6628 41 m 249	SW	45.72	08/65	45.72	08/65	ADELAIDE	S 199	21.34	08/65								U	U	Y	U	
6628 41 m 250	SW	23.01	08/65	23.01	09/65	ADELAIDE	S 199									15.24	U	U	Y	U	
6628 41 m 251	EW	24.38	03/68	24.38	04/68	ADELAIDE	S 199										U	U	Y	U	
6628 41 m 252	EW	26.21	03/68	26.21	04/68	ADELAIDE	S 199										U	U	Y	U	
6628 41 m 253	EW	25.50	03/68	25.50	03/68	ADELAIDE	S 199										U	U	Y	U	
6628 41 m 254	EW	27.20	03/67	27.20	03/68	ADELAIDE	S 199										U	U	Y	U	
6628 41 m 255	EW	12.80	01/57	12.80	01/57	ADELAIDE	S 266										U	U	Y	U	
6628 41 m 256	EW	25.91	02/57	25.91	02/57	ADELAIDE	S 266										U	U	U	U	
6628 41 m 257	EW	12.80	01/57	12.80	01/57	ADELAIDE	S 266										U	U	Y	U	
6628 41 m 258	EW	12.80	01/57	12.80	01/57	ADELAIDE	S 266										U	U	Y	U	
6628 41 m 259	EW	4.88	01/57	4.88	01/57	ADELAIDE	S 266										U	U	Y	U	
6628 41 m 260	EW	12.80	01/57	12.80	01/57	ADELAIDE	S 266										U	U	Y	U	
6628 41 m 261	EW	12.80	01/57	12.80	01/57	ADELAIDE	S 266										U	U	Y	U	

Summary of Latest Water Information for Drillholes

Unit No	Cl	Max Drill Depth (m)	Orig Drill Date	Curr Drill Depth (m)	Curr Drill Date	Hundred	Section	SWL (m)	SWL Date	Well Yield (Gal/hr)	Well Yield Date	TDS (mg/l)	Sampl Date	pH	Permit	Cased To (m)	Full Chem Anal	Drll Log	Geol Log	Ophys Log	Aban Bckf Coll Plug
6628 41 m 262	EW	15.47	01/71	15.47	01/71	ADELAIDE	S 266										U	U	Y	U	
6628 41 m 263	EW	7.62	01/71	7.62	01/71	ADELAIDE	S 266										U	U	Y	U	
6628 41 m 289	EW	19.29	04/64	18.29	04/64	ADELAIDE	S 333										U	U	Y	U	
6628 41 m 290	EW	27.43	04/64	27.43	04/64	ADELAIDE	S 333										U	U	Y	U	
6628 41 m 300	WW	23.09	10/34	23.09	10/34	ADELAIDE	S 379			403.86	01/34						U	Y	U	U	
6628 41 m 301	EW	27.48	04/64	27.48	04/64	ADELAIDE	S 380										U	U	Y	U	
6628 41 m 302	EW	19.20	04/64	19.20	04/64	ADELAIDE	S 380	14.63	04/64								U	U	Y	U	
6628 41 m 358	EW					ADELAIDE	E 111										U	U	U	U	
6628 41 m 363	WW	113.00	09/76	113.00	09/76	ADELAIDE	S 61	40.00	09/76			1529	09/76	7.80	186		Y	Y	U	U	BKF
6628 41 m 5881	WW	100.00	03/78	100.00	07/78	ADELAIDE	E 19	18.00	03/78	300.92	01/78	2403	03/78	7.80	2798	53.68	U	Y	U	U	BKF
6628 41 m 11726	WW	17.50	05/81	17.50	05/81	ADELAIDE	E 378	15.00	05/81			1804	05/81	7.60	8778	17.50	U	Y	U	U	OPR
6628 41 m 11727	WW	17.00	05/81	17.00	05/81	ADELAIDE	S 378	14.50	05/81			1810	05/81	7.50	8779	17.00	U	Y	U	U	OPR
6628 41 m 11728	WW	16.00	05/81	16.00	05/81	ADELAIDE	S 378	13.50	05/81			1832	05/81	7.70	8780	16.00	U	Y	U	U	OPR
6628 41 m 11729	WW	16.50	05/81	16.50	05/81	ADELAIDE	S 378	14.00	05/81			1832	05/81	7.60	8781	16.50	U	Y	U	U	OPR
6628 41 m 11730	WW	16.00	05/81	16.00	05/81	ADELAIDE	S 378	13.50	05/81			1832	05/81	7.60	8782	16.00	U	Y	U	U	OPR
6628 41 m 11732	WW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	8.10	8784	19.00	U	Y	U	U	OPR
6628 41 m 11733	WW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	7.70	8785	19.00	U	Y	U	U	OPR
6628 41 m 11734	WW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	7.70	8786	19.00	U	Y	U	U	OPR

Summary of Latest Water Information for Drillholes

Unit No	Cl	Max Drill Depth (m)	Orig Drill Date	Curr Drill Depth (m)	Curr Drill Date	Hundred	Section	SWL (m)	SWL Date	Well Yield (Cal/hr)	Well Yield Date	TDS (mg/l)	Sampl Date	pH	Permit	Cased To (m)	Full Chem Anal	Dril Log	Geol Log	Gphys Log	Aban Bckf Coll Plug
6628 41 m 11739	WW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	17.50	05/81			1776	05/81	8.10	8791	19.00	U	Y	U	U	OPR
6628 41 m 11742	WW	15.00	05/81	15.00	05/81	ADELAIDE	S 378	12.50	05/81			1787	05/81	7.70	8794	15.00	U	Y	U	U	OPR
6628 41 m 11743	WW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1776	05/81	7.50	8795	19.00	U	Y	U	U	OPR
6628 41 m 11746	WW	15.10	05/81	15.10	05/81	ADELAIDE	S 378	12.50	05/81			1776	05/81	8.00	8798	15.00	U	Y	U	U	OPR
6628 41 m 11753	WW	12.55		12.55	09/81	ADDISON	S 131	6.35	09/81			882	09/81	8.50			U	Y	U	U	ABD
6628 41 m 13444	WW	160.00	11/84	160.00	11/84	ADELAIDE	S 191	20.00	11/85	1583.78					14718	29.00	U	Y	U	Y	

6628-248

HD. ADELAIDE PT. TOWN ACRE 244 BORE NO. 1 A

LOG OF BORE

Depth From	Depth To	Nature of Strata
0'	64'	Clay
64	72	Sand.
		END BORE 72ft.
		DRILLER R.S.MUNRO'S LOG.

Micro Film No.

6628 - 255

HD. ADELAIDE, T.A. BLOCK 266, AUGER HOLE NO. 4. 5A

LOG OF BORE

Depth From	Depth To	Nature of Strata
0'	1'	Fill. Sandy loam and rubble.
1	2	Fill. Fairly soft brownish limey clay with some greenish-grey clay with red and yellow mottling.
2	4	Dark brown limey clay loam with some rubble, (true topsoil) grading to light brown limey and sandy clay with abundant grit and travertine fragments. Slightly mottled.
4	6	Light brown limey clay and slight greenish-grey mottling and numerous travertine particles, becoming greenish-grey clay with brown and yellow-brown mottling. Quite firm and puggy.
6	8	Mainly greenish-grey slightly silty clay with slight yellow-brown (ochreous) and brown mottling. Some small patches of red iron staining. Some gritty fragments. Stiff and puggy.
8	18	Greenish-grey slightly silty clay with abundant patches of reddish material and lesses yellow-brown ochreous mottling. Some brown mottling. Numerous small grit and travertine fragments. Some blobs of black organic matter. Stiff and puggy.
18	20	Greenish-grey silty clay, but mottling mainly yellow and yellow-brown. Only insignificant reddish patches. Less gritty, no travertine fragments. Some moderately large patches. Less gritty, no travertine fragments. Some moderately large patches of brownish-black organic material. Stiff and puggy.
20	26	Greenish-grey slightly silty clay with reddish-brown mottling and some brown and yellow-brown patches. Stiff to very stiff.
26	32	Greenish-grey slightly silty clay with yellow-brown and brown mottling, reddish mottling only very slight.
32	39	Red-brown very sandy clay with small blobs of greenish-grey yellow-brown and brown clay. Patches of red-brownsand and grit. Very stiff.

Micro Film No.

6628-257

HD. ADELAIDE, T.A. BLOCK 266, AUGER HOLE NO. 4 C

LOG OF BORE

Depth From	Depth To	Nature of Strata
0'	2'	Brown sandy fill. Numerous rock fragments.
2	4	Dark brown limey clay (True topsoil). Mottled light brown. Somewhat silty but with numerous gritty fragments of quartz, travertine etc. - becoming more light brown with depth. Fairly soft and pliable.
4	6	Light brown limey clay with abundant gritty travertine fragments etc.
6	8	Light brown limey clay with some green-grey and slight red-brown mottling. Contains the usual gritty travertine, qtz. some black organic matter and whitish limey patches. Moderately stiff
8	10	Mainly green-grey silty clay, with brown, yellow-brown and slight red mottling. Thence as above.
10	14	Ditto but limey patches absent whilst reddish-brown iron staining more common. Very firm.
14	20	Mainly green-grey very stiff puggy silty clay. Slight browniah mottling. Some red and yellow iron oxide patches in varying amount. Some gritty fragments.
20	22	Ditto i.e. green-grey, but with excessive reddish patches and lesser yellow-brown patches. Again very stiff and puggy.
22	24	Ditto but more uellow-brown mottling.
24	26	Ditto - reddish-clay more abundant - appears to form harder kernels in otherwise very stiff and puggy clay.
26	33	Ditto i.e. green-grey silty clay, mottled mainly light red-brown, some yello w-brown and slight reddish. Very stiff and puggy with kernels df even harder clay. Some gritty particles etc. Abundant dark organic material at about 32ft.
33	34	Greenpgrey silty clay. Very stiff. Small patches of well churned light red-brown clayey sand. Numerous gritty particles.

Micro Film No.

BORING 1

ELEVATION 101 ± FEET

% FINES (-#200)	LIQUID LIMIT	PLASTICITY INDEX	STRENGTH DATA: TYPE OF STRENGTH TEST	STRENGTH DATA: TEST CONFINING PRESSURE, LBS/SQ FT	STRENGTH DATA: TEST MOISTURE CONTENT, %	STRENGTH DATA: SHEAR STRENGTH, LBS/SQ FT	MOISTURE-DENSITY DATA: NATURAL MOISTURE CONTENT, %	MOISTURE-DENSITY DATA: DRY DENSITY, LBS/CU FT	FIELD DATA: PENETRATION RESISTANCE, BLOWS/FT
							25.4		
			DS	700	24.9	1200	24.9	96	S/10/6"
							23.8		
			DS	1030	23.3	1640	23.3	101	S = 11
							27.9		
			DS	1310	28.2	1500	28.2	94	S=18/9"
	70		DS	1600	25.1	1600			
LINEAR SHRINKAGE = 17%							39.4		
			DS	1990	33.4	2430	33.4	89	S=11/9"
							24.1		
			DS	2530	32.5	2900	32.5	88	S = 23
							33.7		
			DS	3130	31.6	3220	37.6	85	S=18/9"
							33.8		
57							35.3		N = 42
			DS	3890	19.0	4400	19.0	110	S=24/6"
							19.2		
			DS	4500	24.1	4500	24.1	101	S=32/7"
							26.8		
			DS	5220	30.1	4800	30.1	92	S=29/6"

0 — ASPHALT PAVEMENT
Dark brown SANDY CLAY (CL) (fill, bricks, pockets of sand) (slight seepage) — FILL 4.5'

5 — Red-brown SILTY CLAY (CH) (fill) (stiff, gray)

10 — (green-gray, mottled with yellow) — after 54' W.T. T.H. Lane

15 — (moist zone)

(very stiff) — after 170' S.T. Franklin St.

20 — (cave-in from fill, petrol seepage)

25 — 33.7' Light green-gray and red SANDY CLAY (CL) (very stiff, near SC)

30 — 38.2' Light green-gray SILTY CLAY (CH) (very stiff, mottled with yellow)

40 — (grading less yellow)

45

50

BORING DEPTH 51 FEET
CASING DEPTH 39 FEET
GROUND WATER NOT OBSERVED

50'9" T.D.

6628-289

6628 41 MEW 69 Hel Adel

024599 LOG OF PERCUSSION DRILL HOLE

HOLE NO. 1

SHEET 1 OF 1

LOCATION CNR. GROTE ST. & EASTERN ROADWAY, ADELAIDE

FEATURE FOUNDATION CONDITIONS Depth 60 FT R.L. 249' Coords

SOIL TYPE GEOLOGICAL DESCRIPTION	CASING R.L. (FEET)	DEPTH (FEET)	GRAPHIC LOG	GROUP SYMBOL	SOIL DESCRIPTION GROUP NAME	CONSISTENCY REL. DENSITY	MOISTURE CONTENT	WATER LEVELS	HAND PENETROMETER Tons per sq. foot 1 2 3 4 5
Abundant earthy lime pockets and nodules up to 2 inches across				CL	CLAY SOIL, low plasticity, with some silty clay, brownish red-brown				
Scattered lime pockets and charcoal fragments					CLAY SOIL, high plasticity, silty, brown to reddish brown	VERY FIRM			
					CLAY SOIL, high plasticity, slightly silty, brown and grey with some very fine rootlets				
Few small reddish iron-stone nodules		10		CH	CLAY SOIL, high plasticity, fine sand and silt inclusions, light green-grey with fine mottled brown, yellow-brown and some red ferruginous mottling	STIFF	VERY MOIST		Ref recorded
		20				VERY STIFF			Ref recorded
TO R.L. 229 MOTTLED CLAYS				CL-SC	CLAY SOIL, low plasticity, finely sandy, grey-brown, brick red, yellow mottled				
PLEISTOCENE Coarse grains subangular to rounded and binding due to fines		30		SP-SC	SAND, fine to medium grain, poorly graded, dominantly quartz and silt fines 5% (non-plastic) up to 0.02 mm, grey with brick red and yellow mottling	DENSE	MOIST	NO WATER CUT	2.5+
Few small reddish iron-stone nodules				CH	CLAY SOIL, high plasticity, few fine sand particles, light grey with yellow and yellow-brown mottling, reddish mottling in 33 foot				
OLD EROSION SURFACE		40				VERY STIFF	VERY MOIST		
Abundant pockets of whitish earthy and chalky lime and hard nodules up to 2 - inches.				CH-ML	CLAY SOIL, high plasticity, abundant limey silt pockets, few sand particles, light green-grey yellow-brown mottling				
Few lime pockets and nodules		50		M.L.	SILT SOIL, low plasticity, fine sandy, light brown-yellow-brown mottling				
OLIGOCENE SANDSTONE Calcareous fossiliferous sandstone, fine grained, hard.				GM	GRAVEL irregular lumps of hard sandy limestone & calcareous sandstone	HARD			1.5+
					LIMESTONE, sandy, rubbly, off white, recovered as slurry.			SLUDGE SAMPLES	
UPPER MALLEE LIMESTONE		60			END OF HOLE 60 FEET				

TYPE OF SAMPLE: Open Tube; Sealed Tube; Auger barrel; Slush pump; Casing

HYDROLOGY: Water cut; Static level; Supply; Analysis (ppm); Water level (Date)

CONSISTENCY: VS-Very Soft; S-Soft; F-Firm; St-Stiff; VSt-Very Stiff; H-Hard

REL. DENSITY: VL-Very Loose; L-Loose; C-Compact; D-Dense; VD-Very Dense

MOISTURE: H-Humid; D-Damp; M-Moist; W-Wet; S-Saturated

Bore No. 23 — Logged R.D. Steel

Rig D.H.C. 500 — Date 31 May '84

Driller D. Phillips — Recorded R.D.S.

Started 6 April '84 — Traced J.M.K.

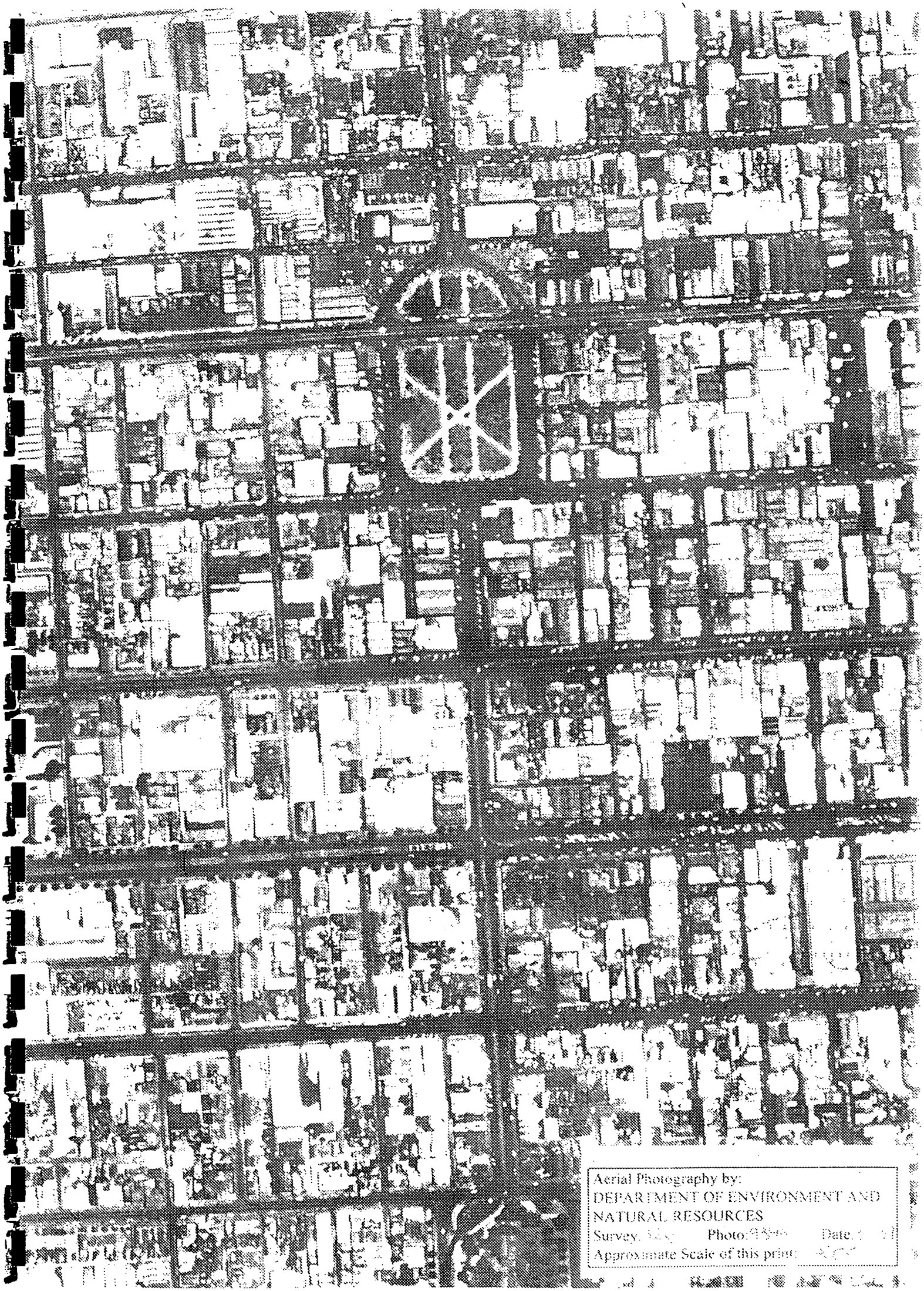
Finished 9 April '84 — Checked R.D.S.

PLAN No. S 3720 No. 8

Vertical Scale 10 feet to 1 inch

Appendix E

Aerial Photographs



Aerial Photography by:
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
Survey [illegible] Photo [illegible] Date [illegible]
Approximate Scale of this print [illegible]

Aerial Photography by
DEPARTMENT OF ENVIRONMENT AND
NATURAL RESOURCES
Survey [illegible] Photo [illegible] Date [illegible]
Approximate Scale of this print 1:[illegible]

Aerial Photography by:
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
Survey: [illegible] Photo: [illegible] Date: [illegible]
Approximate Scale of this print: [illegible]

Aerial Photography by:
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
Survey: SCC Photo: C-6 Date: 26/4
Approximate Scale of this print: 1:5000

Appendix F

Photographs

Photo 1: The Private Carpark on Andrew Street and the entrance driveway into Coachfreight (looking north).

Photo 2: The Coachfreight storage shed (and bus shelter), looking west, across Bowen Street.

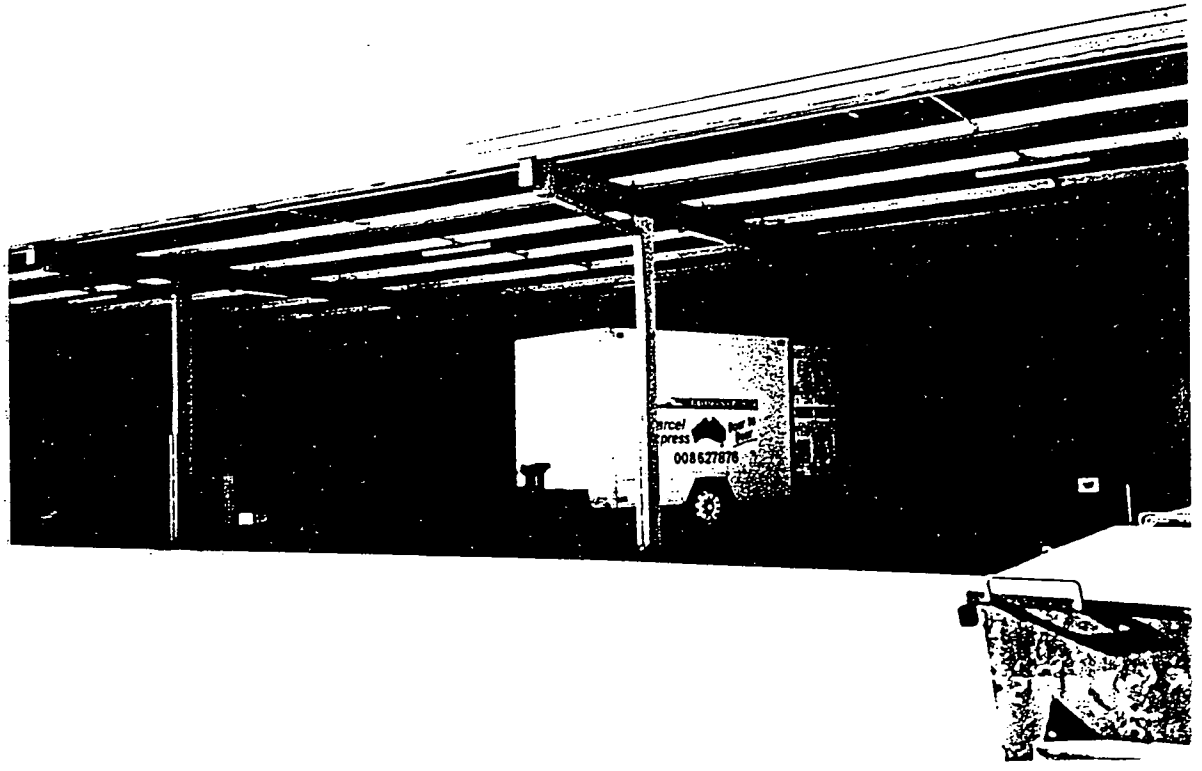


Photo 3: The Coachfreight storage shed, with the conveyor belt along the rear wall (looking south).

Photo 4: The Premier Stateline passenger terminal, and attached canopy for bus parking (looking west across Bowen Street).

Photo 5: The large drums containing waste oils near the stormwater drainage pit at the western edge of the site.

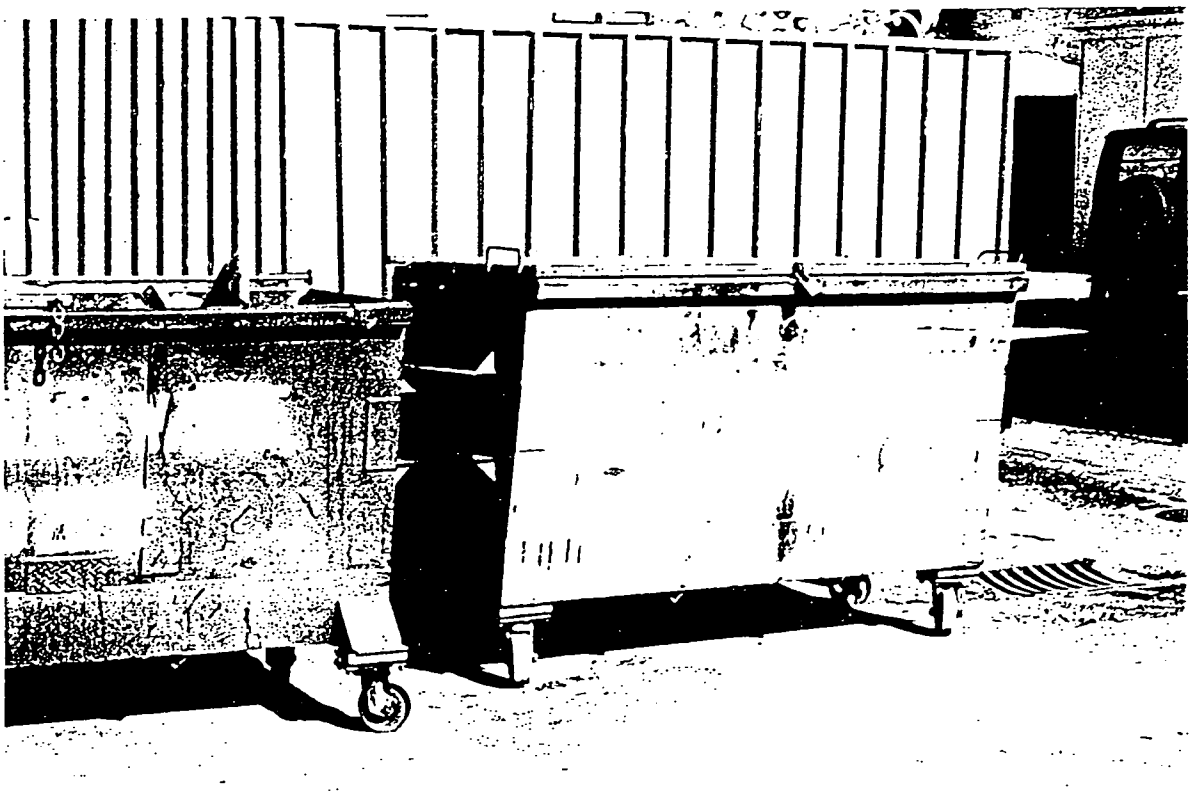


Photo 6: The Collex waste collection bins next to the stormwater drainage pit at the western edge of the site.

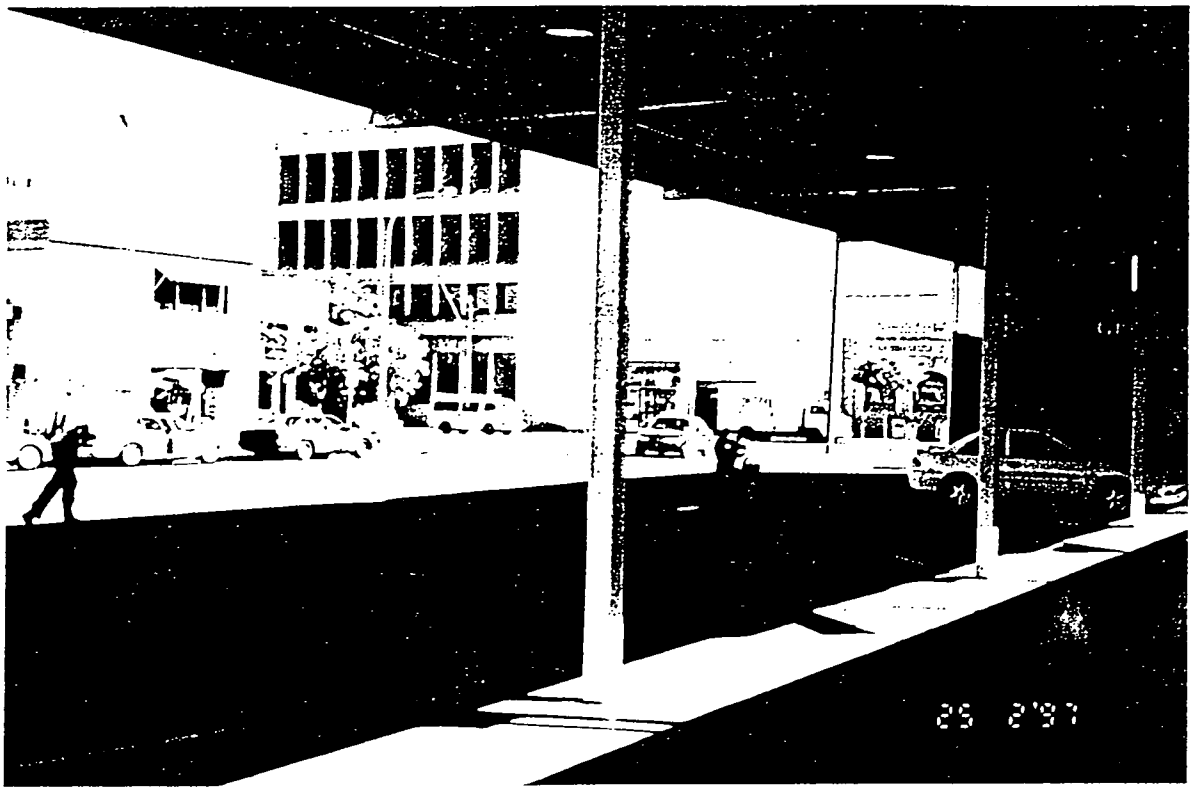


Photo 7: The Greyhound terminal and attached canopy for bus parking (looking north-west).

Photo 8: The carpark at the eastern edge of the site (looking east from the Greyhound terminal).

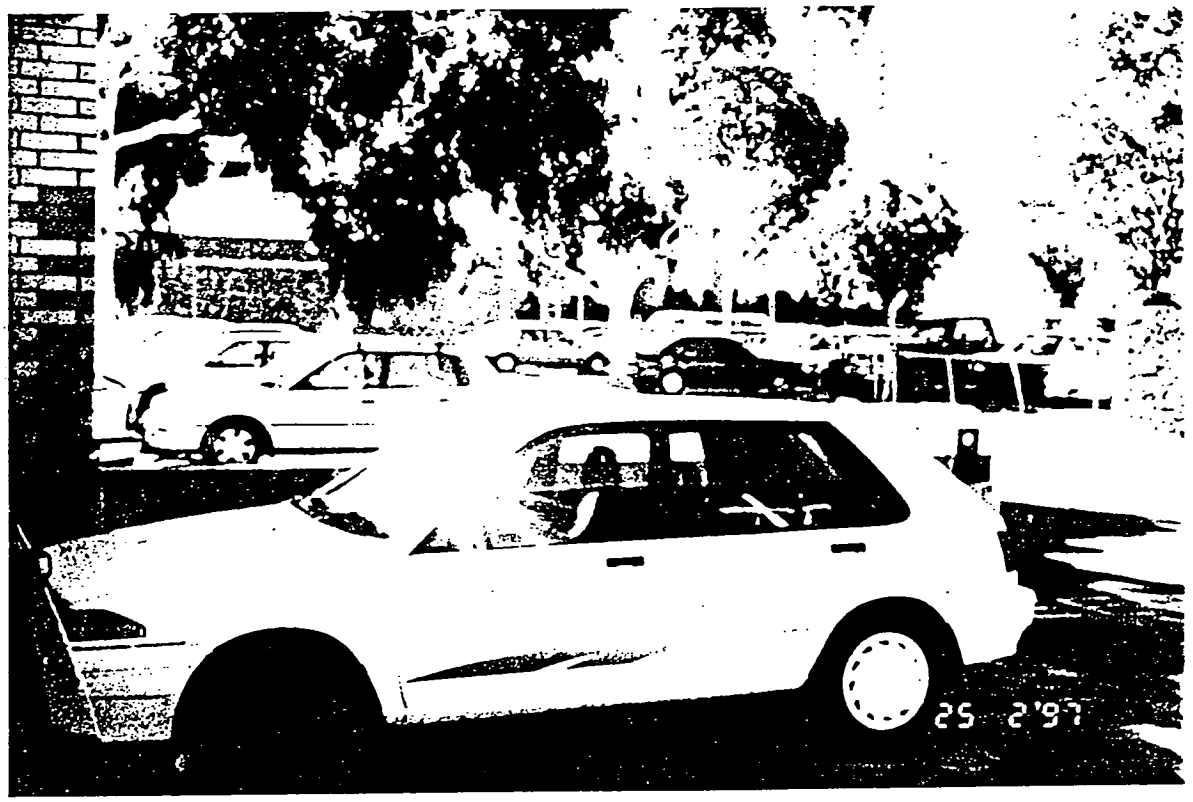


Photo 9: The carpark at the eastern edge of the site (looking east from the Greyhound terminal).

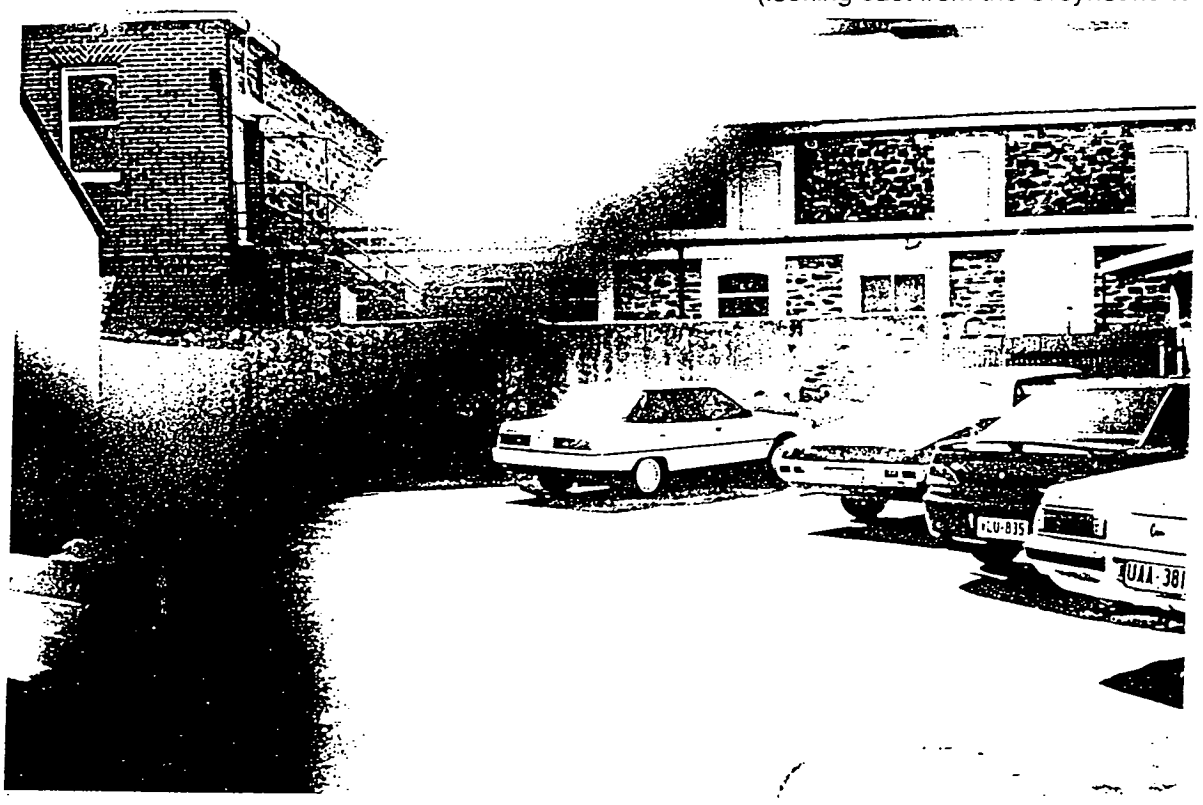


Photo 10: The private car park on Bowen Street with the remains of an old wall along the rear of the site (looking east from Bowen Street).

APPENDIX B

Rust PPK Pty Ltd, 1997,
Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide,
for the Corporation of the City of Adelaide, 30 June 1997

Environmental Site Assessment Franklin Street Bus Station and Car Parks

The Corporation of The City of Adelaide

Rust PPK Pty Ltd
Environment & Infrastructure

101 Pirie Street
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30 June 1997
27J097A 97-459.DOC

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Environment & Infrastructure

Our Reference 2706/2916/27J097A

30 June 1997

The Corporation of The City of Adelaide
Town Hall Adelaide
GPO Box 2252
South Australia 5001

Attention: Mr Brian Fitzpatrick

Dear **Brian**

Environmental Site Assessment Franklin Street Bus Station and Car Parks

Rust PPK is pleased to submit two (2) copies of the above assessment report for your consideration.

The findings of the assessment program have identified no requirements for remedial works at the site in accordance with the continued long term use of the site for commercial purposes. Recommendations have been made with regard to the potential redevelopment of various parts of the site for either similar commercial landuses or for restricted residential purposes (with no access to underlying soil), and also for more sensitive landuses (such as unrestricted residential) where there maybe potential access to underlying soil. It is understood that the recommendations are subject to approval by the appointed environmental auditor, Adrian Hall.

I trust that I have interpreted your requirements correctly. If you have any queries or questions relating to the above report or the assessment program, please do not hesitate to call me on (08) 8405 4300 or 0414 245353.

Yours faithfully

Stuart P Taylor
Team Leader, Environmental Assessment and Remediation
Rust PPK Pty Ltd

Contents

		Page Number
Executive Summary		iii
1.	Introduction	1
2.	Site Identification and Description	
2.1	Site Identification	2
2.2	Site Description	3
2.3	Site Ownership	3
2.4	Site Topography	3
2.5	Local Soil Types	3
2.6	Local and Regional Groundwater	4
3.	Site History	
3.1	Historical Overview	5
3.2	Summary of Potential Site Contamination Issues	5
4.	Soil Assessment program	
4.1	Assessment Rationale	7
4.2	Ground Conditions Encountered	8
4.3	Sampling Depths and Analytes	9
4.4	Laboratory Analysis Program	11
4.5	Soil Assessment Criteria	11
4.6	Soil Contamination Assessment	12
4.7	Data Validation Report	15
5.	Conclusions	16
6.	Recommendations	18
7.	Statement of Limitations	20

Appendices

Appendix A	Site Location Plan
Appendix B	Department of Mines and Energy Groundwater Data
Appendix C	Location of Soil Sampling Points
Appendix D	Soil Borelogs
Appendix E	Interpolated Area of Potentially Impacted Soils
Appendix F	Chain of Custody Forms
Appendix G	Assessment Criteria for Analytical Results
Appendix H	Tabulated Soil Analysis Results
Appendix I	Certified Laboratory Results
Appendix J	Tabulated Results of Replicate and Duplicate Analysis
Appendix K	Data Validation

Executive Summary

Rust PPK Pty Ltd (Rust PPK) was commissioned by The Corporation of the City of Adelaide (The Corporation) to undertake a preliminary environmental assessment of the Franklin Street Bus Station and several surrounding car park sites. The entire subject site which includes the bus station and car parks is located at 85-129 Franklin Street however the site is divided into two sections on the eastern and western sides of Bowen Street.

The environmental assessment program follows a site history investigation undertaken by Rust PPK in March 1997 (Rust PPK doc no 97/143).

The objectives of the environmental assessment program were to investigate and report on any potential soil and groundwater contamination resulting from past site activities, prior to the possible future redevelopment of various parts of the site.

In order to achieve these objectives Rust PPK undertook a comprehensive desktop study and on-site investigation comprising targeted soil investigations and detailed laboratory analysis.

The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- *the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);*
- *the north east corner of the Grote Street public car park (BH14); and*
- *the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).*

An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.

Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC environmental guidelines.

The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial landuses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both landuses.

In accordance with the continued use of all site areas for current commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works at the site. The only possible exception is the need for a site specific risk assessment to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the elevated lead level identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

If any part of the site is to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse. This is necessary in order to further characterise the soil in those areas of the site which were not investigated, particularly due to the presence of ash and cinders within the fill materials at thirteen out of the twenty sampling locations on-site. If any part of the site, with the exception of the Premier Stateline Terminal, is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that charcterisation of any excavated soil be carried out in order to determine off-site disposal options. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in many areas of the site. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

1. Introduction

Rust PPK Pty Ltd (Rust PPK) was commissioned by The Corporation of the City of Adelaide (The Corporation) to undertake a preliminary environmental assessment of the Franklin Street Bus Station and several surrounding car park sites. The entire subject site which includes the bus station and car parks is located at 85-129 Franklin Street however the site is divided into two sections on the eastern and western sides of Bowen Street.

The environmental assessment program follows a site history investigation undertaken by Rust PPK in March 1997 (Rust PPK doc no 97/143)

The objectives of the environmental assessment program were to investigate and report on any potential soil and groundwater contamination resulting from past site activities, prior to the possible future redevelopment of various parts of the site.

In order to achieve these objectives Rust PPK undertook a detailed desktop study and on-site investigation comprising:

- review of historical site usage;
- review of local soil and groundwater;
- drilling and sampling of twenty (20) soil bores;
- laboratory analysis of selected soil samples for a full range of chemical parameters characteristic of suspected potential contaminants resulting from previous on-site and adjacent site activities; and
- review and assessment of soil contaminant levels in accordance with the proposed future landuse.

The scope of works undertaken was in general accordance with the proposed work plan provided to The Corporation in April 1997 (Rust PPK document no. 97-219) and was subject to discussion and approval by The Corporation appointed Environmental Auditor, Mr Adrian Hall (BC Tonkin & Associates).

This report details the results and findings of the assessment program including a summary of available site history, assessment methodology and recommendations for limited site remediation and future site management.

2. Site Identification and Description

2.1 Site Identification

The subject site comprises two irregularly shaped parcels of land to the east and west of Bowen Street. Each of these parcels comprises a number of allotments which are described under different Certificates of Title, as listed in Table 2.1 and Table 2.2 below.

The total area of the site is approximately 1.41 hectares.

The site is located at 85-129 Franklin Street, Adelaide, and has an approximate total area of 1.41 hectares. The Corporation have advised that the site is part of the F8 Franklin Street East Precinct. Any proposed development must comply with the zoning regulations specified by the council which apply to this area. These regulations specify the desired and non-complying land uses and specify that any development should be used to establish a new commercial character in the area, complemented by the upgrading of the public environment.

Table 2.1
Allotment Details for the Eastern Side of Bowen Street

Certificate of Title Reference	Land Description	Area (m^2)
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.60
1751/37	Town Acre 311	648.80
1922/48	Town Acre 263	986.26
5060/608	Allotment 1 in DP 32560	580.00
5317/61	Allotment 12 in DP546	149.60
5317/62	Allotment 91 in FP166443	348.69
5317/63	Allotment 92 in FP166444	271.50
5317/64	Allotment 93 in FP166445	526.90
5317/65	Allotment 91 in FP170401	816.37
TOTAL		9156.02

Table 2.2
Allotment Details for the Western Side of Bowen Street*

Certificate of Title Reference	Land Description	Area (m^2)
2023/96	Town Acre 311	260.67
2128/45	Town Acre 311	257.80
2201/187	Town Acre 311	259.70
3479/180	Town Acres 261 & 262	1744.00
3582/78	Town Acre 261	509.70
3582/79	Town Acre 262	490.04
3582/80	Town Acres 261 & 262	1122.90
3841/122	LTRO Plan 546	340.60
TOTAL		4985.41

The site is surrounded by the following properties:

- Dreamland Furniture and a disused warehouse to the east;
- light industrial facilities to the west;
- Franklin Street to the north; and
- Andrews Street, the Grote Street Church of Christ and Grote Street to the south.

A location map for the site is presented in Appendix A.

2.2 Site Description

The site currently contains the following features:

- the Premier Stateline bus terminal, canopy and private car park on the north-west of the site (collectively referred to as Bus Depot 2);
- the Coachfreight parcel collection and drop off point (including storage shed) in the west of the site;
- a bitumen-sealed private car park in the south-west of the site;
- the Greyhound and McCafferty's Express bus terminals and canopy on the north-eastern side of Bowen Street (collectively referred to as Bus Depot 1);
- a single storey house, a private car park, a toilet block and a two-storey building and adjacent car park all utilised by the Adelaide Central Mission on the eastern side of Bowen Street, in the south of the site (collectively referred to as 104 Grote Street); and
- two bitumen sealed public car parks in the east of the site owned and operated by The Corporation of the City of Adelaide (referred to as the Grote Street Car Park and the Franklin Street Car Park).

2.3 Site Ownership

The current Certificates of Title show the site to be owned by The Corporation of the City of Adelaide.

2.4 Site Topography

The site is situated on a flat parcel of land and is surrounded by similarly flat parcels of land.

2.5 Local Soil Types

Published information and previous experience in the area suggests that the natural soil profile at this site can be expected to include in the order of 1.0m of surface fill, consisting of various reworked soils and building rubble. Underlying this the profile is likely to resemble a Brown Solonized Soil type BS classification. Type BS soil profiles consist of brown sandy to clayey

soils with abundant earthy lime and calcrete in the subsoil. Type BS soils are alkaline and often contain significant amounts of soluble salts. Over most of the city area, Type BS soils vary from a thin layer up to three metres thick and the layer overlies Hindmarsh Clay. Surface absorption in Type BS soils is rapid due to the highly permeable profile and as such external drainage is slight.

2.6 Local and Regional Groundwater

Department of Mines and Energy (MESA) records indicate regional standing groundwater levels at depths ranging from approximately 6 to 40 metres (refer Appendix B).

No groundwater was intersected during the on-site drilling program to a maximum depth of 2.3 m.

3. Site History

3.1 Historical Overview

The following information summarises the information obtained from Certificates of Title, Assessment Books in the Adelaide City Council Archives, the Sands and McDougall Directories of South Australia and historical aerial photographs of the site, all of which was documented in more detail in the Site History Report prepared by Rust PPK in March 1997:

- From 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises including a garage, forge, workshop, bakehouse, and a private road.
- From the 1920s a number of small light industries were established on the site. These included a factory, garages, forges, stables, printing works, workshops, shops and offices. Some of the occupants included the Franklin Wrecking Co, J.W. Turner, a plumber, Oxy-welders Ltd, the O'Donnell Brothers Ltd, and a number of radio and electrical companies.
- During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park by Dimet Corrosion Prevention Pty Ltd and I. and M. Jedynak.
- The Corporation of the City of Adelaide had acquired most of the land comprising the site by 1972, excepting the land contained in Certificates of Title 5060/608 and 1751/37 (the land referred to as 104 Grote Street). The land was then cleared and by 1979 the majority of the existing bus terminals and car parks had been constructed.
- The residences on land contained in Certificates of Title 5060/608 and 1751/37 were acquired by The Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission. The front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking.
- Between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.

3.2 Summary of Potential Site Contamination Issues

Based on the historical information obtained from the Site History Investigation, it is considered that the following potential contamination may be present on site as a result of past on-site and adjacent site activities:

- Polycyclic Aromatic Hydrocarbon (PAH) contamination from the tar-based sub-base materials that have been used beneath bitumen in the past;
- PAH contamination from possible waste products associated with coal fires or furnaces which may have been used on the site in the past;
- Organochlorine Pesticide (OCP) contamination from the possible use of white ant treatments beneath buildings that have existed on-site;

- possible petroleum hydrocarbon (TPH) contamination from leakage of fuel or oil from vehicles; and
- possible heavy metal contamination from activities associated with a plumbing business, forging, oxy-welding, radio and electrical companies, wrecking and auto-mechanics or printing works, all of which existed on the site in the past.

4. Soil Assessment program

4.1 Assessment Rationale

The assessment program was undertaken in general accordance with the proposed scope of works provided to The Corporation in April 1997 (Rust PPK document no. 97-219).

In designing the soil assessment program, reference was drawn from the following sources:

- the Australian and New Zealand Guidelines for the Assessment and management of Contaminated Sites" (ANZECC 1994);
- the guidelines prepared by the South Australian Health Commission in the publication "A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in South Australia" (1993); and
- site history information.

The soil sampling program targeted only the open space areas of the site. The approximate open space area of the site is 0.98 hectares therefore in accordance with the Draft Australian Standard for the Sampling of Soils, the minimum number of sampling points recommended for a site with an area of 0.9 hectares is 20 points. The soil assessment program therefore incorporated twenty (20) soil monitoring bores targeted within the open and accessible areas of the site.

The location of all soil sampling boreholes were discussed with and approved by the appointed auditor, Adrian Hall and the approximate location of the soil monitoring bores are presented in Appendix C.

Drilling and sampling of the soil boreholes was undertaken between 20 - 22 of May 1997. Soil boring was undertaken using stainless steel push tubes, driven by a pneumatic hammer, to a maximum depth of 2.3 m. Soil cores were extracted from the push tubes directly onto clean plastic core trays for logging and collection of soil samples by the Rust PPK field investigator. Soil samples were recovered directly from core trays and transferred to pre-chilled 250 ml glass jars and sealed with teflon lined metal lids. Collected samples were immediately labelled and transferred to a chilled esky for storage.

On completion of field activities all samples were checked for labelling consistency against the field sampling record. Samples were then packed into eskies with fresh ice bricks and sealed for transport to the nominated laboratory for storage and analysis. Chain of Custody forms were completed and accompanied the samples to the laboratory.

To reduce any cross-contamination of soil samples all push tubes were decontaminated and cleaned using a pressurised spray gun prior to the drilling of all soil bores. An equipment rinsate (ER) was taken on one push tube in every ten (10) boreholes, a procedure which involves rinsing the tube with de-ionised water into a sample bottle which can then be sent to the laboratory for analysis to ensure that the tubes were washed correctly.

A field duplicate sample was recovered from a particular depth at each borehole in addition to the primary sample for that depth. Selected field duplicates were analysed along with the primary sample in order to monitor the precision and accuracy of the laboratory analysis and the distribution of contaminants within the soil profile.

4.2 Ground Conditions Encountered

The generalised soil types encountered during drilling are summarised as follows:

- Fill Materials: generally consisted of a surface layer of yellow silty sand with some gravel overlying dark brown silty clays to depths ranging from 0.5 m to 1.2 m. Brick fragments and cinders were identified in 13 out of the 20 boreholes and fragments of vesicular slag were identified in one of the boreholes.

- Natural Sediments: calcareous silty clays with some calcareous gravel ranging from creamy brown mottled brown to orange brown mottled creamy brown to a depth of approximately 2.0 m. At some boreholes the soil became greenish brown at around 2.0 m as it became Hindmarsh clay.

The fill materials which showed visual evidence of contamination are detailed as follows:

BH4: Some ash and cinders and very occasional vesicular slag fragments from 0.7 - 1.0m.
BH5: Occasional ash and cinders from 0.7-0.8 m.
BH6 : Occasional ash and cinders from 0.65-0.75 m.
BH10: Occasional ash and cinders from 0.65-0.7 m.
BH12: Very occasional ash and cinders from 0.55-0.7 m.
BH13: Occasional surface bitumen fragments from 0.035-0.15 m, some ash and cinders from 0.6-0.9 m,
BH14: Occasional ash and cinders from 0.15-0.7 m.
BH15: Occasional ash and cinders from 0.55-0.7 m.
BH16: Occasional ash and cinders from 0.3-0.6 m.
BH17: Occasional ash and cinders from 0.65-0.7 m.
BH18: Occasional ash and cinders from 0.4-0.5 m.
BH19: Occasional ash and cinders from 0.6-0.7 m.
BH20: Very occasional ash and cinders from 0.015-0.2 m, occasional ash and cinders from 0.35-0.55 m

Environmental soil monitoring borelogs are presented in Appendix D and a site plan showing the approximate area of fill materials containing ash, cinders and/or slag is contained in Appendix E.

4.3 Sampling Depths and Analytes

In general 3 to 4 soil samples were collected from the first metre of the soil core, with an additional 1 to 3 samples recovered between 1.0 m and 2.0 m, and then one sample was taken below 2.0 m, if the borehole was drilled past 2.0 m. The sampling generally included between 2 and 5 soil samples from the fill materials depending on the depth of fill. The specific sample depths were dependent on the soil profile at each location.

Selected soil samples were analysed for a range of chemical analytes including:

- Organochlorine Pesticides (OCPs);
- Heavy Metals - arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), and zinc (Zn);
- Total Petroleum Hydrocarbons (TPHs);
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs); and
- pH.

Four soil samples were also analysed for the full Victorian EPA Chemical Suite which generally consists of a selection (or all) of the following analytes:

- Heavy Metals - As, Be, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Zn;
- Organochlorine Pesticides (OCPs);
- Total Petroleum Hydrocarbons (TPHs);
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX);
- Poly Aromatic Hydrocarbons (PAHs);
- Poly Chlorinated Biphenyls (PCBs);
- Chlorinated Hydrocarbons;
- Cyanide;
- Fluoride; and
- Phenols.

The four samples which were analysed for the full Victorian EPA screen were all field duplicates. Two of the duplicates were labelled as blind duplicates (the borehole number and depth was not indicated) and analysed by the primary laboratory along with the original samples in order to provide an intra-laboratory comparison between the results. The other field duplicates were analysed by the secondary laboratory while the original samples were analysed by the primary laboratory in order to provide an inter-laboratory comparison. These analyses were undertaken as a quality control measure.

Two Equipment Rinsates (ER1 and ER2) was also analysed for PAHs, heavy metals and OCPs.

Chain of Custody documentation showing all of the samples recovered and the analysis selected for particular samples is presented in Appendix F.

4.3.1 Rationale for Analyte Selection

Metals (As, Be, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Zn)

Analysis for the nominated range of heavy metals was undertaken to target metallic species which may have been present within any fill materials on-site. Heavy metals could be present on-site from activities associated with many of the businesses which existed on-site in the past. The metals selected are in accordance with the suite of metals recommended within the Victorian EPA Screen and have the potential for posing health and/or environmental concerns if significant elevated levels are identified.

pH

Analysis for pH was undertaken on the majority of the samples as it is a measure of the relative acidity or alkalinity of the soil. The soil pH provides valuable information relating to the potential for leachate generation and solubility of certain metallic and non metallic analytes.

TPH/BTEX

TPH and BTEX analyses were undertaken as a measure of potential petroleum hydrocarbon residues within the soil profile. The potential for on-site petroleum hydrocarbon impacted soils was identified from the possibility of leakage of fuel and oil from cars in those areas that are used as an open bitumen car park.

PAHs

Analysis for PAHs was undertaken due to the possibility that tar-based materials were used beneath the bitumen car park and also due to the possibility that wastes associated with coal, coke or fuel oil fires or furnaces may be present on-site. PAHs typically result from the incomplete combustion and partial pyrolysis of petroleum hydrocarbon products (ie. fuel oils, coke and coal). Some PAH compounds, particularly Benzo(a)pyrene are known human carcinogens, whilst other PAHs including Benzo(a)anthracene and Dibenz(a,h)anthracene are suspected human carcinogens.

OCPs

Analysis for OCPs was carried out due to the possibility of residual contamination from the use of white ant treatments beneath or around any of the residences or other buildings that existed on the site in the past. OCPs have the potential to pose significant health risks for future occupiers of the site as the more residual OCPs such as Dieldrin, Heptachlor and DDT have a predicted environmental persistence time of 5-15 years.

Victorian EPA Screen

Analysis of selected soil samples for the Victorian EPA screen was undertaken in accordance with the requirements of the independently appointed Environmental Auditor. The range of analytes contained within the Vic EPA screen provide a broad chemical characterisation of the site targeted towards a wide range of common industrial and commercial pollutants.

4.4 Laboratory Analysis Program

The primary laboratory soil analyses were conducted by:

Australian Government Analytical Laboratories (AGAL)
51-65 Clarke Street
South Melbourne, Victoria.

AGAL laboratories are NATA certified for all of the nominated soil analyses.

Two duplicate samples were sent to a secondary laboratory as a Quality Control (QC) measure. The inter-laboratory QC duplicate analysis was conducted by:

MGT Environmental Consulting Pty Ltd
3 Kingston Town Close
Oakleigh, Victoria.

MGT are also NATA certified for all of the nominated soil analyses.

4.5 Soil Assessment Criteria

In order to assess the level and significance of any potential contaminants detected through analytical laboratory testing it is usual to reference established environmental investigation levels and/or human health threshold exposure levels.

For the purpose of assessing potential long term human health risks, the South Australian Health Commission (SAHC) Investigation Levels as specified within the publication "A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in SA" (SAHC January 1993), are referenced as the adopted initial investigation levels.

For the purpose of assessing potential environmental risks, the Environmental Investigation Levels specified in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC/NH&MRC 1992) are referenced as the adopted initial investigation levels. The ANZECC Environmental investigation guidelines are primarily based on threshold levels for phytotoxicity and surface water receptors and are derived to protect the most sensitive receptor likely to be placed at risk and to reflect a level at which there is no observed effect on that receptor.

The SAHC (health) and the ANZECC (environmental) Investigation Levels do not necessarily represent an immediate action level if exceeded during the course of the initial investigation, however, they indicate contaminant levels which need to be assessed further through risk analysis to determine the relative level and significance of the contaminant concentrations on a site specific basis.

As a preliminary aid in the evaluation of site specific health based risk analysis, the Proposed Health Based Soil Guidelines (Langley et al 1996) as presented in the Health Risk Assessment and Management of Contaminated Sites - Contaminated Sites Monograph Series No. 5, 1996 are used as reference criteria. The Langley Criteria incorporate health based soil guidelines for a range of potential exposure settings including:

Exposure setting **A** - 'standard' residential;
Exposure setting **B** - 'restricted' residential with substantial vegetable garden (limits on poultry meat intake);
Exposure setting **C** - 'restricted' residential with substantial vegetable garden (exclusions on poultry meat intake);
Exposure setting **D** - residential with restricted soil access (includes medium to high density residential);
Exposure setting **E** - parks, recreational open space and playing fields: includes secondary schools;
Exposure setting **F** - commercial/industrial sites.

For the purpose of the preliminary contamination assessment the assessment criteria nominated within the SAHC Health Based Guidelines and the ANZECC Environmental Investigation levels will be referenced as the primary assessment criteria. For the purpose of the preliminary health risk assessment reference will be drawn from the Langley Criteria for restricted residential landuse with limited soil access and commercial/industrial landuse (Langley et al 1996 - Exposure Settings D and F) in order to provide information regarding the health risks associated with the site depending on the potential future landuse.

In the case of analytes not covered by the nominated guidelines the Dutch Investigation and Intervention values will be referenced and the former Dutch C levels and the NSW EPA Guidelines for Assessing Service Station Sites will be used as the guidelines for TPH/BTEX.

4.6 Soil Contamination Assessment

Assessment Criteria for comparison with soil analytical results is contained in Appendix G and laboratory results from the nominated soil analyses are presented in tabulated form in Appendix H. Full certified laboratory results are presented in Appendix I. Refer to Appendix C for the sampling location plan.

Heavy Metals

Elevated levels of **zinc** (280 mg/kg, 2000 mg/kg and 410 mg/kg) in excess of the ANZECC Environmental Investigation level (200 mg/kg), were reported within the fill materials (0-0.7 m) at boreholes BH4, BH14 and BH20. At borehole BH14, located in the north eastern corner of the Grote Street Car Park, the zinc concentration was also above the SAHC Health Based Investigation level of 500 mg/kg. From a preliminary human health risk assessment perspective the zinc concentrations identified at these locations were well below the proposed health based soil guidelines for both restricted residential landuse (limited soil access) and commercial/industrial landuse (Langley et al 1996, Exposure settings D and F) of 28000 mg/kg and 35000 mg/kg.

Elevated **lead** concentrations (670 mg/kg and 1600 mg/kg) in excess of the ANZECC Environmental Investigation level and the SAHC Health Based Investigation level, both of which have a level of 300 mg/kg, were reported within the fill materials (0-0.7 m) recovered from boreholes BH4 and BH14. The lead concentration from BH14 was also in excess of the proposed health based soil guidelines for both restricted residential landuse and commercial/industrial landuse (Langley et al 1996, Exposure Settings D and F) of 1200 mg/kg and 1500 mg/kg respectively.

An elevated **copper** concentration of 450 mg/kg which is in excess of the ANZECC Environmental Investigation level (60 mg/kg) and the SAHC Health Based Investigation level (100 mg/kg) was reported within the fill materials (0.55-0.7 m) recovered from borehole BH14 located in the north eastern corner of the Grote Street Car Park. The concentration reported was however well below the proposed health based soil guidelines for both restricted residential landuse (limited soil access) and commercial/industrial landuse (Langley et al 1996, Exposure settings D and F) of 4000 mg/kg and 5000 mg/kg.

Analysis for heavy metals was undertaken on eight natural soil samples across the site and the concentrations were all well below the relevant assessment criteria.

The concentrations of heavy metals were below the referenced acceptance criteria for the remainder of the boreholes however fragments of ash and cinders were identified in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11, and in boreholes BH4 and BH18 located on the western side of Bowen Street therefore there is the potential for localised or 'hotspot' heavy metal contamination at all of these locations.

Polycyclic Aromatic Hydrocarbons (PAHs)

An elevated Benzo(a)pyrene level of 1.7 mg/kg which is in excess of the SAHC Health Based Investigation level of 1 mg/kg, was reported within the surficial fill materials (0.05-0.2 m) recovered from borehole BH20 located in the Adelaide Central Mission Car Park on the corner of Bowen Street and Grote Street. Ash and cinders were identified in the fill materials, which extended to 0.55 m, at this location. The Total PAH concentration at this location was 15 mg/kg which is not above the SAHC Health Based Investigation level

20 mg/kg, however the presence of the ash and cinder fragments indicates the potential for localised or 'hotspot' PAH contamination at this location.

Although the concentrations of Total PAH and benzo(a)pyrene were below the acceptance criteria for the remainder of the boreholes, fragments of ash and cinders were identified in boreholes BH4 and BH18 located on the western side of Bowen Street and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. There is therefore the potential for localised or 'hotspot' PAH contamination at these locations.

pH

Laboratory analysis reported soil pH levels ranging from 8.8 to 11.0 which is indicative of moderately alkaline soils. The analysis reported that all of the eighteen samples analysed for pH were found to exceed the ANZECC Environmental Investigation criteria which recommends an upper pH of 8, with sixteen out of the eighteen samples also exceeding the SAHC health based investigation criteria which recommends an upper pH of 9. The range of pH values reported in the fill materials were found to be very similar to those reported in the underlying natural soils.

Organochlorine Pesticides (OCPs) and Organophospate Pesticides (OPPs)

All soil samples analysed for OCPs reported concentrations below the respective laboratory detection limits and consequently well below the nominated intervention criteria.

Total Petroleum Hydrocarbons (TPHs) and Mono Aromatic Hydrocarbons (BTEX)

All soil samples analysed for TPH and BTEX compounds reported concentrations below the respective laboratory detection limits and consequently well below the nominated intervention criteria.

Victorian EPA Screen

The four samples that was analysed for a Victorian EPA Screen (BH4, BH13, BH12/D and BH15/D) reported concentrations of Polychlorinated Biphenyls (PCBs), phenol and chlorinated hydrocarbons below the laboratory detection limits. The samples from boreholes BH12 and BH15 were also analysed for cyanide and cresols and the concentrations reported were below the laboratory detection limits.

Elevated levels of fluoride of 260 mg/kg and 190 mg/kg were reported in the fill materials (0.55-0.85 m) recovered from boreholes BH12 and BH15, located in the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park, respectively. The levels were below the Dutch intervention level of 2000 mg/kg. It is likely that the fluoride is associated with the ash and cinders, which were identified at both locations.

Equipment Rinsate

The equipment rinsate which was from the push tube used in BH8, was analysed for PAHs, metals and OCPs. The laboratory results reported all PAHs, OCPs and metals below the respective laboratory detection limits and hence below the specific environmental and health based guidelines for these analytes.

4.7 Data Validation Report

All analytical data for soil was assessed to ensure validation. Results of internal laboratory Quality Control (QC) for soils are included within the laboratory reports in Appendix I. This includes results of surrogate recoveries and replicate analysis carried out as part of the laboratory QC program. Tabulated results of all of laboratory replicate analysis and field duplicate analysis is contained in Appendix J.

The precision of the results for each analyte for both the laboratory replicate and field duplicate samples was determined by calculating the Relative Percentage Difference (RPD) between a replicates and duplicates. This was calculated a follows:

$$RPD = \frac{(\text{Concentration 1} - \text{Concentration 2}) \times 100}{(\text{Concentration 1} + \text{Concentration 2}) \div 2}$$

The acceptance criteria for laboratory replicates is generally set at an RPD of 20%, with an RPD of 30% used for field duplicates. This criteria is based on Rust PPK quality assurance (QA) protocols, which were developed with regard to the US EPA regulations. The %RPD values for the laboratory replicate and field duplicates are contained in Appendix K.

In order to obtain a measure of overall precision, a relative standard deviation (%RSD) was determined for each analyte. This involved normalising each sample result and the corresponding replicate/duplicate results and then calculating the standard deviation of the complete set of normalised values for that analyte. This relative standard deviation is calculated as a percentage and is included in Appendix K. For soil sampling programs an RSD below 30% is considered satisfactory.

The laboratory analysis program included the analysis of four field duplicates and eight laboratory replicates. The RPD was greater than 30% for the inter-laboratory duplicate results for copper and zinc. The extraction methods used by the primary and the secondary laboratory are identical and the analytical methods are compatible (ICP-AES/Flame Atomic Absorption Spectrometry) and therefore the difference between the inter-laboratory duplicate results would most likely be due to the heterogeneous nature of soil and the consequent difficulty in obtaining a 'true' duplicate sample in the field.

One of the RPDs was greater than 20% for the laboratory replicate results for lead and this could also be due to the hetergeneous nature of soil and the difficulty in obtaining two replicate samples from the soil sample in the laboratory. The RSDs were within the accepted criteria for all of the replicates as shown in Appendix K.

5. Conclusions

The investigation program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);
- the north east corner of the Grote Street public car park (BH14); and
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).

The concentrations of heavy metals were reported to depths ranging from 0.2 m to 0.7 m.

An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street to a maximum depth of 0.85 m. Elevated Total fluoride concentrations were also identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park.

These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations. The presence of these ash, cinders and/or slag is indicative of former waste products such as coke, coal and potential fuel oil wastes which may result from the incomplete combustion of petroleum hydrocarbon products (which may occur in domestic fires or furnaces for example). The ash, cinders and/or slag may also be waste products resulting from former forging operations which occurred at the site from around the 1920s to the 1970s.

Fragments of ash, cinders and/or slag were identified in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. Due to the fragmented nature and uneven distribution of the ash, cinders and/or slag within the fill materials, the concentrations of contaminants that have been reported may not necessarily be indicative of the level of potential contamination in the soil. In addition to this, the relatively low proportion of the ash, cinders and/or slag within the overall soil matrix may be resulting in a dilution effect on the contaminant levels within the overall matrix. There is therefore the potential for high concentrations of localised (hotspot) PAH, heavy metal and/or fluoride contaminants within the fill materials at all of the locations where the ash, cinders and/or slag were observed. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

Heavy metal concentrations from eight of the soil samples recovered from the natural underlying soils reported concentration levels below both the ANZECC and SAHC

investigation levels. From an environmental perspective it is considered that the presence of moderately alkaline surface and subsurface soils will act to minimise the potential for heavy metal leachate generation and infiltration by acting to favour the complexing of the ions within the clay matrix.

As a preliminary health risk assessment, the concentrations of all analytes were also compared to the proposed health based soil guidelines (Langley et al 1996) for restricted residential landuse and commercial/industrial landuse (Exposure Settings D and F). The preliminary risk assessment identifies the lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park (BH14) in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for restricted residential and commercial/industrial landuses.

The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

6. Recommendations

Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

In accordance with the continued use of these areas for commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within these areas. This recommendation is with the exception of a site specific risk assessment required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

If these areas of the site are to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials at nine out of the eleven sampling locations in these areas. If this land is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in these areas. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

104 Grote Street

The investigation program has identified no requirements for any subsequent site characterisation or remedial works within this area (which includes the house, private car park, storage building and adjacent car park) provided the current uses are maintained. If this portion of the site is to be developed for a more sensitive landuse (for example residential), it is recommended that more extensive site characteristion is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area, and so that the soil can be further characterised in those areas not covered in this investigation. Similarly to the other areas of the site, if this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation.

Coachfreight and adjacent car park

If the current use of the land in this area is to be maintained, there are no requirements for remedial works in this area of the site. This is contingent upon the adequate maintenance and management of the bitumen surfaces. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is

recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area. If this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation (as described previously).

Bus Depot 2 (Premier Stateline)

No contamination was identified in this area (which includes the bus parking area and the car park adjacent the terminal building) and so no remedial works or further site characterisation works are required provided the site use remains as at present. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, in order to further characterise the soil in those areas not covered in this investigation.

7. Statement of Limitations

This report has been prepared by the consultant with all reasonable skill, care and diligence in accordance with the terms of agreement with the client, and taking into account the human and other resources utilised by agreement with the client.

The data in this report was derived by applying the methodology described in previous sections of this report. To the best of the consultant's knowledge, the information contained in the report is accurate at the date of issue. However, there should be a recognition of the limitations of the environmental site assessment process. These are referred to, for example, in Section 4 of ASTM Practice E 1527-94. Clause 4.5 states the following:

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognised environmental conditions in connection with a property. This site assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for recognised environmental conditions in connection with a property, and both parties recognise limits of time and cost.

It should also be recognised that site conditions, including the extent of contamination and contaminant concentrations, can change with time. This may be particularly relevant if the report is used after a protracted delay, such that further investigation of the site may be necessary.

In preparing this report, the consultant has relied upon, and presumed accurate, certain information provided by the client or third parties. Unless otherwise stated in the report, the consultant has not attempted to verify the accuracy or completeness of any such information.

The consultant has prepared this report for the client in accordance with generally accepted consulting practice and the consultant's terms of business. No other warranty, express or implied, is made as to the professional advice included in this report. The consultant disclaims any responsibility in respect of any matters outside the scope of the terms of agreement with the client.

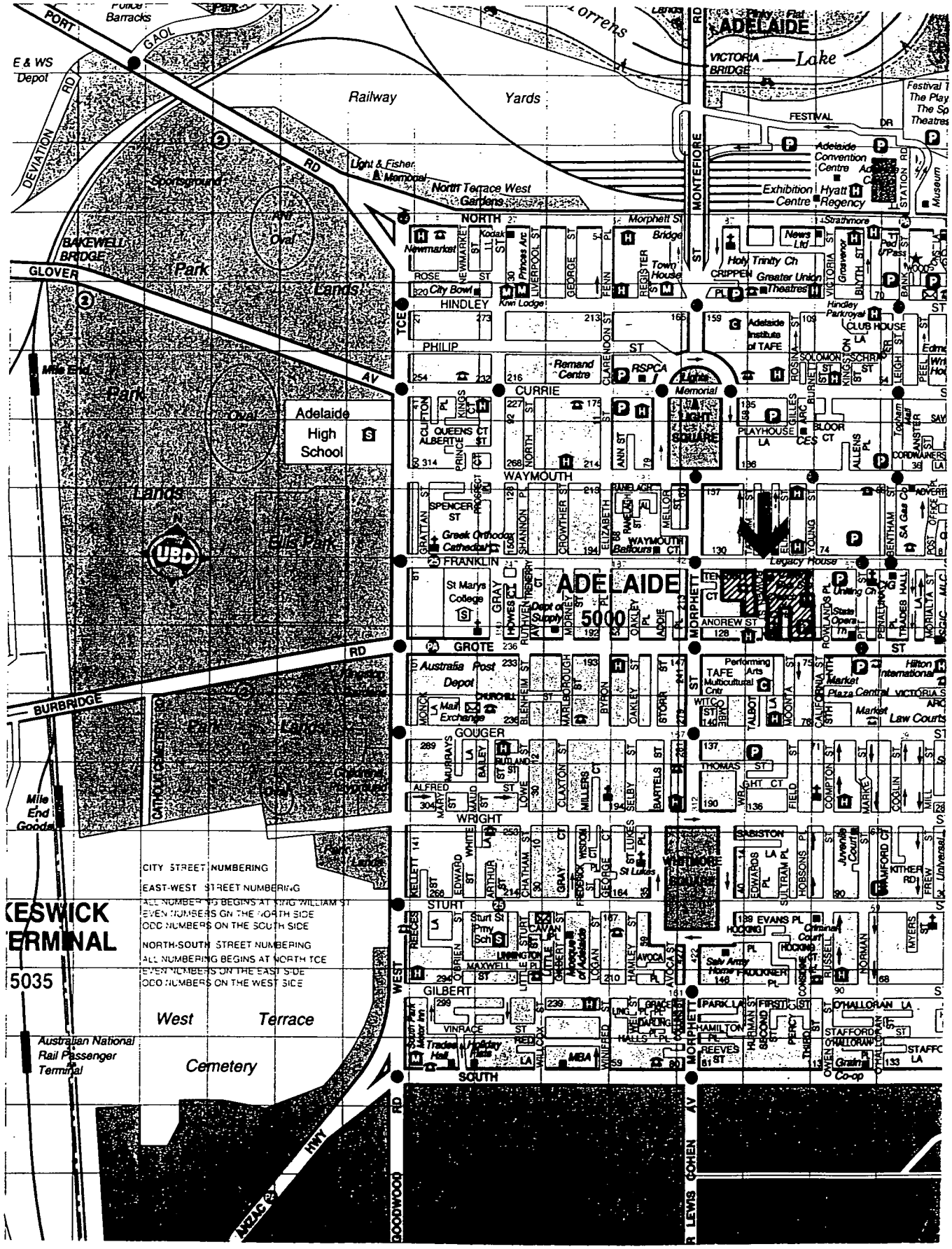
This report has not been prepared for use by parties other than the client. It may or may not contain sufficient information for the purposes of other parties or for other uses. The consultant accepts no responsibility to third parties to whom this report, or any part thereof, is made known.

A third party relies upon the report at its own risk.

In accordance with standard practice, the assessment carried out is site specific. Consequently, the assessment does not address environmental liabilities which may or may not pertain to other properties either currently or previously owned or operated by the client, or to other off-site environmental liabilities.

Appendix A

Site Location Plan



SITE LOCATION PLAN

MAP COURTESY OF UNIVERSAL PRESS

CODE	REVISIONS	DATE

RUST PPK
Environment & Infrastructure

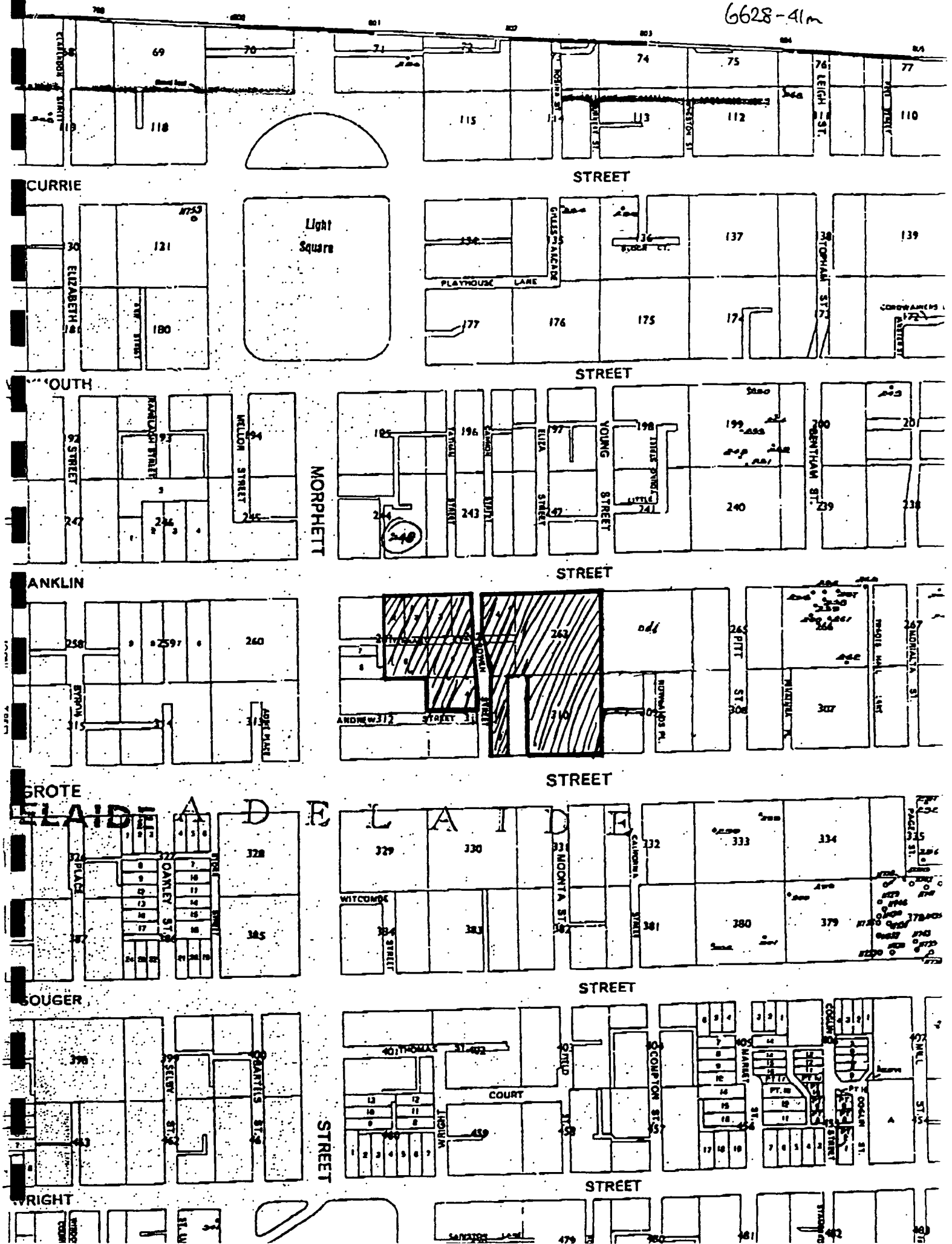
100 NORTH TERRACE ADELAIDE
SOUTH AUSTRALIA, 5000
TELEPHONE (08) 2125733
FAX: (08) 2124686

CHECKED	JRH
DRAWN	JRH
DATE	27.6.97
DRAWING No.	27J097A

Appendix B

Department of Mines and Energy
Groundwater Data

6628-41m

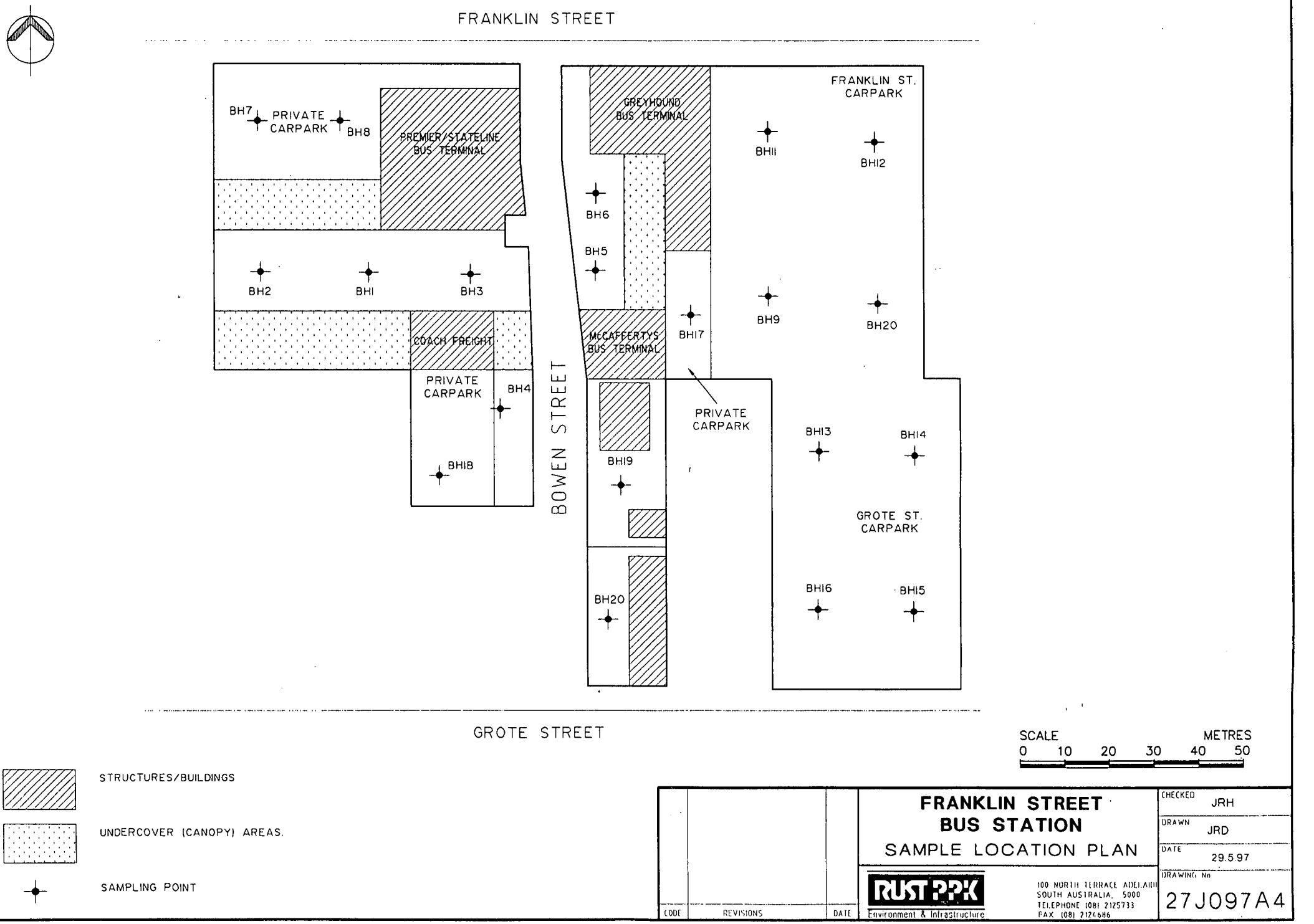

69
70
71
74
75
76
77
118
115
113
112
110
LEIGH ST.
STREET
CURRIE
121
Light Square
137
139
ELIZABETH
PLAYHOUSE LANE
177
176
175
174
STOPHAM ST.
180
STREET
SOUTH
92 STREET
MORPHETT STREET
WILLOR STREET
247
234
195
196
197
198
199
200
240
239
238
YOUNG STREET
STREET
ANKLIN
258
259
260
ANDREW STREET
312
311
263
264
265
PITT ST.
266
307
308
GROTE
ELAIDE
328
OAKLEY ST.
385
329
330
331
NOONTA ST.
332
333
334
379
380
381
382
383
384
WITCOMBE
STREET
GOUGER
378
SELBY ST.
BARTELS ST.
STREET
THOMAS ST.
COURT
WRIGHT
459
460
MARKET
CONSTITUTION ST.
STREET
WRIGHT
479
480
481
482

Summary of Latest Water Information for Drillholes

nit No	Cl	Max Drill Depth (m)	Orig Drill Date	Curr Drill Depth (m)	Curr Drill Date	Hundred	Section	SWL (m)	SWL Date	Well Yield (Gal/hr)	Well Yield Date	TDS (mg/l)	Sampl Date	pH	Permit	Cased To (m)	Full Chem Anal	Dril Log	Geol Log	Ophys Log	Aban Bckf Coll Plug
628 41 m 262	EM	15.47	01/71	15.47	01/71	ADELAIDE	S 266										U	U	Y	U	
628 41 m 263	EM	7.62	01/71	7.62	01/71	ADELAIDE	S 266										U	U	Y	U	
628 41 m 289	EM	18.29	04/64	18.29	04/64	ADELAIDE	S 333										U	U	Y	U	
628 41 m 290	EM	27.43	04/64	27.43	04/64	ADELAIDE	S 333										U	U	Y	U	
628 41 m 300	MW	23.09	10/34	23.09	10/34	ADELAIDE	S 379			403.86	01/34						U	Y	U	U	
628 41 m 301	EM	27.48	04/64	27.48	04/64	ADELAIDE	S 380										U	U	Y	U	
628 41 m 302	EM	19.20	04/64	19.20	04/64	ADELAIDE	S 380	14.63	04/64								U	U	Y	U	
628 41 m 358	EM					ADELAIDE	S 111										U	U	U	U	
628 41 m 368	MW	113.00	09/76	113.00	09/76	ADELAIDE	S 61	40.00	09/76			1529	09/76	7.80	186		Y	Y	U	U	BKP
628 41 m 6881	MW	100.00	03/78	100.00	07/78	ADELAIDE	E 19	18.00	03/78	300.92	01/78	2403	03/78	7.80	2798	63.68	U	Y	U	U	BKP
628 41 m 11726	MW	17.50	05/81	17.50	05/81	ADELAIDE	S 378	15.00	05/81			1804	05/81	7.60	8778	17.50	U	Y	U	U	OPR
628 41 m 11727	MW	17.00	05/81	17.00	05/81	ADELAIDE	S 378	14.50	05/81			1810	05/81	7.50	8779	17.00	U	Y	U	U	OPR
628 41 m 11728	MW	16.00	05/81	16.00	05/81	ADELAIDE	S 378	13.50	05/81			1832	05/81	7.70	8780	16.00	U	Y	U	U	OPR
628 41 m 11729	MW	16.50	05/81	16.50	05/81	ADELAIDE	S 378	14.00	05/81			1832	05/81	7.60	8781	16.50	U	Y	U	U	OPR
628 41 m 11730	MW	16.00	05/81	16.00	05/81	ADELAIDE	S 378	13.50	05/81			1832	05/81	7.60	8782	16.00	U	Y	U	U	OPR
628 41 m 11732	MW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	8.10	8784	19.00	U	Y	U	U	OPR
628 41 m 11733	MW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	7.70	8785	19.00	U	Y	U	U	OPR
628 41 m 11734	MW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	7.70	8786	19.00	U	Y	U	U	OPR

Appendix C

Location of Soil Sampling Points


FRANKLIN STREET
BH7
PRIVATE CARPARK
BH8
PREMIER/STATELINE BUS TERMINAL
BH2
BH1
BH3
COACH FREIGHT
PRIVATE CARPARK
BH4
BH18
BOWEN STREET
GREYHOUND BUS TERMINAL
FRANKLIN ST. CARPARK
BH11
BH12
BH6
BH5
BH9
BH20
McCAFFERTYS BUS TERMINAL
BH17
PRIVATE CARPARK
BH13
BH14
BH19
GROTE ST. CARPARK
BH20
BH16
BH15
GROTE STREET
SCALE
METRES
0 10 20 30 40 50
STRUCTURES/BUILDINGS
UNDERCOVER (CANOPY) AREAS.
SAMPLING POINT
CODE
REVISIONS
DATE
FRANKLIN STREET BUS STATION
SAMPLE LOCATION PLAN
CHECKED JRH
DRAWN JRD
DATE 29.5.97
DRAWING No 27J097A4
RUST PPK
Environment & Infrastructure
100 NORTH TERRACE ADELAIDE
SOUTH AUSTRALIA, 5000
TELEPHONE (08) 2125733
FAX (08) 2124686

Appendix D

Soil Borelogs

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 11:15 am **Location No:** BH1

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.06		BITUMEN.			
0.06-0.5	0.06-0.3 0.4-0.5	FILL. Sand, off-white/yellow becoming yellow, some fine to medium gravel.	0		
0.5-1.0	0.8-1.0	Silty CLAY. Orange brown.	0		
1.0-2.1	1.4-1.55 2.0-2.1/D	Silty CLAY. Creamy brown, mottled off-white and brown, becoming more clayey with depth.	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 12:00 pm **Location No:** BH2

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.			
0.055-0.7	0.1-0.3/D 0.4-0.5	FILL. Sand, off-white/yellow becoming yellow, some fine to coarse gravel.	0		
0.7-1.55	0.8-1.0 1.35-1.5	Silty Sandy CLAY. Orangey/brown, becoming more silty (less sandy) and calcareous with depth.	0		
1.55-2.0	1.8-2.0	Silty CLAY. Grey brown mottled off-white and brown, calcareous.	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 12:40 pm **Location No:** BH3

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.			
0.055-0.65	0.1-0.3/D 0.4-0.5	FILL. Sand, yellow, some fine to coarse gravel.	0		
0.65-1.2	0.8-1.0	Silty CLAY. Greyish green, mottled brown and off-white (calcareous nodules).	0		
1.2-2.1	1.4-1.55 2.0-2.1	Silty CLAY. Greyish green, mottled red and mustard yellow. (Hindmarsh clay).	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 1:10 pm **Location No:** BH4

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.25		BITUMEN.			
0.025-0.4	0.1-0.3	FILL. Sand, yellow, some fine to coarse gravel.	0		
0.4-1.0	0.45-0.6/D 0.8-1.0	FILL. Sandy clay, dark brown, occasional fine to medium gravel, occasional fine to medium orange brick fragments, some fine to coarse black ash and cinders, some creamy brown calcareous nodules, very occasional fine to medium silvery black, vesicular slag fragments, very occasional medium china fragments.	1		
1.0-1.6	1.55-1.7	Silty CLAY. Creamy brown, mottled brown, calcareous.	0		
1.6-2.1	2.0-2.1	Silty CLAY. Greyish green, mottled creamy brown and brown, and yellow brown, some grey/black mottling towards bottom.	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 2:00 pm **Location No:** BH5

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.4		BITUMEN.			
0.04-0.7	0.1-0.3 0.4-0.5/D	FILL. Sand, yellow, some fine to medium gravel.	0		
0.7-0.85	0.7-0.8	FILL. Sandy clay, dark brown, occasional fine black ash/cinders, occasional fine to medium orange brick fragments, occasional fine gravel.	1		
0.85-1.3	0.8-1.0	Silty CLAY. Orangey brown, mottled creamy brown.	0		
1.3-2.1	1.35-1.5 1.7-1.8 2.0-2.1	Silty CLAY. Greyish brown, mottled off-white and brown (calcareous).	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 2:40 pm **Location No:** BH6

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.05		BITUMEN.			
0.05-0.65	0.1-0.3 0.4-0.5	FILL. Sand, yellow, some fine to medium gravel.	0		
0.65-0.75	0.65-0.75	FILL. Sandy clay, dark brown, some fine to medium gravel, occasional fine to medium orange brick fragments, occasional fine to medium black ash/cinders.	1		
0.75-1.2	1.0-1.2/D	Silty CLAY. Creamy brown mottled brown.	0		
1.2-1.8	1.7-1.8	Hindmarsh CLAY. Greyish green, mottled brown, yellow and reddy brown.	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 3:30 pm **Location No:** BH7

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.07					
0.07-0.8	0.1-0.3 0.4-0.5	FILL. Silty sand, yellow, some powered green siltstone, some fine to coarse gravel.	0		
0.8-1.35	0.8-1.0	Silty CLAY. Orangey brown.	0		
1.35-2.0	1.35-1.5/D 1.8-2.0	Silty CLAY. Creamy brown, mottled brown and off-white, calcareous.	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 4:00 pm **Location No:** BH8

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.10		BITUMEN.			
0.1-0.5	0.1-0.3 0.4-0.5/D	FILL. Silty sand, yellow (creamy brown), occasional fine to medium gravel.	0		
0.5-1.8	0.8-1.0 1.35-1.55	Silty CLAY. Creamy brown mottled brown.	0		
1.8-2.0	1.8-2.0	Silty CLAY. Off-white, some fine limestone gravel (moist - perched water table).	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 21/5/97 **Time:** 9:30 am **Location No:** BH9

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.45		BITUMEN.			
0.045-0.9	0.1-0.3 0.35-0.5	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0	(0.3-0.4) 4.3	
0.9-2.1	0.7-0.9/D 1.3-1.45 2.0-2.1	Silty CLAY. Creamy brown, mottled brown, calcareous.	0	(0.6-0.7) 5.3 (1.5-1.6) 6.8	

Logged by: JRH **Sampled by:** JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 21/5/97 **Time:** 10:10 am **Location No:** BH10

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.45		BITUMEN.			
0.045-0.65	0.1-0.3 0.35-0.5	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0	(0.55-0.65) 4.5	
0.65-0.7		FILL. Silty clay, dark brown, occasional fine black ash/cinders, occasional fine orange brick fragments, occasional fine gravel.	1		
0.7-0.85	0.7-0.85/D	Silty CLAY. Orangey brown mottled creamy brown, occasional fine yellow roots, occasional fine to medium brown roots.	0	(0.75-0.85) 10.5	
0.85-2.0	1.0-1.2 1.4-1.55 1.8-2.0	Silty CLAY. Creamy brown mottled brown and off-white, occasional fine black spots,, very occasional fine roots, calcareous.	0	(1.2-1.3) 8.0	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 11:00 am **Location No:** BH11

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.03		BITUMEN.			
0.03-0.7	0.1-0.3 0.35-0.5/D	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel, some silty clay pockets (orangey brown).	0	(0.3-0.4) 11.2	
0.7-1.0	0.8-1.0	Silty CLAY. Orangey brown, mottled creamy brown, calcareous, occasional fine to medium roots.	0	(0.65-0.75) 11.9	
1.0-2.0	1.3-1.45 1.8-2.0	Silty CLAY. Creamy brown, mottled off-white and brown calcareous, very occasional fine to coarse brown roots.	0	(1.6-1.7) 27.9	

Logged by: JRH **Sampled by:** JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 9:00 am **Location No:** BH12

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.03		BITUMEN.			
0.03-0.45	0.15-0.3	FILL. Silty sand, yellow, fine to coarse sand, some fine to coarse gravel.	0	(0.4-0.5) 66.7	
0.45-0.55		FILL. Silty sand, brown and yellow, occasional silty clay pockets, dark brown, fine to medium gravel.	0		
0.55-0.7	0.55-0.7/D	FILL. Silty clay, dark brown, very occasional fine black ash/cinders.	1		
0.7-1.0	0.85-1.0	Silty CLAY. Orangey brown, calcareous, mottled off-white and brown.	0	(0.7-0.8) 25.8	
1.0-2.0	1.55-1.7 1.85-2.0	Silty CLAY. Creamy brown, mottled off-white and brown, very occasional large roots, becoming greeny brown mottled off-white and brown.	0	(1.7-1.8) 49.3	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 11:45 am **Location No:** BH13

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.35		BITUMEN.			
0.035-0.15	0.05-0.15 0.2-0.35	FILL. Silty sand, yellow, fine to coarse grains, occasional bitumen fragments from surface, some fine to coarse gravel.	0		
0.15-0.6	0.35-0.5	FILL. Silty sand, grey/brown, some fine to coarse gravel.	0	(0.5-0.6) 6.0	
0.6-0.9	0.7-0.9/D	FILL. Silty clay, dark brown, some fine to medium gravel, some fine to medium roots, some fine to medium black ash/cinders and orange brick fragments from 0.7-0.8 m.	1		
0.9-2.0	1.35-1.5 1.8-2.0	Silty CLAY. Creamy brown mottled off-white and brown, calcareous.	0	(1.0-1.2) 8.2 (1.2-1.8) 6.9	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 12:30 pm **Location No:** BH14

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.035		BITUMEN.			
0.035-0.15	0.05-0.15	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0		
0.15-0.70	0.15-0.3 0.55-0.7	FILL. Silty sand, grey/brown, some fine to coarse gravel, occasional silty clay pockets with fine black ash/cinders and occasional fine to medium orange brick fragments.	1		
0.70-1.2	0.7-0.85 1.0-1.2	FILL. Silty clay. Some fine to medium orange brick fragments, some fine to medium gravel, some off-white calcareous limestone fragments.	0	(0.8-1.0) 9.3	
1.2-2.0	1.85-2.0/D	Silty CLAY. Creamy brown mottled off-white and brown, calcareous.	0	(1.3-1.4) 16.6	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 1:00 pm **Location No:** BH15

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.			
0.055-0.55	0.15-0.3 0.3-0.5	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0	(0.3-0.4) 6.6	
0.55-0.7		FILL. Silty clay, dark brown mottled off-white and orangey brown, occasional fine to medium black ash/cinders, occasion fine orange brick fragments, occasional fine to medium roots, some off-white pockets.	1	(0.55-0.65) 10.7	
0.7-1.1	0.7-0.85/D	Silty clay, orangey brown (disturbed natural soil?).	0	(0.8-0.9) 9.2	
1.1-2.1	1.5-1.6 2.0-2.1	Silty CLAY. Creamy brown, mottled brown and off-white.	0	(1.6-1.7) 13.0	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 1:45 pm **Location No:** BH16

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.045		BITUMEN.			
0.045-0.3	0.1-0.3/D	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0		
0.3-0.6	0.4-0.5	FILL. Silty clay, greeny brown, occasional fine to medium roots, mottled off-white and brown, occasional fine orange brick fragments, occasional fine black ash/cinders.	1	(0.3-0.4) 6.9	
0.6-1.2	0.85-1.0	Silty CLAY. Greeny brown mottled off-white and brown.	0		
1.4-2.0	1.75-1.85	Silty CLAY. Grey/green mottled yellow and reddish brown. (Hindmarsh clay).	0	(1.5-1.6) 8.6	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

**

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 2:50 pm **Location No:** BH17

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.075		BITUMEN.			
0.075-0.65	0.1-0.3 0.35-0.5/D	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0	(0.3-0.4) 6.9	
0.75-0.7		FILL. Silty clay, dark brown, occasional fine black ash/cinders, occasional fine to medium orange brick fragments, occasional fine to medium gravel.	1		
0.7-1.0	0.8-1.0	Silty CLAY. Orangey brown mottled brown, occasional coarse limestone gravel.	0	(0.7-0.8) 7.3	
1.0-2.0	1.8-2.0	Silty CLAY. Creamy brown mottled brown and off-white, calcareous, becoming greenish brown with depth.	0	(1.4-1.5) 12.5	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 3:45 pm **Location No:** BH18

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.			
0.055-0.15	0.05-0.15	FILL. Gravelly sand, fine to coarse gravel, browny yellow.	0		
0.15-0.4	0.15-0.3	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0		
0.4-0.5	0.4-0.5	FILL. Silty clay, dark brown, occasional fine black ash/cinders, occasional fine orange brick fragments, occasional fine to medium gravel.	1		
0.5-1.6	0.8-1.0 1.45-1.6	Silty CLAY. Orangey brown mottled off-white and brown.	0	(0.75-0.85) 25.7 (1.0-1.2) 9.0	
1.6-2.3	2.15-2.3	Silty CLAY. Creamy brown, mottled brown and off-white, becoming greeny brown mottled off-white and brown with depth.	0	(1.6-1.7) 130	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 10:00 am **Location No:** BH19

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.01		BITUMEN.			
0.01-0.4	0.1-0.3/D	FILL. Silty sand, yellowy brown, fine to coarse sand, some fine to coarse gravel.	0	(0.3-0.4) 10.5	
0.4-0.6		FILL. Silty sand, brown and yellow, fine to coarse sand, occasional fine to coarse gravel, occasional fine to coarse orange brick fragments.	0 0		
0.6-0.7	0.55-0.7	FILL. Silty clay, dark brown, very occasional fine black ash/cinders, occasional fine orange brick fragments.	1		
0.7-0.9		Silty clay, brown (disturbed natural soil?).	0	(0.7-0.8) 201	
0.9-1.4	0.95-1.1	Silty CLAY. Orangey brown, mottled off-white and brown, calcareous, occasional fine to coarse limestone fragments.	0		
1.4-2.0	1.85-2.0	Silty CLAY. Creamy brown mottled brown and off-white, calcareous.	0	(1.6-1.7) 195	

Logged by: JRH **Sampled by:** JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 10:40 am **Location No:** BH20

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.015		BITUMEN.			
0.015-0.2	0.05-0.2	FILL. Silty clay, brown, occasional fine to medium gravel, occasional fine orange brick fragments, very occasional fine black ash/cinders.	1		
0.2-0.35	0.2-0.35	FILL. Silty sand, grey/brown, some fine to coarse gravel, occasional fine orange brick fragments.	0		
0.35-0.55	0.45-0.55/D	FILL. Silty clay, dark brown, very occasional fine orange brick fragments, occasional fine black ash/cinders.	1	(0.5-0.6) 99.0	
0.55-1.1	0.85-1.0	Silty CLAY. Orangey brown, mottled off-white and brown, calcareous, occasional fine limestone gravel.	0	(1.0-1.2) 33	
1.1-2.0	1.8-1.95	Silty CLAY. Creamy brown mottled off-white and brown, calcareous.	0	(1.7-1.8) 25.4	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

**

Appendix E

Interpolated Area of Potentially Impacted Soils

FRANKLIN STREET

BH7 PRIVATE CARPARK BH8

PREMIER/STATELINE BUS TERMINAL

BH2 BH1 BH3

COACH FREIGHT

PRIVATE CARPARK

BH4

BH18

BOWEN STREET

GREYHOUND BUS TERMINAL

FRANKLIN ST. CARPARK

BH11 BH12

BH6 BH5

McCAFFERTYS BUS TERMINAL

BH17 BH9 BH20

PRIVATE CARPARK

BH19

BH13 BH14

GROTE ST. CARPARK

BH20 BH16 BH15

GROTE STREET

LEGEND

APPROXIMATE BOUNDARY OF FILL MATERIAL CONTAINING ASH, CINDERS AND OR SLAG.

STRUCTURES/BUILDINGS

UNDERCOVER (CANOPY) AREAS.

SAMPLING POINT

SCALE METRES 0 10 20 30 40 50

CODE	REVISIONS	DATE

FRANKLIN STREET BUS STATION

Interpolated Area of Potentially Impacted Soil.

RUST PPK Environment & Infrastructure

100 NORTH TERRACE ADELAIDE SOUTH AUSTRALIA, 5000
TELEPHONE (08) 2125733
FAX: (08) 2124686

CHECKED	JRH
DRAWN	JRD
DATE	29.5.97
DRAWING No.	27J097A4

Appendix F

Chain of Custody Forms

DUE 24.05.97

CHAIN OF CUSTODY

Lab Name	AGAL
Address	5r-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location: Frankin [illegible] Rig Station

Rust PPK Job Number: **27J097A**

Relinquished By	Jane Hewitt	Received by	Perla Manuel
Date	22/5/97	Date	23.05.97 VC
Company	Rust PPK Pty Ltd, Adelaide	Company	AGAL
Signature	JHewitt	Signature	

Samples on Ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs	Sampler Initials	Comments
20/5/97	11:15	BH1	0.06-0.3	250ml	S	<4°C	X		X		V97 / 18593	JRH	
20/5/97	11:15	BH1	0.4-0.5	250ml	S	<4°C						JRH	
20/5/97	11:15	BH1	0.8-1.0	250ml	S	<4°C						JRH	
20/5/97	11:15	BH1	1.4-1.55	250ml	S	<4°C						JRH	
20/5/97	11:15	BH1	2.0-2.1	250ml	S	<4°C						JRH	
20/5/97	11:15	BH1	2.0-2.1	250ml	S	<4°C						JRH	
20/5/97	12:00	BH2	0.1-0.3	250ml	S	<4°C						JRH	
20/5/97	12:00	BH2	0.4-0.5	250ml	S	<4°C						JRH	
20/5/97	12:00	BH2	0.8-1.0	250ml	S	<4°C						JRH	
20/5/97	12:00	BH2	1.35-1.5	250ml	S	<4°C						JRH	
20/5/97	12:00	BH2	1.8-2.0	250ml	S	<4°C	X			18594		JRH	
20/5/97	12:40	BH3	0.1-0.3	250ml	S	<4°C						JRH	
20/5/97	12:40	BH3	0.1-0.3	250ml	S	<4°C						JRH	
20/5/97	12:40	BH3	0.4-0.5	250ml	S	<4°C						JRH	
20/5/97	12:40	BH3	0.8-1.0	250ml	S	<4°C	X		X		18595	JRH	
20/5/97	12:40	BH3	1.4-1.55	250ml	S	<4°C						JRH	

Please fax back a signed copy when samples are recieved at the laboratory.

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location: Franklin Street Bus Station

Rust PPK Job Number: 27J097A

Relinquished By	Jane Hewitt	Received by	Perla Manuel
Date	22/5/97	Date	23.05.97
Company	Rust PPK Pty Ltd, Adelaide	Company	AGAL VIC
Signature	JRHewitt	Signature	

Samples on Ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs									Sampler Initials	Comments
20/5/97	12:40	BH3	2.0-2.1	250ml	S	<4°C														JRH	
20/5/97	1:10	BH4	0.1-0.3	250ml	S	<4°C														JRH	
20/5/97	1:10	BH4	0.45-0.6	250ml	S	<4°C		FULL VICTORIAN EPA SCREEN										18596		JRH	OCPs by GC ECD
20/5/97	1:10	BH4	0.8-1.0	250ml	S	<4°C														JRH	
20/5/97	1:10	BH4	1.55-1.7	250ml	S	<4°C														JRH	
20/5/97	1:10	BH4	2.0-2.1	250ml	S	<4°C														JRH	
20/5/97	2:00	BH5	0.1-0.3	250ml	S	<4°C														JRH	
20/5/97	2:00	BH5	0.4-0.5	250ml	S	<4°C														JRH	
20/5/97	2:00	BH5/D	0.4-0.5	250ml	S	<4°C														JRH	
20/5/97	2:00	BH5	0.8-1.0	250ml	S	<4°C		X	X				18597							JRH	
20/5/97	2:00	BH5	1.35-1.5	250ml	S	<4°C														JRH	
20/5/97	2:00	BH5	1.7-1.8	250ml	S	<4°C														JRH	
20/5/97	2:00	BH5	2.0-2.1	250ml	S	<4°C														JRH	
20/5/97	2:40	BH6	0.1-0.3	250ml	S	<4°C														JRH	
20/5/97	2:40	BH6	0.4-0.5	250ml	S	<4°C														JRH	
20/5/97	2:40	BH6	0.65-0.75	250ml	S	<4°C	X	X	X			18598								JRH	

Please fax back a signed copy when samples are recieved at the laboratory.

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location	Franklin Street Bus Station

Rust PPK Job Number	27J097A

Relinquished By	Jane Hewitt	Received by	Perla Manuel
Date	22/5/97	Date	23.05.97
Company	Rust PPK Pty Ltd, Adelaide	Company	AGAL VIC
Signature	JHewitt	Signature	

Samples on Ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs	Sampler Initials	Comments
20/5/97	2:40	BH6	1.0-1.2	250ml	S	<4°C						JRH	
20/5/97	2:40	BH6/D	1.0-1.2	250ml	S	<4°C						JRH	
20/5/97	2:40	BH6	1.7-1.8	250ml	S	<4°C						JRH	
20/5/97	3:30	BH7	0.1-0.3	250ml	S	<4°C						JRH	
20/5/97	3:30	BH7	0.4-0.5	250ml	S	<4°C	X		X		18599	JRH	
20/5/97	3:30	BH7	0.8-1.0	250ml	S	<4°C						JRH	
20/5/97	3:30	BH7	1.35-1.5	250ml	S	<4°C						JRH	
20/5/97	3:30	BH7	1.8-2.0	250ml	S	<4°C						JRH	
20/5/97	4:00	BH8	0.1-0.3	250ml	S	<4°C						JRH	
20/5/97	4:00	BH8	0.4-0.5	250ml	S	<4°C						JRH	
20/5/97	4:00	BH8/D	0.4-0.5	250ml	S	<4°C						JRH	
20/5/97	4:00	BH8	0.8-1.0	250ml	S	<4°C	X		X		18550	JRH	
20/5/97	4:00	BH8	1.35-1.55	250ml	S	<4°C						JRH	
20/5/97	4:00	BH8	1.8-2.0	250ml	S	<4°C						JRH	
21/5/97	9:30	BH9	0.1-0.3	250ml	S	<4°C						JRH	
21/5/97	9:30	BH9	0.35-0.5	250ml	S	<4°C						JRH	

Please fax back a signed copy when samples are recieved at the laboratory.

22.05.97 20:31 633 P02 RUST PPK ADELAIDE 61823111290

CHAIN OF CUSTODY

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location	Franklin street Bus Station

Rust PPK Job Number	273097A

Relinquished By	Jane Hewitt	Received by	Paula Manuel
Date	22/5/97	Date	23.05.97
Company	Rust PPK Pty Ltd, Adelaide	Company	AGAL VIC
Signature	JHewitt	Signature	

Samples on ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs	Sampler Initials	Comments
21/5/97	9:30	BH9	0.7-0.9	250ml	S	<4°C						JRH	
21/5/97	9:30	BH9/D	0.7-0.9	250ml	S	<4°C						JRH	
21/5/97	9:30	BH9	1.3-1.45	250ml	S	<4°C						JRH	
21/5/97	9:30	BH9	2.0-2.1	250ml	S	<4°C	X			18551		JRH	
21/5/97	10:10	BH10	0.1-0.3	250ml	S	<4°C						JRH	
21/5/97	10:10	BH10	0.35-0.5	250ml	S	<4°C						JRH	
21/5/97	10:10	BH10	0.7-0.85	250ml	S	<4°C	X		X	18552		JRH	
21/5/97	10:10	BH10	1.0-1.2	250ml	S	<4°C						JRH	
21/5/97	10:10	BH10	1.4-1.55	250ml	S	<4°C						JRH	
21/5/97	10:10	BH10	1.8-2.0	250ml	S	<4°C						JRH	
21/5/97	11:00	BH11	0.1-0.3	250ml	S	<4°C						JRH	
21/5/97	11:00	BH11	0.35-0.5	250ml	S	<4°C						JRH	
21/5/97	11:00	BH11/D	0.35-0.5	250ml	S	<4°C						JRH	
21/5/97	11:00	BH11	0.8-1.0	250ml	S	<4°C	X		X	18553		JRH	
21/5/97	11:00	BH11	1.3-1.45	250ml	S	<4°C						JRH	
21/5/97	11:00	BH11	1.8-2.0	250ml	S	<4°C						JRH	

Please fax back a signed copy when samples are recieved at the laboratory.

CHAIN OF CUSTODY

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location	Franklin Street Bus Station

Rust PPK Job Number	27J097A

Relinquished By	Jane Hewitt	Received by	Penta Manuel
Date	22/5/97	Date	23.05.97
Company	Rust PPK Pty Ltd, Adelaide	Company	AGAL VIC
Signature	JKHewitt	Signature	

Samples on Ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs		Sampler Initials	Comments
22/5/97	9:00	BH12	0.15-0.3	250ml	S	<4°C							JRH	
22/5/97	9:00	BH12	0.55-0.7	250ml	S	<4°C	X	X	X		18554		JRH	
22/5/97	9:00	BH12	0.85-1.0	250ml	S	<4°C							JRH	
22/5/97	9:00	BH12	1.55-1.7	250ml	S	<4°C							JRH	
22/5/97	9:00	BH12	1.85-2.0	250ml	S	<4°C							JRH	
21/5/97	11:45	BH13	0.05-0.15	250ml	S	<4°C							JRH	
21/5/97	11:45	BH13	0.2-0.35	250ml	S	<4°C							JRH	
21/5/97	11:45	BH13	0.35-0.5	250ml	S	<4°C							JRH	
21/5/97	11:45	BH13	0.7-0.9	250ml	S	<4°C	FULL VICTORIAN EPA SCREEN				18555		JRH	OCPs by GC ECD
21/5/97	11:45	BH13	1.35-1.5	250ml	S	<4°C							JRH	
21/5/97	11:45	BH13	1.8-2.0	250ml	S	<4°C							JRH	
21/5/97	12:30	BH14	0.05-0.15	250ml	S	<4°C							JRH	
21/5/97	12:30	BH14	0.15-0.3	250ml	S	<4°C							JRH	
21/5/97	12:30	BH14	0.55-0.7	250ml	S	<4°C	X	X	X		18556		JRH	
21/5/97	12:30	BH14	0.7-0.85	250ml	S	<4°C							JRH	
21/5/97	12:30	BH14	1.0-1.2	250ml	S	<4°C							JRH	

Please fax back a signed copy when samples are recieved at the laboratory

CHAIN OF CUSTODY

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location: Franklin street Bus Station

Rust PPK Job Number: **27J097A**

Relinquished By	Jane Hewitt	Received by	Perla Manuel
Date	22/5/97	Date	23.05.97
Company	Rust PPK Pty Ltd, Adelaide	Company	AGAL VIC
Signature	JRHewitt	Signature	

Samples on Ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs	Sampler Initials	Comments
21/5/97	12:30	BH14	1.85-2.0	250ml	S	<4°C						JRH	
21/5/97	12:30	BH14/D	1.85-2.0	250ml	S	<4°C						JRH	
21/5/97	1:00	BH15	0.15-0.3	250ml	S	<4°C						JRH	
21/5/97	1:00	BH15	0.3-0.5	250ml	S	<4°C						JRH	
21/5/97	1:00	BH15	0.7-0.85	250ml	S	<4°C	X		X		18557	JRH	
21/5/97	1:00	BH15	1.5-1.6	250ml	S	<4°C						JRH	
21/5/97	1:00	BH15	2.0-2.1	250ml	S	<4°C						JRH	
21/5/97	1:45	BH16	0.1-0.3	250ml	S	<4°C						JRH	
21/5/97	1:45	BH16/D	0.1-0.3	250ml	S	<4°C						JRH	
21/5/97	1:45	BH16	0.4-0.5	250ml	S	<4°C	X	X	X		18558	JRH	
21/5/97	1:45	BH16	0.85-1.0	250ml	S	<4°C						JRH	
21/5/97	1:45	BH16	1.75-1.85	250ml	S	<4°C						JRH	
21/5/97	2:50	BH17	0.1-0.3	250ml	S	<4°C						JRH	
21/5/97	2:50	BH17	0.35-0.5	250ml	S	<4°C						JRH	
21/5/97	2:50	BH17	0.35-0.5	250ml	S	<4°C						JRH	
21/5/97	2:50	BH17	0.8-1.0	250ml	S	<4°C	X		X		18559	JRH	

Please fax back a signed copy when samples are recieved at the laboratory.

CHAIN OF CUSTODY

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location	Franklin Street Bus Station

Rust PPK Job Number	27J097A

Relinquished By	Jane Hewitt	Received by	Lola Manuel
Date	22/5/97	Date	23.05.97
Company	Rust PPK Pty Ltd, Adelaide	Company	AGAL UIC
Signature	JRHewitt	Signature	

Samples on Ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs									Sampler Initials	Comments
21/5/97	2:50	BH17	1.8-2.0	250ml	S	<4°C														JRH	
21/5/97	3:45	BH18	0.05-0.15	250ml	S	<4°C														JRH	
21/5/97	3:45	BH18	0.15-0.3	250ml	S	<4°C														JRH	
21/5/97	3:45	BH18	0.4-0.5	250ml	S	<4°C		X	X		18560									JRH	
21/5/97	3:45	BH18	0.8-1.0	250ml	S	<4°C														JRH	
21/5/97	3:45	BH18	1.45-1.6	250ml	S	<4°C														JRH	
21/5/97	3:45	BH18	2.15-2.3	250ml	S	<4°C														JRH	
22/5/97	10:00	BH19	0.1-0.3	250ml	S	<4°C														JRH	
22/5/97	10:00	BH19/D	0.1-0.3	250ml	S	<4°C														JRH	
22/5/97	10:00	BH19	0.55-0.7	250ml	S	<4°C	X	X	X	X	18561									JRH	
22/5/97	10:00	BH19	0.95-1.1	250ml	S	<4°C														JRH	
22/5/97	10:00	BH19	1.85-2.0	250ml	S	<4°C														JRH	
22/5/97	10:40	BH20	0.05-0.2	250ml	S	<4°C	X	X	X	X	18562									JRH	
22/5/97	10:40	BH20	0.2-0.35	250ml	S	<4°C														JRH	
22/5/97	10:40	BH20	0.45-0.55	250ml	S	<4°C														JRH	
22/5/97	10:40	BH20/D	0.45-0.55	250ml	S	<4°C														JRH	

Please fax back a signed copy when samples are recieved at the laborat[illegible]

CHAIN OF CUSTODY

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location	Franklin Street Bus Station

Rust PPK Job Number
27J097A

Relinquished By	Jane Hewitt	Received by	Perla Manuel
Date	22/5/97	Date	23.05.97
Company	Rust PPK Pty Ltd, Adelaide	Company	AGAL VIC
Signature	JRHewitt	Signature	

Samples on Ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs		Sampler Initials	Comments
22/5/97	10:40	BH20	0.85-1.0	250ml	S	<4°C							JRH	
22/5/97	10:40	BH20	1.8-1.95	250ml	S	<4°C							JRH	
20/5/97		BD1		250ml	S	<4°C							JRH	
20/5/97		BD2		250ml	S	<4°C	X	X	X		18563		JRH	
20/5/97		BD3		250ml	S	<4°C							JRH	
21/5/97		BD4		250ml	S	<4°C							JRH	
21/5/97		BD6		250ml	S	<4°C	X		X		18564		JRH	
20/5/97		ER1	BH8	2x500ml	W	<4°C	X	X			X	18565	JRH	Please composite before analysing
21/5/97		ER2	BH18	2x500ml	W	<4°C	X	X			X	18566	JRH	Please composite before analysing

→ bottle had BH17 label

Please fax back a signed copy when samples are recieved at the laboratory.

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

CHAIN OF CUSTODY

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location	Franklin Street Bus Station

Rust PPK Job Number
27J097A

Relinquished By	Jane Hewitt	Received by	ONUR MEHMET
Date	22/5/97	Date	28/5/97
Company	Rust PPK Pty Ltd, Adelaide	Company	MGT
Signature	JRHewitt	Signature	

Samples on Ice: YES

Metals:

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes	Sampler Initials	Comments
22/5/97	9:00	BH12/D	0.55-0.7	250ml	S	<4°C	FULL VICTORIAN EPA SCREEN	JRH	OCPs by GC ECD
21/5/97	1:00	BH15/D	0.7-0.85	250ml	S	<4°C	FULL VICTORIAN EPA SCREEN	JRH	OCPs by GC ECD

Please fax back a signed copy when samples are recieved at the laboratory.

DUE 28-05

ACN 058 381 507

RUST PPK
Environment & Infrastructure

101 Pirie Street
Adelaide, South Australia
GPO Box 39[illegible], Adelaide
SA 5001 Australia
Telephone (08) 8405 4300
Int Tel + 61 8 8405 4300
Facsimile (08) 8405 4301
Email ppkadel@ozemail.com.au

A NATA Certified Quality Company

Facsimile

Attention:	Jane/Perla	Fax No:	(03) 96851788
To:	AGAL	Reference:	27J097A
From:	Jane Hewitt	Date:	22 May 1997
Re:	Soil samples arriving Friday 23/5	No of Pages (incl. this page):	9

Please phone this office if any part of this transmission failed or was misdirected

Jane/Perla

Four eskies of samples will be arriving to you today (Friday 23/5) and enclosed in this fax are the revised chain of custody forms which show the required analysis and must replace the chain of custody forms which were sent with the samples. If you could sign and write the lab numbers on these new chain of custody forms when the samples arrive that would be great. The samples that require analysis have been marked with an X on the lid.

In addition to this the following water samples, which you already have in storage (all from Job Number 27J097A), need to be analysed:

1. JOB LOCATION: Tynte Street Carpark
   DATE SAMPLED: 12/5/97
   SAMPLE ID: ER1
   SAMPLE LOCATION: BH6
   CONTAINER SIZE: 1 Litre
   ANALYSIS REQUIRED: Metals, PAHs and OCPs

V97/18466

AGAL VIC
REC BY: Perla Manuel
DATE: 23/05/97
TIME: 10:00

2. JOB LOCATION: Vaughan Place Carpark
   DATE SAMPLED: 14/5/97
   SAMPLE ID: ER1
   SAMPLE LOCATION: BH8
   CONTAINER SIZE: 2 x 500 ml (please composite before analysing)
   ANALYSIS REQUIRED: Metals, PAHs and OCPs

18467

3. JOB LOCATION: Palais Carpark
   DATE SAMPLED: 15/5/97
   SAMPLE ID: ER1
   SAMPLE LOCATION: BH8
   CONTAINER SIZE: 2 x 500 ml (please composite before analysing)
   ANALYSIS REQUIRED: Metals, PAHs and OCPs

18514

NB. Metals are As, Cd, Cr, Cu, Hg, Pb, Zn
All OCP analysis is to be by GC ECD

Thanks

JHewitt

Jane Hewitt

Appendix G

Assessment Criteria for Analytical Results

Assessment Criteria for Comparison with Soil Analytical Results
Metals, pH and PAH

All criteria expressed in mg/kg (ppm)

Analyte	Assessment Criteria			
	ANZECC	SAHC	Langley (D)	Langley (F)
Metals:				
Arsenic	20	100	400	500
Beryllium			80	100
Cadmium	3	20	80	100
Cobalt				
Chromium	50			
Copper	60	100	4000	5000
Mercury	1	2	60	75
Manganese	500		6000	7500
Molybdenum				
Nickel	60		2400	3000
Lead	300	300	1200	1500
Antimony	20			
Selenium				
Tin	50			
Zinc	200	500	28000	35000
pH	8	9		
Polycyclic Aromatic Hydrocarbons (PAH):				
Naphthalene	5			
Acenaphthylene				
Acenaphthene				
Fluorene	10			
Phenanthrene	10			
Anthracene	10			
Fluoranthrene	10			
Pyrene				
Benz(a)anthracene				
Chrysene				
Benzo(b)fluoranthene and Benzo(k)fluoranthrene				
Benzo(a)pyrene		1	4	5
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				
Total PAH		20	80	100

ANZECC	Environmental Guidelines (1992)
SAHC	South Australian Health Commission health based Guidelines (1993)
Langley (D)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting D - restricted residential)
Langley (F)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting F - commercial/industrial)

Assessment Criteria for Comparison with Soil Analytical Results OCPs and PCBs

All results expressed in mg/kg (ppm)

Analyte	Assessment Criteria			
	ANZECC	SAHC	Langley (D)	Langley (F)
Organochlorine Pesticides:				
HCB				
Dichloran				
Total BHC				
Lindane				
Heptachlor			40	50
Heptachlor Epoxide				
Total Chlordane (ocy, cis, trans, chlordene, nonachlor)			200	250
Total endosulphan				
Aldrin			40	50
Dieldrin	0.2		40	50
Endrin Total				
Dicofol				
op-DDE, pp-DDE				
op-DDD pp-DDD				
op DDT pp-DDT			800	1000
Methoxychlor				
Total OCPs				
Polychlorinated Biphenyls (PCB's):				
A1016				
A1221				
A1232				
A1242				
A1248				
A1254				
A1260				
A1262				
Total Aroclors	1		40	50

ANZECC	Environmental Guidelines (1992)
SAHC	South Australian Health Commission health based Guidelines (1993)
Langley (D)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting D - restricted residential)
Langley (F)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting F - commercial/industrial)

Assessment Criteria for Comparison with Soil Analytical Results
BTEX, TPH, Phenols, Fluoride, Cyanide, Cresols

All results expressed in mg/kg (ppm)

Analyte	Assessment Criteria						
	ANZECC	SAHC	Langley (D)	Langley (F)	Dutch	NSW EPA	Dutch C
BTEX:							
Benzene	1				1	0.5	
Toluene					130	3	
Ethyl Benzene					50	5	
Xylene					25	5	
Total BTEX							
Total Petroleum Hydrocarbons (TPH):							
C_6-C_9						65	800
C_{10}-C_{14}							
C_{15}-C_{28}						1000	5000
C_{29}-C_{36}							
Total TPH							
Phenols:							
Phenol			34000	42500			
3-Methylphenol							
2-Methylphenol							
4-Methylphenol							
2-Ethylphenol							
4-Ethylphenol							
2,4-Dimehtylphenol							
2,3,5-Trimethylphenol							
4-Nitrophenol							
Cresols					5		
Fluoride					2000		
Cyanide		250	2000	2500			

ANZECC	Environmental Guidelines (1992)
SAHC	South Australian Health Commission health based Guidelines (1993)
Langley (D)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting D - restricted residential)
Langley (F)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting F - commercial/industrial)
Dutch	Dutch Intervention Criteria (1994)
NSW EPA	Guidelines for Assessing Service Station Sites - Threshold Concentrations for sensitive land use (soils) (1994)
Dutch C	Dutch C Criteria

Appendix H

Tabulated Soil Analysis Results

Analytical Results - Soil
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH1	BH2	BH3	BH4	BH4*	BH4/D
Sample Depth	Reporting	0.06-0.3	1.8-2.0	0.8-1.0	0.45-0.6	0.45-0.6	0.45-0.6
Metals:							
Arsenic	5	<LOR	9.4	7.4	7:6	7.5	8.5
Cadmium	1	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Cobalt	1				8 -	7.6	
Chromium (total)	2	9.2	29	31	31	29	26
Copper	2	9.5	7	7.3	32	29	34
Mercury	0.5	<LOR	<LOR	<LOR	<LOR	<LOR	**1.6** [1]
Nickel	1				15	14	
Lead	5	<LOR	7.5	10	**446** [1,2]	**670** [1,2]	**440** [1,2]
Selenium	5				<LOR	<LOR	
Zinc	2	8.7	19	21	**280** [1]	**270** [1]	**270** [1]
Manganese	10				200		
Beryllium	1				1.2	1.2	
Molybdenum	5				<LOR	<LOR	
Antimony	5				<LOR	<LOR	
Tin	2				28	26	
pH	0.1	**9.5** [1,2]		**9.5** [1,2]			**9.2** [1,2]
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1				<LOR		<LOR
Acenaphthylene	0.1				<LOR		<LOR
Acenaphthene	0.1				<LOR		<LOR
Fluorene	0.1				<LOR		<LOR
Phenanthrene	0.1				<LOR		<LOR
Anthracene	0.1				<LOR		<LOR
Fluoranthrene	0.1				0.1		<LOR
Pyrene	0.1				0.1		<LOR
Benz(a)anthracene	0.1				<LOR		<LOR
Chrysene	0.1				<LOR		<LOR
Benzo(b)fluoranthene an	0.1				0.1		<LOR
Benzo(k)fluoranthrene	0.1				<LOR		<LOR
Benzo(a)pyrene	0.1				0.1		<LOR
Indeno(1,2,3-cd)pyrene	0.1				<LOR		<LOR
Dibenz(a,h)anthracene	0.1				<LOR		<LOR
Benzo(g,h,i)perylene	0.1				<LOR		<LOR
Total PAH	1.6				<LOR		<LOR

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH4/D* 0.45-0.6	BH5 0.8-1.0	BH6 0.65-0.75	BH7 0.4-0.5	BH8 0.8-1.0	BH9 2.0-2.1
Metals:							
Arsenic	5			5.6	<LOR	10	9.3
Cadmium	1			<LOR	<LOR	<LOR	<LOR
Cobalt	1						
Chromium (total)	2			22	13	17	16
Copper	2			24	4.6	9	5.5
Mercury	0.5			<LOR	<LOR	<LOR	<LOR
Nickel	1						
Lead	5			45	<LOR	5.3	5.3
Selenium	5						
Zinc	2			69	17	15	14
Manganese	10						
Beryllium	1						
Molybdenum	5						
Antimony	5						
Tin	2						
pH	0.1		**9.5** [1,2]	**9.4** [1,2]	**9.8** [1,2]	**10** [1,2]	
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1	<LOR	<LOR	<LOR			
Acenaphthylene	0.1	<LOR	<LOR	0.1			
Acenaphthene	0.1	<LOR	<LOR	<LOR			
Fluorene	0.1	<LOR	<LOR	<LOR			
Phenanthrene	0.1	<LOR	<LOR	0.2			
Anthracene	0.1	<LOR	<LOR	0.1			
Fluoranthrene	0.1	<LOR	<LOR	0.9			
Pyrene	0.1	<LOR	<LOR	0.9			
Benz(a)anthracene	0.1	<LOR	<LOR	0.5			
Chrysene	0.1	<LOR	<LOR	0.4			
Benzo(b)fluoranthene an	0.1	<LOR	<LOR	0.4			
Benzo(k)fluoranthrene	0.1	<LOR	<LOR	0.4			
Benzo(a)pyrene	0.1	<LOR	<LOR	0.6			
Indeno(1,2,3-cd)pyrene	0.1	<LOR	<LOR	0.4			
Dibenz(a,h)anthracene	0.1	<LOR	<LOR	<LOR			
Benzo(g,h,i)perylene	0.1	<LOR	<LOR	0.4			
Total PAH	1.6	<LOR	<LOR	5.3			

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH10 0.7-0.85	BH11 0.8-1.0	BH11* 0.8-1.0	BH12 0.55-0.7	BH12/D 0.55-0.7	BH12/D* 0.55-0.7
Metals:							
Arsenic	5	5	8.9	9.8	<LOR	2.8	2.8
Cadmium	1	<LOR	<LOR	<LOR	<LOR	<0.5	<0.5
Cobalt	1					8.5	8.5
Chromium (total)	2	46	11	12	29	28	26
Copper	2	18	5.7	6	10	14	14
Mercury	0.5	<LOR	<LOR	<LOR	<LOR	<0.1	<0.1
Nickel	1					14	12
Lead	5	13	<LOR	<LOR	11	14	15
Selenium	5					<0.5	<0.5
Zinc	2	30	9.8	10	17	28	32
Manganese	10					220	210
Beryllium	1					<2	<2
Molybdenum	5					<10	<10
Antimony	5					<10	<10
Tin	2					<10	<10
pH	0.1	**8.8** [1]	**9.3** [1,2]		**9.2** [1,2]		
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1				<LOR	<0.1	
Acenaphthylene	0.1				<LOR	<0.1	
Acenaphthene	0.1				<LOR	<0.1	
Fluorene	0.1				<LOR	<0.1	
Phenanthrene	0.1				<LOR	<0.1	
Anthracene	0.1				<LOR	<0.1	
Fluoranthrene	0.1				<LOR	<0.1	
Pyrene	0.1				<LOR	<0.1	
Benz(a)anthracene	0.1				<LOR	<0.1	
Chrysene	0.1				<LOR	<0.1	
Benzo(b)fluoranthene an	0.1				<LOR	<0.1	
Benzo(k)fluoranthrene	0.1				<LOR	<0.1	
Benzo(a)pyrene	0.1				<LOR	<0.1	
Indeno(1,2,3-cd)pyrene	0.1				<LOR	<0.1	
Dibenz(a,h)anthracene	0.1				<LOR	<0.1	
Benzo(g,h,i)perylene	0.1				<LOR	<0.1	
Total PAH	1.6				<LOR		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH13 0.7-0.9	BH13* 0.7-0.9	BH13/D 0.7-0.9	BH13/D* 0.7-0.9	BH14 0.55-0.7	BH15 0.7-0.85
Metals:							
Arsenic	5	5.1	<LOR	<LOR	5	19	<LOR
Cadmium	1	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Cobalt	1	7.7	8.1				
Chromium (total)	2	29	29	33	34	18	26
Copper	2	16	16	17	17	**450** [1,2]	9.9
Mercury	0.5	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Nickel	1	15	15				
Lead	5	43	36	39	34	**1600** [1,2,3,4]	11
Selenium	5	<LOR	<LOR				
Zinc	2	32	32	32	32	**2000** [1,2]	14
Manganese	10	260	270				
Beryllium	1		1.2	1.1			
Molybdenum	5		<LOR	<LOR			
Antimony	5		<LOR	<LOR			
Tin	2		2.6	2.8			
pH	0.1			**8.9** [1]		**11** [1,2]	**9.3** [1,2]
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1	<LOR	<LOR			<LOR	
Acenaphthylene	0.1	<LOR	<LOR			<LOR	
Acenaphthene	0.1	<LOR	<LOR			<LOR	
Fluorene	0.1	<LOR	<LOR			<LOR	
Phenanthrene	0.1	<LOR	0.2			<LOR	
Anthracene	0.1	<LOR	0.1			<LOR	
Fluoranthrene	0.1	0.1	0.3			0.2	
Pyrene	0.1	0.1	0.2			0.2	
Benz(a)anthracene	0.1	<LOR	0.2			<LOR	
Chrysene	0.1	<LOR	0.1			<LOR	
Benzo(b)fluoranthene an	0.1	0.1	0.1			0.1	
Benzo(k)fluoranthrene	0.1	<LOR	0.1			0.1	
Benzo(a)pyrene	0.1	<LOR	0.1			0.1	
Indeno(1,2,3-cd)pyrene	0.1	<LOR	<LOR			<LOR	
Dibenz(a,h)anthracene	0.1	<LOR	<LOR			<LOR	
Benzo(g,h,i)perylene	0.1	<LOR	<LOR			<LOR	
Total PAH	1.6	<LOR	1.4			<LOR	

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH15/D 0.7-0.85	BH15/D* 0.7-0.85	BH16 0.4-0.5	BH17 0.8-1.0	BH18 0.4-0.5	BH18* 0.4-0.5
Metals:							
Arsenic	5	2.8		9.5	11		
Cadmium	1	<0.5		<LOR	<LOR		
Cobalt	1	9.4					
Chromium (total)	2	28		29	13		
Copper	2	16		10	7.3		
Mercury	0.5	<0.1		<LOR	<LOR		
Nickel	1	11					
Lead	5	15		11	<LOR		
Selenium	5	<0.5					
Zinc	2	26		21	11		
Manganese	10	260					
Beryllium	1	<2					
Molybdenum	5	<10					
Antimony	5	<10					
Tin	2	<10					
pH	0.1			**9.7** [1,2]	**9.8** [1,2]	**9.4** [1,2]	**9.4** [1,2]
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1	<0.1	<0.1	<LOR		<LOR	
Acenaphthylene	0.1	<0.1	<0.1	<LOR		<LOR	
Acenaphthene	0.1	<0.1	<0.1	<LOR		<LOR	
Fluorene	0.1	<0.1	<0.1	<LOR		<LOR	
Phenanthrene	0.1	<0.1	<0.1	<LOR		<LOR	
Anthracene	0.1	<0.1	<0.1	<LOR		<LOR	
Fluoranthrene	0.1	<0.1	<0.1	<LOR		<LOR	
Pyrene	0.1	<0.1	<0.1	<LOR		<LOR	
Benz(a)anthracene	0.1	<0.1	<0.1	<LOR		<LOR	
Chrysene	0.1	<0.1	<0.1	<LOR		<LOR	
Benzo(b)fluoranthene an	0.1	<0.1	<0.1	<LOR		<LOR	
Benzo(k)fluoranthrene	0.1	<0.1	<0.1	<LOR		<LOR	
Benzo(a)pyrene	0.1	<0.1	<0.1	<LOR		<LOR	
Indeno(1,2,3-cd)pyrene	0.1	<0.1	<0.1	<LOR		<LOR	
Dibenz(a,h)anthracene	0.1	<0.1	<0.1	<LOR		<LOR	
Benzo(g,h,i)perylene	0.1	<0.1	<0.1	<LOR		<LOR	
Total PAH	1.6			<LOR		<LOR	

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH19 0.55-0.7	BH20 0.05-0.7	ER1 0.05-0.8	ER2 0.05-0.9
Metals:					
Arsenic	5	<LOR	7.6	<LOR	<LOR
Cadmium	1	<LOR	<LOR	<LOR	<LOR
Cobalt	1				
Chromium (total)	2	23	33	<LOR	<LOR
Copper	2	8.9	31	<LOR	<LOR
Mercury	0.5	<LOR	<LOR	<LOR	<LOR
Nickel	1				
Lead	5	28	140	<LOR	<LOR
Selenium	5				
Zinc	2	17	**410** [1]	<LOR	<LOR
Manganese	10				
Beryllium	1				
Molybdenum	5				
Antimony	5				
Tin	2				
pH	0.1	**9.1** [1,2]	**9.5** [1,2]		
Polycyclic Aromatic Hydrocarbons (PAH):					
Naphthalene	0.1	<LOR	<LOR	<LOR	<LOR
Acenaphthylene	0.1	<LOR	0.3	<LOR	<LOR
Acenaphthene	0.1	<LOR	<LOR	<LOR	<LOR
Fluorene	0.1	<LOR	<LOR	<LOR	<LOR
Phenanthrene	0.1	<LOR	0.3	<LOR	<LOR
Anthracene	0.1	<LOR	0.2	<LOR	<LOR
Fluoranthrene	0.1	<LOR	2.1	<LOR	<LOR
Pyrene	0.1	<LOR	2.2	<LOR	<LOR
Benz(a)anthracene	0.1	<LOR	1.3	<LOR	<LOR
Chrysene	0.1	<LOR	1.3	<LOR	<LOR
Benzo(b)fluoranthene an	0.1	<LOR	1.3	<LOR	<LOR
Benzo(k)fluoranthrene	0.1	<LOR	1.5	<LOR	<LOR
Benzo(a)pyrene	0.1	<LOR	**1.7** [2]	<LOR	<LOR
Indeno(1,2,3-cd)pyrene	0.1	<LOR	1.3	<LOR	<LOR
Dibenz(a,h)anthracene	0.1	<LOR	0.3	<LOR	<LOR
Benzo(g,h,i)perylene	0.1	<LOR	1.3	<LOR	<LOR
Total PAH	1.6	<LOR	15	<LOR	<LOR

ER is an equipment rinsate, the results for which are in ug/L

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
OCPs and OPPs

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH13	BH13*	BH12/D	BH15/D	BH15/D*
Sample Depth	Reporting	0.45-0.6	0.7-0.9	0.7-0.9	0.55-0.7	0.7-0.85	0.7-0.85
Organochlorine Pesticides:							
HCB	0.05	<LOR	<LOR	<LOR			
Dichloran	0.05	<LOR	<LOR	<LOR			
Total BHC	0.05	<LOR	<LOR	<LOR			
Lindane	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
Heptachlor	0.05	<LOR	<LOR	<LOR			
Heptachlor Epoxide	0.05	<LOR	<LOR	<LOR			
Total Chlordane (ocy, cis, trans, chlordene, nonachlor)	0.05	<LOR	<LOR	<LOR			
Total endosulphan	0.05	<LOR	<LOR	<LOR			
Aldrin	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
Dieldrin	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
Endrin Total	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
Dicofol	0.05	<LOR	<LOR	<LOR			
op-DDE, pp-DDE	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
op-DDD pp-DDD	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
op DDT pp-DDT	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
Methoxychlor	0.05	<LOR	<LOR	<LOR			
Total OCPs	0.2	<LOR	<LOR	<LOR			
Organophosphate Pesticides:							
Dichlorvos	0.1	<LOR	<LOR	<LOR			
Mevinphos	0.1	<LOR	<LOR	<LOR			
Diazinon	0.1	<LOR	<LOR	<LOR			
Chlorpyrifos-Methyl	0.1	<LOR	<LOR	<LOR			
Fenchlorvos	0.1	<LOR	<LOR	<LOR			
Parathion-methyl	0.1	<LOR	<LOR	<LOR			
Chlorpyriphos	0.1	<LOR	<LOR	<LOR			
Malathion	0.1	<LOR	<LOR	<LOR			
Fenitrothion	0.1	<LOR	<LOR	<LOR			
Parathion	0.1	<LOR	<LOR	<LOR			
Chlorfenvinphos	0.1	<LOR	<LOR	<LOR			
Bromophos-Ethyl	0.1	<LOR	<LOR	<LOR			
Tetrachlorvinphos	0.1	<LOR	<LOR	<LOR			
Ethion	0.1	<LOR	<LOR	<LOR			
Total OPPs	0.2	<LOR	<LOR	<LOR			

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Analytical Results - Soil
OCPs and OPPs

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	ER1	ER2
Organochlorine Pesticides:			
HCB	0.05	<LOR	<LOR
Dichloran	0.05	<LOR	<LOR
Total BHC	0.05	<LOR	<LOR
Lindane	0.05	<LOR	<LOR
Heptachlor	0.05	<LOR	<LOR
Heptachlor Epoxide	0.05	<LOR	<LOR
Total Chlordane (ocy, cis, trans, chlordene, nonachlor	0.05	<LOR	<LOR
Total endosulphan	0.05	<LOR	<LOR
Aldrin	0.05	<LOR	<LOR
Dieldrin	0.05	<LOR	<LOR
Endrin Total	0.05	<LOR	<LOR
Dicofol	0.05	<LOR	<LOR
op-DDE, pp-DDE	0.05	<LOR	<LOR
op-DDD pp-DDD	0.05	<LOR	<LOR
op DDT pp-DDT	0.05	<LOR	<LOR
Methoxychlor	0.05	<LOR	<LOR
Total OCPs	0.2	<LOR	<LOR
Organophosphate Pesticides:			
Dichlorvos	0.1		
Mevinphos	0.1		
Diazinon	0.1		
Chlorpyrifos-Methyl	0.1		
Fenchlorvos	0.1		
Parathion-methyl	0.1		
Chlorpyriphos	0.1		
Malathion	0.1		
Fenitrothion	0.1		
Parathion	0.1		
Chlorfenvinphos	0.1		
Bromophos-Ethyl	0.1		
Tetrachlorvinphos	0.1		
Ethion	0.1		
Total OPPs	0.2		

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

ER is an equipment rinsate, the results for which are in ug/L

Analytical Results

BTEX, TPH, Phenols, Fluoride, Cyanide, Cresols, PCBs

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of Reporting	BH4 0.45-0.6	BH4* 0.45-0.6	BH12/D 0.55-0.7	BH12/D* 0.55-0.7	BH13 0.7-0.9	BH13* 0.7-0.9
BTEX:							
Benzene	0.5	<LOR	<LOR	<0.01	<0.01	<LOR	
Toluene	0.5	<LOR	<LOR	<0.01	<0.01	<LOR	
Ethyl Benzene	0.5	<LOR	<LOR	<0.01	<0.01	<LOR	
Xylene	1	<LOR	<LOR	<0.01	<0.01	<LOR	
Total BTEX	2	<LOR	<LOR	<0.01		<LOR	
Total Petroleum Hydrocarbons (TPH):							
C_6-C_9	25	<LOR	<LOR	<20		<LOR	
C_{10}-C_{14}	25	<LOR	<LOR	<50		<LOR	
C_{15}-C_{28}	25	<LOR	<LOR	<100		<LOR	
C_{29}-C_{36}	25	<LOR	<LOR	<100		<LOR	
Total TPH	100	<LOR	<LOR			<LOR	
Phenols							
Phenol	0.1	<LOR	<LOR	<0.1	<0.1	<LOR	<LOR
3-Methylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2-Methylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2-Ethylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2,4-Dimehtylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2,3,5-Trimethylphenol	0.1	<LOR	<LOR			<LOR	<LOR
4-Nitrophenol	0.1	<LOR	<LOR			<LOR	<LOR
Cresols				<0.1	<0.1		
Fluoride				260			
Cyanide				<5			
Polychlorinated Biphenyls (PCBs)							
A1016	0.2	<LOR				<LOR	<LOR
A1221	0.2	<LOR				<LOR	<LOR
A1232	0.2	<LOR				<LOR	<LOR
A1242	0.2	<LOR				<LOR	<LOR
A1248	0.2	<LOR				<LOR	<LOR
A1254	0.2	<LOR				<LOR	<LOR
A1260	0.2	<LOR				<LOR	<LOR
A1262	0.2	<LOR				<LOR	<LOR
Total Aroclors	1	<LOR				<LOR	<LOR

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Analytical Results

BTEX, TPH, Phenols, Fluoride, Cyanide, Cresols, PCBs

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of Reporting	BH4 0.45-0.6	BH4* 0.45-0.6	BH12/D 0.55-0.7	BH12/D* 0.55-0.7	BH13 0.7-0.9	BH13* 0.7-0.9
BTEX:							
Benzene	0.5	<LOR	<LOR	<0.01	<0.01	<LOR	
Toluene	0.5	<LOR	<LOR	<0.01	<0.01	<LOR	
Ethyl Benzene	0.5	<LOR	<LOR	<0.01	<0.01	<LOR	
Xylene	1	<LOR	<LOR	<0.01	<0.01	<LOR	
Total BTEX	2	<LOR	<LOR	<0.01		<LOR	
Total Petroleum Hydrocarbons (TPH):							
C_6-C_9	25	<LOR	<LOR	<20		<LOR	
C_{10}-C_{14}	25	<LOR	<LOR	<50		<LOR	
C_{15}-C_{28}	25	<LOR	<LOR	<100		<LOR	
C_{29}-C_{36}	25	<LOR	<LOR	<100		<LOR	
Total TPH	100	<LOR	<LOR			<LOR	
Phenols							
Phenol	0.1	<LOR	<LOR	<0.1	<0.1	<LOR	<LOR
3-Methylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2-Methylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2-Ethylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2,4-Dimehtylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2,3,5-Trimethylphenol	0.1	<LOR	<LOR			<LOR	<LOR
4-Nitrophenol	0.1	<LOR	<LOR			<LOR	<LOR
Cresols				<0.1	<0.1		
Fluoride				260			
Cyanide				<5			
Polychlorinated Biphenyls (PCBs)							
A1016	0.2	<LOR				<LOR	<LOR
A1221	0.2	<LOR				<LOR	<LOR
A1232	0.2	<LOR				<LOR	<LOR
A1242	0.2	<LOR				<LOR	<LOR
A1248	0.2	<LOR				<LOR	<LOR
A1254	0.2	<LOR				<LOR	<LOR
A1260	0.2	<LOR				<LOR	<LOR
A1262	0.2	<LOR				<LOR	<LOR
Total Aroclors	1	<LOR				<LOR	<LOR

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Analytical Results
Volatile Organic Scan
All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH4 0.45-0.6	BH13 0.7-0.9
Monocyclic Aromatic Hydrocarbons			
Benzene	1.0	<LOR	<LOR
Toluene	1.0	<LOR	<LOR
Ethylbenzene	1.0	<LOR	<LOR
m.p-xylene	1.0	<LOR	<LOR
o-xylene	1.0	<LOR	<LOR
Styrene	1.0	<LOR	<LOR
Isopropylbenzene	1.0	<LOR	<LOR
n-propylbenzene	1.0	<LOR	<LOR
1,3,5-Trimethylbenzene	1.0	<LOR	<LOR
tert-Butylbenzene	1.0	<LOR	<LOR
1,2,4-Trimethylbenzene	1.0	<LOR	<LOR
sec-Butylbenzene	1.0	<LOR	<LOR
n-Butylbenzene	1.0	<LOR	<LOR
Fumigants			
2,2-Dichloropropane	1.0	<LOR	<LOR
1,2-Dichloropropane	1.0	<LOR	<LOR
1,2-dibromoethane	1.0	<LOR	<LOR
Halogenated Aliphatic Hydrocarbons:			
Dichlorofluoromethane	1.0	<LOR	<LOR
Chloromethane	1.0	<LOR	<LOR
Vinyl Chloride	1.0	<LOR	<LOR
Bromomethane	1.0	<LOR	<LOR
Chlorethane	1.0	<LOR	<LOR
Trichlorofluoromethane	1.0	<LOR	<LOR
1,1-Dichloroethene	1.0	<LOR	<LOR
Methylene Chloride	1.0	<LOR	<LOR
trans-1,2-Dichloroethene	1.0	<LOR	<LOR
1,1-Dichloroethane	1.0	<LOR	<LOR
cis-1,2-Dichloroethene	1.0	<LOR	<LOR
Bromochloromethane	1.0	<LOR	<LOR
1,1,1-Trichloroethane	1.0	<LOR	<LOR
Carbon Tetrachloride	1.0	<LOR	<LOR
1.1-Dichloropropene	1.0	<LOR	<LOR
1,2-Dichloroethane	1.0	<LOR	<LOR

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Analytical Results
Volatile Organic Scan (Cont)

Borehole Number	Limit Of	BH4	BH13	BH12/D*	BH15/D*
Sample Depth	Reporting	0.45-0.6	0.7-0.9	0.55-0.7	0.7-0.85
Trichloroethene	1.0	<LOR	<LOR		
Dibromomethane	1.0	<LOR	<LOR		
cis-1,3-dichloropropene	1.0	<LOR	<LOR		
trans-1,3-dichloropropene	1.0	<LOR	<LOR		
1,1,2-Trichloroethane	1.0	<LOR	<LOR		
Tetrachloroethene	1.0	<LOR	<LOR		
1,3-Dichloropropane	1.0	<LOR	<LOR		
1,1,1,2-Tetrachloroethane	1.0	<LOR	<LOR		
1,1,2,2-Tetrachloroethane	1.0	<LOR	<LOR		
1,2,3-Trichloropropane	1.0	<LOR	<LOR		
4-Isopropyltoluene	1.0	<LOR	<LOR		
1,2-Dibromo-3-chloropropane	1.0	<LOR	<LOR		
Hexachlorobutadiene	1.0	<LOR	<LOR	<0.1	<0.1
Hexachloroethane				<0.1	<0.1
Hexachlorocyclopentadiene				<0.1	<0.1
Halogenated Aromatic Hydrocarbons					
1,2,3-Trichlorobenzene	1.0	<LOR	<LOR		
1,2,4-Trichlorobenzene	1.0	<LOR	<LOR	<0.1	<0.1
1,2-Dichlorobenzene	1.0	<LOR	<LOR	<0.1	<0.1
1,4-Dichlorobenzene	1.0	<LOR	<LOR	<0.1	<0.1
1,3-Dichlorobenzene	1.0	<LOR	<LOR	<0.1	<0.1
2-Chlorotoluene	1.0	<LOR	<LOR		
4-Chlorotoluene	1.0	<LOR	<LOR		
Bromobenzene	1.0	<LOR	<LOR		
Chlorobenzene	1.0	<LOR	<LOR	<0.1	<0.1
2-Choronapthalene				<0.1	<0.1
hexachlorobenzene				<0.1	<0.1
tetrachlorobenzene				<0.1	<0.1
Trihalomethanes (Volatiles)					
Chloroform	1.0	<LOR	<LOR		
Dibromochloromethane	1.0	<LOR	<LOR		
Bromodichloromethane	1.0	<LOR	<LOR		
Bromoform	1.0	<LOR	<LOR		
Naphthalene	1.0	<LOR	<LOR		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Appendix I

Certified Laboratory Results

REPORT OF ANALYSIS

RE-ISSUE OF REPORT

Client: Rust PPK
GPO Box 398
ADELAIDE SA 5001

Attention: Stuart Taylor/Jane Hewitt

Sample Description: Soil/Water - Project No27J097A - Franklin Street Bus Station

Lab Registration Nos: V97/18543 to V97/18566

Date Received: 23rd May 1997

Samples submitted to AGAL have been analysed as received. The information below is provided as part of our commitment to the quality of the analytical results. Please contact the undersigned for any further details relating to this Report.

Methods of Analysis:

• BTEX & TPH (C_6-C_9)	AGAL(Vic) Method VL234 (Purge & Trap GC/MS)
• TPH (C_{10}-C_{36}) - Soil	AGAL(Vic) Method VL228 (GC/FID)
• VOC's	AGAL(Vic) Method VL234 (Purge & Trap GC/MS)
• PAH's - Soil/Water	AGAL(Vic) Method VL221/222 (GC/MS)
• Metals - Soil/Water	AGAL(Vic) Method VL239/250 (ICP/MS/AES)
• OC/OP pesticides/PCB's - Soil/Water	AGAL(Vic) Method VL206/207 (GC determination)
• Phenols - Soil	AGAL(Vic) Method VL210 (HPLC determination)
• pH	AGAL(Vic) Method VL271 (Using APHA 4500B)

Quality Assurance:

The QA procedures conducted with the analyses include -

- Analysis of reagent blanks
- Analysis of recoveries
- Analysis of samples in duplicate

Results obtained for recoveries of selected analytes were as follows:

Analyte	Soil	Water
Toluene-d8	95%	-
TPH	91%	-
Phenanthrene	87%	106%
Dieldrin	84%	103%
3-Methyl phenol	81%	-
Lead	85%	101%
Zinc	78%	99%

Results of Analysis:

Analytical results on samples as received appear on the following page(s). All results are based on using one technique for each test. Soil results are reported on a dry weight basis.

This report shall not be reproduced except in full.

Barrie Magor
B.Sc.(Hons), Grad.Dip.App.Sci., MRACI
(Organics Analyses)

Roger Cromie
Dip.App.Sci., Grad.Dip.App.Sci., MRACI
(Metals Analyses)

Anthony Crane
B.App.Sci.
(Inorganics Analyses)

Date: 18-6-97

File : h:\word\reports\1997\18593.doc

REPORT OF ANALYSIS

Results for soil

Client Reference No:			BH4 (0.45-0.6)		BH13 (0.7-0.9)	BH19 (0.55-0.7)	BH20 (0.05-0.2)
Lab Registration No:	**Units**	**LOR**	**V97/18546**		**V97/18555**	**V97/18561**	**V97/18562**
BTEX:							
Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes	mg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total BTEX	mg/kg	**2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**
Petroleum Hydrocarbons:							
C_6 - C_9	mg/kg	25	<25	<25	<25	<25	<25
C_{10} - C_{14}	mg/kg	25	<25	<25	<25	<25	<25
C_{15} - C_{28}	mg/kg	25	<25	<25	<25	<25	<25
C_{29} - C_{36}	mg/kg	25	<25	<25	<25	<25	<25
Total Hydrocarbons	mg/kg	**100**	**<100**	**<100**	**<100**	**<100**	**<100**

Client Reference No:			BH4 (0.45-0.6)		BH13 (0.7-0.9)	
Lab Registration No:	**Units**	**LOR**	**V97/18546**		**V97/18555**	
Phenols:						
Phenol	mg/kg	0.1	<0.1	<0.1	<0.1	
3-Methylphenol	mg/kg	0.1	<0.1	<0.1	<0.1	
2-Methylphenol	mg/kg	0.1	<0.1	<0.1	<0.1	
2-Ethylphenol	mg/kg	0.1	<0.1	<0.1	<0.1	
2,4-Dimethylphenol	mg/kg	0.1	<0.1	<0.1	<0.1	
2,3,5-Trimethylphenol	mg/kg	0.1	<0.1	<0.1	<0.1	
4-Nitrophenol	mg/kg	0.1	<0.1	<0.1	<0.1	

REPORT OF ANALYSIS

Client Reference No: / Lab Registration No:	Units	LOR	BH4 (0.45-0.6) V97/18546	BH13 (0.7-0.9) V97/18555
Dichlorodifluoromethane	mg/kg	1.0	<1.0	<1.0
Chloromethane	mg/kg	1.0	<1.0	<1.0
Vinyl chloride	mg/kg	1.0	<1.0	<1.0
Bromomethane	mg/kg	1.0	<1.0	<1.0
Chloroethane	mg/kg	1.0	<1.0	<1.0
Trichlorofluoromethane	mg/kg	1.0	<1.0	<1.0
1,1-Dichloroethene	mg/kg	1.0	<1.0	<1.0
Methylene chloride	mg/kg	1.0	<1.0	<1.0
trans-1,2-Dichloroethene	mg/kg	1.0	<1.0	<1.0
1,1-Dichloroethane	mg/kg	1.0	<1.0	<1.0
2,2-Dichloropropane	mg/kg	1.0	<1.0	<1.0
cis-1,2-Dichloroethene	mg/kg	1.0	<1.0	<1.0
Bromochloromethane	mg/kg	1.0	<1.0	<1.0
Chloroform	mg/kg	1.0	<1.0	<1.0
1,1,1-Trichloroethane	mg/kg	1.0	<1.0	<1.0
Carbon tetrachloride	mg/kg	1.0	<1.0	<1.0
1,1-Dichloropropene	mg/kg	1.0	<1.0	<1.0
Benzene	mg/kg	1.0	<1.0	<1.0
1,2-Dichloroethane	mg/kg	1.0	<1.0	<1.0
Trichloroethene	mg/kg	1.0	<1.0	<1.0
1,2-Dichloropropane	mg/kg	1.0	<1.0	<1.0
Dibromomethane	mg/kg	1.0	<1.0	<1.0
Bromodichloromethane	mg/kg	1.0	<1.0	<1.0
cis-1,3-dichloropropene	mg/kg	1.0	<1.0	<1.0
Toluene	mg/kg	1.0	<1.0	<1.0
trans-1,3-dichloropropene	mg/kg	1.0	<1.0	<1.0
1,1,2-Trichloroethane	mg/kg	1.0	<1.0	<1.0
Tetrachloroethene	mg/kg	1.0	<1.0	<1.0
1,3-Dichloropropane	mg/kg	1.0	<1.0	<1.0
Dibromochloromethane	mg/kg	1.0	<1.0	<1.0

REPORT OF ANALYSIS

Client Reference No:			BH4 (0.45-0.6)	BH13 (0.7-0.9)
Lab Registration No:	Units	LOR	V97/18546	V97/18555
1,2-dibromoethane	mg/kg	1.0	<1.0	<1.0
Chlorobenzene	mg/kg	1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	mg/kg	1.0	<1.0	<1.0
Ethylbenzene	mg/kg	1.0	<1.0	<1.0
m,p-xylene	mg/kg	1.0	<1.0	<1.0
o-xylene	mg/kg	1.0	<1.0	<1.0
Styrene	mg/kg	1.0	<1.0	<1.0
Bromoform	mg/kg	1.0	<1.0	<1.0
Isopropylbenzene	mg/kg	1.0	<1.0	<1.0
Bromobenzene	mg/kg	1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	mg/kg	1.0	<1.0	<1.0
1,2,3-Trichloropropane	mg/kg	1.0	<1.0	<1.0
n-propylbenzene	mg/kg	1.0	<1.0	<1.0
2-Chlorotoluene	mg/kg	1.0	<1.0	<1.0
4-Chlorotoluene	mg/kg	1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	mg/kg	1.0	<1.0	<1.0
tert-Butylbenzene	mg/kg	1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	mg/kg	1.0	<1.0	<1.0
sec-Butylbenzene	mg/kg	1.0	<1.0	<1.0
1,3-Dichlorobenzene	mg/kg	1.0	<1.0	<1.0
4-Isopropyltoluene	mg/kg	1.0	<1.0	<1.0
1,4-Dichlorobenzene	mg/kg	1.0	<1.0	<1.0
1,2-Dichlorobenzene	mg/kg	1.0	<1.0	<1.0
n-Butylbenzene	mg/kg	1.0	<1.0	<1.0
1,2- Dibromo-3-chloropropane	mg/kg	1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	mg/kg	1.0	<1.0	<1.0
Hexachlorobutadiene	mg/kg	1.0	<1.0	<1.0
Naphthalene	mg/kg	1.0	<1.0	<1.0
1,2,3-Trichlorobenzene	mg/kg	1.0	<1.0	<1.0

REPORT OF ANALYSIS

Client Reference No:			BH4 (0.45-0.6)	BH5 (0.8-1.0)	BH6 (0.65-0.75)	BH12 (0.55-0.7)	BH13 (0.7-0.9)	
Lab Registration No:	Units	LOR	V97/18546	V97/18547	V97/18548	V97/18554	V97/18555	
PAH's:								
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.2
Anthracene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.1
Fluoranthene	mg/kg	0.1	0.1	<0.1	0.9	<0.1	0.1	0.3
Pyrene	mg/kg	0.1	0.1	<0.1	0.9	<0.1	0.1	0.2
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	0.5	<0.1	<0.1	0.2
Chrysene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	0.1
Benzo(b)fluoranthene	mg/kg	0.1	0.1	<0.1	0.4	<0.1	0.1	0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	0.1
Benzo(a)pyrene	mg/kg	0.1	0.1	<0.1	0.6	<0.1	<0.1	0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1
Total PAH's (as above)	mg/kg	**1.6**	**<1.6**	**<1.6**	**5.3**	**<1.6**	**<1.6**	**1.4**

Client Reference No:			BH14 (0.55-0.7)	BH16 (0.4-0.5)	BH18 (0.4-0.5)	BH19 (0.55-0.7)	BH20 (0.05-0.2)	BD2	
Lab Registration No:	Units	LOR	V97/18556	V97/18558	V97/18560	V97/18561	V97/18562	V97/18563	
PAH's:									
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1	2.1	<0.1	<0.1
Pyrene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1	2.2	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Benzo(b)fluoranthene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.5	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.7	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Dibenz(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Total PAH's (as above)	mg/kg	**1.6**	**<1.6**	**<1.6**	**<1.6**	**<1.6**	**15**	**<1.6**	**<1.6**

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REPORT OF ANALYSIS

Client Reference No:			BH4 (0.45-0.6)	BH13 (0.7-0.9)	
Lab Registration No:	Units	LOR	V97/18546	V97/18555	
OC Pesticides:					
HCB	mg/kg	0.05	<0.05	<0.05	<0.05
Dichloran	mg/kg	0.05	<0.05	<0.05	<0.05
BHC (α,β,δ)	mg/kg	0.05	<0.05	<0.05	<0.05
Lindane (γ-BHC)	mg/kg	0.05	<0.05	<0.05	<0.05
Heptachlor	mg/kg	0.05	<0.05	<0.05	<0.05
Heptachlor Epoxide	mg/kg	0.05	<0.05	<0.05	<0.05
Chlordane (total)	mg/kg	0.05	<0.05	<0.05	<0.05
Endosulphan (total)	mg/kg	0.05	<0.05	<0.05	<0.05
Aldrin	mg/kg	0.05	<0.05	<0.05	<0.05
Dieldrin	mg/kg	0.05	<0.05	<0.05	<0.05
Endrin (total)	mg/kg	0.05	<0.05	<0.05	<0.05
Dicofol	mg/kg	0.05	<0.05	<0.05	<0.05
DDT's (total)	mg/kg	0.05	<0.05	<0.05	<0.05
Methoxychlor	mg/kg	0.05	<0.05	<0.05	<0.05
Total OC's (as above)	mg/kg	**0.2**	**<0.2**	**<0.2**	**<0.2**

Client Reference No:			BH4 (0.45-0.6)	BH13 (0.7-0.9)	
Lab Registration No:	Units	LOR	V97/18546	V97/18555	
OP Pesticides:					
Mevinphos	mg/kg	0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	0.1	<0.1	<0.1	<0.1
Fenchlorphos	mg/kg	0.1	<0.1	<0.1	<0.1
Parathion-methyl	mg/kg	0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	0.1	<0.1	<0.1	<0.1
Chlorfenvinphos	mg/kg	0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	0.1	<0.1	<0.1	<0.1
Tetrachlorvinphos	mg/kg	0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	0.1	<0.1	<0.1	<0.1
Total OP's (as above)	mg/kg	**0.2**	**<0.2**	**<0.2**	**<0.2**

REPORT OF ANALYSIS

Client Reference No: / Lab Registration No:	Units	LOR	BH4 (0.45-0.6) V97/18546	BH13 (0.7-0.9) V97/18555	
PCB's (as Aroclors):					
A1016	mg/kg	0.2	<0.2	<0.2	<0.2
A1221	mg/kg	0.2	<0.2	<0.2	<0.2
A1232	mg/kg	0.2	<0.2	<0.2	<0.2
A1242	mg/kg	0.2	<0.2	<0.2	<0.2
A1248	mg/kg	0.2	<0.2	<0.2	<0.2
A1254	mg/kg	0.2	<0.2	<0.2	<0.2
A1260	mg/kg	0.2	<0.2	<0.2	<0.2
Total PCB's	mg/kg	**1.0**	**<1.0**	**<1.0**	**<1.0**

Client Reference No: / Lab Registration No:	Units	LOR	BH1 (0.06-0.3) V97/18543	BH3 (0.8-1.0) V9718545	BH5 (0.8-1.0) V97/18547	BH6 (0.65-0.75) V97/18548	BH7 (0.4-0.5) V97/18549
pH	--	0.1	9.5	9.5	9.5	9.4	9.8

Client Reference No: / Lab Registration No:	Units	LOR	BH8 (0.8-1.0) V97/18550	BH10 (0.7-0.85) V97/18552	BH11 (0.8-1.0) V97/18553	BH12 (0.55-0.7) V97/18554	BH14 (0.55-0.7) V97/18556
pH	--	0.1	10	8.8	9.3	9.2	11

Client Reference No: / Lab Registration No:	Units	LOR	BH15 (0.7-0.85) V97/18557	BH16 (0.4-0.5) V97/18558	BH17 (0.8-1.0) V97/18559	BH18 (0.4-0.5) V97/18560	BH19 (0.55-0.7) V97/18561
pH	--	0.1	9.3	9.7	9.8	9.4	9.1

Client Reference No: / Lab Registration No:	Units	LOR	BH20 (0.05-0.2) V97/18562	BD2 V97/18563	BD6 V97/18564
pH	--	0.1	9.5	9.2	8.9

REPORT OF ANALYSIS

SAMPLE	CLIENT REF.	As	Cd	Co	Cr	Cu	Mn	Ni	Pb	Se	Zn
Minimum level of reporting		5.0	1.0	1.0	2.0	2.0	10	1.0	5.0	5.0	2.0
V97/018543	BH1 .06-	<5.0	<1.0		9.2	9.5			<5.0		8.7
V97/018544	BH2 1.8-	9.4	<1.0		29	7			7.5		19
V97/018545	BH3 .8-1.0	7.4	<1.0		31	7.3			10		21
V97/018546	BH4 .45-	7.6	<1.0	8	31	32	200	15	446	<5.0	280
V97/018546 dup	BH4 .45-	7.5	<1.0	7.6	29	29		14	670	<5.0	270
V97/018548	BH6 .65-	5.6	<1.0		22	24			45		69
V97/018549	BH7 .4-.5	<5.0	<1.0		13	4.6			<5.0		17
V97/018550	BH8 .8-1.0	10	<1.0		17	9			5.3		15
V97/018551	BH9 2.0-	9.3	<1.0		16	5.5			5.3		14
V97/018552	BH10 .7-	5	<1.0		46	18			13		30
V97/018553	BH11 .8-	8.9	<1.0		11	5.7			<5.0		9.8
V97/018553 dup	BH11 .8-	9.8	<1.0		12	6			<5.0		10
V97/018554	BH12 .55-	<5.0	<1.0		29	10			11		17
V97/018555	BH13 .7-	5.1	<1.0	7.7	29	16	260	15	43	<5.0	32
V97/018555 dup	BH13 .7-	<5.0	<1.0	8.1	29	16	270	15	36	<5.0	32
V97/018556	BH14 .55	19	<1.0		18	450			1600		2000
V97/018557	BH15 .7-	<5.0	<1.0		26	9.9			11		14
V97/018558	BH16 .4-	9.5	<1.0		29	10			11		21
V97/018559	BH17 .8-	11	<1.0		13	7.3			<5.0		11
V97/018561	BH19 .55-	<5.0	<1.0		23	8.9			28		17
V97/018562	BH20 .05-	7.6	<1.0		33	31			140		410
V97/018563	BD2	8.5	<1.0		26	34			440		270
V97/018564	BD6	<5.0	<1.0		33	17			39		32
V97/018564 dup	BD6	5	<1.0		34	17			34		32

Results above are expressed in mg/kg.

REPORT OF ANALYSIS

Results for water

Client Reference No: Lab Registration No:	Units	LOR	ER1 V97/18565	ER2 V97/18566
OC Pesticides:				
HCB	µg/L	0.05	<0.05	<0.05
Dichloran	µg/L	0.05	<0.05	<0.05
BHC (α,β,δ)	µg/L	0.05	<0.05	<0.05
Lindane (γ-BHC)	µg/L	0.05	<0.05	<0.05
Heptachlor	µg/L	0.05	<0.05	<0.05
Heptachlor Epoxide	µg/L	0.05	<0.05	<0.05
Chlordane (total)	µg/L	0.05	<0.05	<0.05
Endosulphan (total)	µg/L	0.05	<0.05	<0.05
Aldrin	µg/L	0.05	<0.05	<0.05
Dieldrin	µg/L	0.05	<0.05	<0.05
Endrin (total)	µg/L	0.05	<0.05	<0.05
Dicofol	µg/L	0.05	<0.05	<0.05
DDT's (total)	µg/L	0.05	<0.05	<0.05
Methoxychlor	µg/L	0.05	<0.05	<0.05
Total OC's (as above)	µg/L	**0.2**	**<0.2**	**<0.2**

Client Reference No: Lab Registration No:	Units	LOR	ER1 V97/18565	ER2 V97/18566
PAH's:				
Naphthalene	µg/L	0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1
Benzo(b)fluoranthene	µg/L	0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1
Dibenz(ah)anthracene	µg/L	0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1
Total PAH's (as above)	µg/L	**1.0**	**<1.0**	**<1.0**

REPORT OF ANALYSIS

SAMPLE	CLIENT REF.	DESCRIPTION	As	Cd	Cr	Cu	Hg	Pb	Zn
Minimum level of reporting			5	1	5	5	0.5	5	5
V97/018565	ER1 20/05	WATER FRANKLIN ST 27J097A	<5	<1	<5	<5	<0.5	<5	<5
V97/018566	ER2	WATER FRANKLIN ST 27J097A	<5	<1	<5	<5	<0.5	<5	<5
		Results in ug/L							

- Sample was filtered through a 0.45um filter and acidified on receipt. The resulting solution was analysed for dissolved elements by AGAL method VL250 using ICP-MS.

Results above are expressed in µg/L.

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REPORT OF ANALYSIS

Client:	**Rust PPK** **GPO Box 398** **ADELAIDE SA 5001**
Attention:	**Stuart Taylor/Jane Hewitt**
Sample Description:	**Soil/Water - Project No27J097A -** **Franklin Street Bus Station**
Lab Registration Nos:	**V97/18543 to V97/18566**
Date Received:	**23rd May 1997**

Samples submitted to AGAL have been analysed as received. The information below is provided as part of our commitment to the quality of the analytical results. Please contact the undersigned for any further details relating to this Report.

Methods of Analysis:

- Metals - Soil — AGAL(Vic) Method VL239 (ICP/MS/AES)

Quality Assurance:

The QA procedures conducted with the analyses include -

- Analysis of reagent blanks
- Analysis of recoveries
- Analysis of samples in duplicate

Results obtained for recoveries of selected analytes were as follows:

Analyte	Soil
Beryllium	98%
Mercury	106%
Antimony	89%

Results of Analysis:

Analytical results on samples as received appear on the following page(s). All results are based on using one technique for each test. Soil results are reported on a dry weight basis.

This report shall not be reproduced except in full.

Roger Cromie
Dip.App.Sci., Grad.Dip.App.Sci., MRACI
(Metals Analyses)

Date: 30-5-97

File : h:\word\reports\1997\18543.doc

REPORT OF ANALYSIS

SAMPLE	CLIENT REF.	Be	Hg	Mo	Sb	Sn
Minimum level of reporting		1.0	0.50	5.0	5.0	2.0
V97/018543	BH1 .06-		<0.50			
V97/018544	BH2 1.8-		<0.50			
V97/018545	BH3 .8-1.0		<0.50			
V97/018546	BH4 .45-	1.2	<0.50	<5.0	<5.0	28
V97/018546 dup	BH4 .45-	1.2	<0.50	<5.0	<5.0	26
V97/018548	BH6 .65-		<0.50			
V97/018549	BH7 .4-.5		<0.50			
V97/018550	BH8 .8-1.0		<0.50			
V97/018551	BH9 2.0-		<0.50			
V97/018552	BH10 .7-		<0.50			
V97/018553	BH11 .8-		<0.50			
V97/018553 dup	BH11 .8-		<0.50			
V97/018554	BH12 .55-		<0.50			
V97/018555	BH13 .7-	1.1	<0.50	<5.0	<5.0	2.8
V97/018555 dup	BH13 .7-	1.2	<0.50	<5.0	<5.0	2.6
V97/018556	BH14 .55		<0.50			
V97/018557	BH15 .7-		<0.50			
V97/018558	BH16 .4-		<0.50			
V97/018559	BH17 .8-		<0.50			
V97/018561	BH19 .55-		<0.50			
V97/018562	BH20 .05-		<0.50			
V97/018563	BD2		1.6			
V97/018564	BD6		<0.50			
V97/018564 dup	BD6		<0.50			

Results above are expressed in mg/kg.

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101 Pirie Street
Adelaide
South Australia 5001
Site : FRANKLIN ST BUS STATION 27J097A

CHLORINATED HYDROCARBONS US EPA SW486 METHOD 8010 & 8080.

Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank		
Lab. No.	MY1968	MY1969	MY1969D			
Benzyl chloride	<0.01	<0.01	<0.01	<0.001		
2-Chloronaphthalene	<0.01	<0.01	<0.01	<0.001		
1,2-Dichlorobenzene	<0.01	<0.01	<0.01	<0.001		
1,3-Dichlorobenzene	<0.01	<0.01	<0.01	<0.001		
1,4-Dichlorobenzene	<0.01	<0.01	<0.01	<0.001		
Hexachlorobenzene	<0.01	<0.01	<0.01	<0.001		
Hexachlorobutadiene	<0.01	<0.01	<0.01	<0.001		
Hexachlorocyclopentadiene	<0.01	<0.01	<0.01	<0.001		
Hexachloroethane	<0.01	<0.01	<0.01	<0.001		
Tetrachlorobenzenes	<0.01	<0.01	<0.01	<0.001		
1,2,4-Trichlorobenzene	<0.01	<0.01	<0.01	<0.001		

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 23/05/97 Date Reported 10/06/97

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Site : FRANKLIN ST BUS STATION 27J097A

HEAVY METALS VIC EPA PUB.139 METHODS 13&16(Hg) US EPA SW846 7000 SERIES

Sample	BH12/D	BH12/D Dup	BH15/D	Method Blank	Spike % Recov	
Lab. No.	MY1968	MY1968D	MY1969			
Antimony	<10	<10	<10	<0.5	-	
Arsenic	2.8	2.8	2.8	<0.02	-	
Beryllium	<2	<2	<2	<0.05	-	
Cadmium	<0.5	<0.5	<0.5	<0.02	-	
Chromium	28	26	28	<0.05	92%	
Cobalt	8.5	8.5	9.4	<0.05	-	
Copper	14	14	16	<0.05	90%	
Lead	14	15	15	<0.05	90%	
Manganese	220	210	260	<0.05	-	
Mercury	<0.1	<0.1	<0.1	<0.001	-	
Molybdenum	<10	<10	<10	<0.5	-	
Nickel	14	12	11	<0.05	-	
Selenium	<0.5	<0.5	<0.5	<0.02	-	
Tin	<10	<10	<10	<0.5	-	
Zinc	28	32	26	<0.05	-	

Extraction with (1+3) HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

Date received 23/05/97 Date Reported 10/06/97

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

Sample	BH12/D	BH15/D				
Lab. No.	MY1968	MY1969				
Fluoride (Total)	260	190				

Results in ppm (soils mg/kg dry, waters mg/l.)

Date received 23/05/97 Date Reported 10/06/97

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Site : FRANKLIN ST BUS STATION 27J097A

CYANIDE (CN-) US EPA SW846 METHOD 9010.

Sample	BH12/D	BH15/D				
Lab. No.	MY1968	MY1969				
Cyanide, total	<5	<5				

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 23/05/97 Date Reported 10/06/97

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Site : FRANKLIN ST BUS STATION 27J097A

MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8020&5030.

Sample	BH12/D	BH12/D Dup	BH15/D	Method Blank	Spike % Recov	
Lab. No.	MY1968	MY1968D	MY1969			
Benzene	<0.01	<0.01	<0.01	<0.001	112%	
Toluene	<0.01	<0.01	<0.01	<0.001	106%	
Ethyl Benzene	<0.01	<0.01	<0.01	<0.001	104%	
Xylenes	<0.01	<0.01	<0.01	<0.001	108%	

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 23/05/97 Date Reported 10/06/97

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RUST PPK Pty. Ltd.
101 Pirie Street
Adelaide
South Australia 5001
Site : FRANKLIN ST BUS STATION 27J097A

ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8080 .

Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank		
Lab. No.	MY1968	MY1969	MY1969D			
Aldrin	<0.01	<0.01	<0.01	<0.001		
Lindane	<0.01	<0.01	<0.01	<0.001		
4,4'-DDD	<0.01	<0.01	<0.01	<0.001		
4,4'-DDE	<0.01	<0.01	<0.01	<0.001		
4,4'-DDT	<0.01	<0.01	<0.01	<0.001		
Dieldrin	<0.01	<0.01	<0.01	<0.001		
Endrin	<0.01	<0.01	<0.01	<0.001		

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 23/05/97 Date Reported 10/06/97

G. Black

mgt Environmental Consulting Pty. Ltd.

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RUST PPK Pty. Ltd.
101 Pirie Street
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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8100(GC).

Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank	Spike % Recov	
Lab. No.	MY1968	MY1969	MY1969D			
Naphthalene	<0.1	<0.1	<0.1	<0.001	-	
Acenaphthylene	<0.1	<0.1	<0.1	<0.001	-	
Acenaphthene	<0.1	<0.1	<0.1	<0.001	-	
Fluorene	<0.1	<0.1	<0.1	<0.001	-	
Phenanthrene	<0.1	<0.1	<0.1	<0.001	-	
Anthracene	<0.1	<0.1	<0.1	<0.001	-	
Fluoranthrene	<0.1	<0.1	<0.1	<0.001	90%	
Pyrene	<0.1	<0.1	<0.1	<0.001	92%	
Benzo(a)anthracene	<0.1	<0.1	<0.1	<0.001	-	
Chrysene	<0.1	<0.1	<0.1	<0.001	-	
Benzo(b)fluoranthene	<0.1	<0.1	<0.1	<0.001	-	
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.001	-	
Benzo(a)pyrene	<0.1	<0.1	<0.1	<0.001	96%	
Dibenzo(a,h)anthracene	<0.1	<0.1	<0.1	<0.001	-	
Benzo(g,h,i)perylene	<0.1	<0.1	<0.1	<0.001	-	
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.001	-	

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 23/05/97 Date Reported 10/06/97

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8080

Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank		
Lab. No.	MY1968	MY1969	MY1969D			
Total PCB's as Arochlor 1260	<0.1	<0.1	<0.1	<0.01		

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Site : FRANKLIN ST BUS STATION 27J097A

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410, GC- US EPA SW846 8040

Sample	BH12/D	BH12/D Dup	BH15/D	Method Blank		
Lab. No.	MY1968	MY1968D	MY1969			
Phenol	<0.1	<0.1	<0.1	<0.01		
Cresols (Total)	<0.1	<0.1	<0.1	<0.01		

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 23/05/97 Date Reported 10/06/97

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Site : FRANKLIN ST BUS STATION 27J097A

TOTAL PETROLEUM HYDROCARBONS (GC) MGT METHOD 100A - GC FID & MS.

Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank	Spike % Recov	
Lab. No.	MY1968	MY1969	MY1969D			
T.R.H. C_6 -C_9 Fraction by GC	<20	<20	<20	<0.02	-	
T.R.H. C_{10}-C_{14} Fraction by GC	<50	<50	<50	<0.05	-	
T.R.H. C_{15}-C_{28} Fraction by GC	<100	<100	<100	<0.1	89%	
T.R.H. C_{29}-C_{36} Fraction by GC	<100	<100	<100	<0.1	-	

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT300A soils, US EPA 3510 waters.

Date received 23/05/97 Date Reported 10/06/97

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CRITERIA USED TO ASSESS QUALITY CONTROL RESULTS

VALIDITY AND RELIABILITY OF TEST RESULTS

The continuing validity and reliability of results is accomplished by monitoring a number of factors :

1. Analysis of duplicates. Duplicates run at a minimum of 5 %
2. Recovery of known additions. Spikes run at a minimum of 5 % with each batch of samples.
3. Analysis of reagent blanks run with each batch of samples.

1. Analysis of Duplicates

Duplicates are analysed as a matter of course and the data analysed by means of a range chart type system. The range for each duplicate pair is determined and 'normalised' by dividing by the average of the duplicate results.
Once enough data has been gathered control data for each method can be developed. The mean range (R) is determined as :

$$R = \frac{(\Sigma R_i)}{n}$$

where n = number of observations
and R_i = normalised range

and the variance (square of the standard deviation) is determined as :

$$s_r^2 = \frac{(\Sigma R_i^2 - nR^2)}{n - 1}$$

The control criteria thus become :

Average range	R
Warning Limit	$R + 2s_r$
Control Limit	$R + 3s_r$

The normalised range for each duplicate pair is calculated and compared with the above criteria. (This can be achieved either graphically or by visual comparison of the data.)
Since the limits are based on 95 % and 90 % confidence levels respectively , the following actions are taken, based on these statistical parameters.

Control Limit

If one measurement exceeds the C.L. repeat the analysis. If the repeat is within the C.L. continue analyses . If it exceeds the C.L. discontinue analyses and correct the problem.

Warning Limit

If two out of three successive points exceed the W.L. analyse another sample. If the next point is less than the W.L. continue analyses, if the next point exceeds the W.L. discontinue analyses and correct the problem.

***Particular care needs to be taken with some soil samples with regard to sample homogeneity, especially with regard to 'organics' analyses. Statistical analysis may indicate a problem exists when in fact the problem is really only sample homogeneity.

2. Recovery of known additions.

The recovery of known additions is used to verify the absence of matrix effects and absence of interferences. Recovery from standards is used to verify method performance. Recovery data is compared against acceptance criteria published in Standards Methods for Examination of Water and Waste water, or appropriate U.S. EPA Methods.

If recoveries fall outside acceptance criteria, analyses should be discontinued and the problem rectified.

3.0 Analysis of Reagent Blanks

Reagent blanks are used to monitor purity of reagents and the overall procedural blank. Reagent blanks are run as a matter of course with each batch for analysis. Unusual or out of the 'norm' results for blanks are investigated and corrective action taken before analysis of any batch is completed.

G. Black.

Appendix J

Tabulated Results of Replicate and Duplicate Analysis

Analytical Results - Laboratory Replicates
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH4 0.45-0.6	BH4* 0.45-0.6	BH4/D 0.45-0.6	BH4/D* 0.45-0.6	BH11 0.8-1.0	BH11* 0.8-1.0
Metals:							
Arsenic	5	7.6	7.5	8.5		8.9	9.8
Cadmium	1	<LOR	<LOR	<LOR		<LOR	<LOR
Cobalt	1	8	7.6				
Chromium (total)	2	31	29	26		11	12
Copper	2	32	29	34		5.7	6
Mercury	0.5	<LOR	<LOR	**1.6** [1]		<LOR	<LOR
Nickel	1	15	14				
Lead	5	**446** [1,2]	**670** [1,2]	**440** [1,2]		<LOR	<LOR
Selenium	5	<LOR	<LOR				
Zinc	2	**280** [1]	**270** [1]	**270** [1]		9.8	10
Manganese	10	200					
Beryllium	1	1.2	1.2				
Molybdenum	5	<LOR	<LOR				
Antimony	5	<LOR	<LOR				
Tin	2	28	26				
pH	0.1			**9.2** [1,2]		**9.3** [1,2]	
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1	<LOR		<LOR	<LOR		
Acenaphthylene	0.1	<LOR		<LOR	<LOR		
Acenaphthene	0.1	<LOR		<LOR	<LOR		
Fluorene	0.1	<LOR		<LOR	<LOR		
Phenanthrene	0.1	<LOR		<LOR	<LOR		
Anthracene	0.1	<LOR		<LOR	<LOR		
Fluoranthrene	0.1	0.1		<LOR	<LOR		
Pyrene	0.1	0.1		<LOR	<LOR		
Benz(a)anthracene	0.1	<LOR		<LOR	<LOR		
Chrysene	0.1	<LOR		<LOR	<LOR		
Benzo(b)fluoranthene and	0.1	0.1		<LOR	<LOR		
Benzo(k)fluoranthrene	0.1	<LOR		<LOR	<LOR		
Benzo(a)pyrene	0.1	0.1		<LOR	<LOR		
Indeno(1,2,3-cd)pyrene	0.1	<LOR		<LOR	<LOR		
Dibenz(a,h)anthracene	0.1	<LOR		<LOR	<LOR		
Benzo(g,h,i)perylene	0.1	<LOR		<LOR	<LOR		
Total PAH	1	<LOR		<LOR	<LOR		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Laboratory Replicates
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH12/D 0.55-0.7	BH12/D* 0.55-0.7	BH13 0.7-0.9	BH13* 0.7-0.9	BH13/D 0.7-0.9	BH13/D* 0.7-0.9
Metals:							
Arsenic	5	2.8	2.8	5.1	<LOR	<LOR	5
Cadmium	1	<0.5	<0.5	<LOR	<LOR	<LOR	<LOR
Cobalt	1	8.5	8.5	7.7	8.1		
Chromium (total)	2	28	26	29	29	33	34
Copper	2	14	14	16	16	17	17
Mercury	0.5	<0.1	<0.1	<LOR	<LOR	<LOR	<LOR
Nickel	1	14	12	15	15		
Lead	5	14	15	43	36	39	34
Selenium	5	<0.5	<0.5	<LOR	<LOR		
Zinc	2	28	32	32	32	32	32
Manganese	10	220	210	260	270		
Beryllium	1	<2	<2	1.1	1.2		
Molybdenum	5	<10	<10	<LOR	<LOR		
Antimony	5	<10	<10	<LOR	<LOR		
Tin	2	<10	<10	2.8	2.6		
pH	0.1					**8.9** [1]	
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1			<LOR	<LOR		
Acenaphthylene	0.1			<LOR	<LOR		
Acenaphthene	0.1			<LOR	<LOR		
Fluorene	0.1			<LOR	<LOR		
Phenanthrene	0.1			<LOR	0.2		
Anthracene	0.1			<LOR	0.1		
Fluoranthrene	0.1			0.1	0.3		
Pyrene	0.1			0.1	0.2		
Benz(a)anthracene	0.1			<LOR	0.2		
Chrysene	0.1			<LOR	0.1		
Benzo(b)fluoranthene and	0.1			0.1	0.1		
Benzo(k)fluoranthrene	0.1			<LOR	0.1		
Benzo(a)pyrene	0.1			<LOR	0.1		
Indeno(1,2,3-cd)pyrene	0.1			<LOR	<LOR		
Dibenz(a,h)anthracene	0.1			<LOR	<LOR		
Benzo(g,h,i)perylene	0.1			<LOR	<LOR		
Total PAH	1			<LOR	1.4		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Laboratory Replicates
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH15/D 0.7-0.85	BH15/D* 0.7-0.85	BH18 0.4-0.5	BH18* 0.4-0.5
Metals:					
Arsenic	5				
Cadmium	1				
Cobalt	1				
Chromium (total)	2				
Copper	2				
Mercury	0.5				
Nickel	1				
Lead	5				
Selenium	5				
Zinc	2				
Manganese	10				
Beryllium	1				
Molybdenum	5				
Antimony	5				
Tin	2				
pH	0.1			**9.4** [1,2]	**9.4** [1,2]
Polycyclic Aromatic Hydrocarbons (PAH):					
Naphthalene	0.1	<0.1	<0.1		
Acenaphthylene	0.1	<0.1	<0.1		
Acenaphthene	0.1	<0.1	<0.1		
Fluorene	0.1	<0.1	<0.1		
Phenanthrene	0.1	<0.1	<0.1		
Anthracene	0.1	<0.1	<0.1		
Fluoranthrene	0.1	<0.1	<0.1		
Pyrene	0.1	<0.1	<0.1		
Benz(a)anthracene	0.1	<0.1	<0.1		
Chrysene	0.1	<0.1	<0.1		
Benzo(b)fluoranthene and	0.1	<0.1	<0.1		
Benzo(k)fluoranthrene	0.1	<0.1	<0.1		
Benzo(a)pyrene	0.1	<0.1	<0.1		
Indeno(1,2,3-cd)pyrene	0.1	<0.1	<0.1		
Dibenz(a,h)anthracene	0.1	<0.1	<0.1		
Benzo(g,h,i)perylene	0.1	<0.1	<0.1		
Total PAH	1				

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory

* indicates laboratory replicate

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[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Laboratory Replicates
OCPs and OPPs

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH13. 0.7-0.9	BH13* 0.7-0.9	BH15/D 0.7-0.85	BH15/D* 0.7-0.85
Organochlorine Pesticides:					
HCB	0.05	<LOR	<LOR		
Dichloran	0.05	<LOR	<LOR	-	
Total BHC	0.05	<LOR	<LOR	-	
Lindane	0.05	<LOR	<LOR	<0.01	<0.01
Heptachlor	0.05	<LOR	<LOR		
Heptachlor Epoxide	0.05	<LOR	<LOR		
Total Chlordane (ocy, cis, trans, chlordene, nonachlor)	0.05	<LOR	<LOR		
Total endosulphan	0.05	<LOR	<LOR		
Aldrin	0.05	<LOR	<LOR	<0.01	<0.01
Dieldrin	0.05	<LOR	<LOR	<0.01	<0.01
Endrin Total	0.05	<LOR	<LOR	<0.01	<0.01
Dicofol	0.05	<LOR	<LOR		
op-DDE, pp-DDE	0.05	<LOR	<LOR	<0.01	<0.01
op-DDD pp-DDD	0.05	<LOR	<LOR	<0.01	<0.01
op DDT pp-DDT	0.05	<LOR	<LOR	<0.01	<0.01
Methoxychlor	0.05	<LOR	<LOR		
Total OCPs	0.2	<LOR	<LOR		
Organophosphate Pesticides:					
Dichlorvos	0.1	<LOR	<LOR		
Mevinphos	0.1	<LOR	<LOR		
Diazinon	0.1	<LOR	<LOR		
Chlorpyrifos-Methyl	0.1	<LOR	<LOR		
Fenchlorvos	0.1	<LOR	<LOR		
Parathion-methyl	0.1	<LOR	<LOR		
Chlorpyriphos	0.1	<LOR	<LOR		
Malathion	0.1	<LOR	<LOR		
Fenitrothion	0.1	<LOR	<LOR		
Parathion	0.1	<LOR	<LOR		
Chlorfenvinphos	0.1	<LOR	<LOR		
Bromophos-Ethyl	0.1	<LOR	<LOR		
Tetrachlorvinphos	0.1	<LOR	<LOR		
Ethion	0.1	<LOR	<LOR		
Total OPPs	0.2	<LOR	<LOR		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

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Analytical Results - Laboratory Replicates
BTEX, TPH, Phenols, Cresols,
All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH4 0.45-0.6	BH4* 0.45-0.6	BH13 0.7-0.9	BH13* 0.7-0.9	BH12/D 0.55-0.7	BH12/D* 0.55-0.7
BTEX:							
Benzene	0.5	<LOR	<LOR			<0.01	<0.01
Toluene	0.5	<LOR	<LOR			<0.01	<0.01
Ethyl Benzene	0.5	<LOR	<LOR			<0.01	<0.01
Xylene	1	<LOR	<LOR			<0.01	<0.01
Total BTEX	2	<LOR	<LOR				
Total Petroleum Hydrocarbons (TPH):							
C_6-C_9	25	<LOR	<LOR				
C_{10}-C_{14}	25	<LOR	<LOR				
C_{15}-C_{28}	25	<LOR	<LOR				
C_{29}-C_{36}	25	<LOR	<LOR				
Total TPH	100	<LOR	<LOR				
Cresols						<0.1	<0.1
Phenols							
Phenol	0.1	<LOR	<LOR	<LOR	<LOR	<0.1	<0.1
3-Methylphenol	0.1	<LOR	<LOR	<LOR	<LOR		
2-Methylphenol	0.1	<LOR	<LOR	<LOR	<LOR		
2-Ethylphenol	0.1	<LOR	<LOR	<LOR	<LOR		
2,4-Dimehtylphenol	0.1	<LOR	<LOR	<LOR	<LOR		
2,3,5-Trimethylphenol	0.1	<LOR	<LOR	<LOR	<LOR		
4-Nitrophenol	0.1	<LOR	<LOR	<LOR	<LOR		
Polychlorinated Biphenyls (PCBs)							
A1016	0.2	<LOR		<LOR	<LOR		
A1221	0.2	<LOR		<LOR	<LOR		
A1232	0.2	<LOR		<LOR	<LOR		
A1242	0.2	<LOR		<LOR	<LOR		
A1248	0.2	<LOR		<LOR	<LOR		
A1254	0.2	<LOR		<LOR	<LOR		
A1260	0.2	<LOR		<LOR	<LOR		
A1262	0.2	<LOR		<LOR	<LOR		
Total Aroclors	1	<LOR		<LOR	<LOR		

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* indicates laboratory replicate

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Analytical Results - Laboratory Replicates
BTEX, TPH, Phenols, Cresols,

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH15/D 0.7-0.85	BH15/D* 0.7-0.85
BTEX:			
Benzene	0.5		
Toluene	0.5		
Ethyl Benzene	0.5		
Xylene	1		
Total BTEX	2		
Total Petroleum Hydrocarbons (TPH):			
C_6-C_9	25	<20	<20
C_{10}-C_{14}	25	<50	<50
C_{15}-C_{28}	25	<100	<100
C_{29}-C_{36}	25	<100	<100
Total TPH	100		
Cresols			
Phenols			
Phenol	0.1		
3-Methylphenol	0.1		
2-Methylphenol	0.1		
2-Ethylphenol	0.1		
2,4-Dimehtylphenol	0.1		
2,3,5-Trimethylphenol	0.1		
4-Nitrophenol	0.1		
Polychlorinated Biphenyls (PCBs)			
A1016	0.2		
A1221	0.2		
A1232	0.2		
A1242	0.2		
A1248	0.2		
A1254	0.2		
A1260	0.2	<0.1	<0.1
A1262	0.2		
Total Aroclors	1		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are in

* indicates laboratory replicate

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Analytical Results - Laboratory Replicates
Volatile Organic Scan
All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH15/D 0.7-0.85	BH15/D* 0.7-0.85
Trichloroethene	1.0		
Dibromomethane	1.0		
cis-1,3-dichloropropene	1.0		
trans-1,3-dichloropropene	1.0		
1,1,2-Trichloroethane	1.0		
Tetrachloroethene	1.0		
1,3-Dichloropropane	1.0		
1,1,1,2-Tetrachloroethane	1.0		
1,1,2,2-Tetrachloroethane	1.0		
1,2,3-Trichloropropane	1.0		
4-Isopropyltoluene	1.0		
1,2-Dibromo-3-chloropropane	1.0		
Hexachlorobutadiene	1.0	<0.1	<0.1
Hexachloroethane		<0.1	<0.1
Hexachlorocyclopentadiene		<0.1	<0.1
Halogenated Aromatic			
Hydrocarbons	1.0		
1,2,3-Trichlorobenzene	1.0		
1,2,4-Trichlorobenzene	1.0	<0.1	<0.1
1,2-Dichlorobenzene	1.0	<0.1	<0.1
1,4-Dichlorobenzene	1.0	<0.1	<0.1
1,3-Dichlorobenzene	1.0	<0.1	<0.1
2-Chlorotoluene	1.0		
4-Chlorotoluene	1.0		
Bromobenzene	1.0		
Chlorobenzene		<0.1	<0.1
2-Choronapthalene		<0.1	<0.1
hexachlorobenzene		<0.1	<0.1
tetrachlorobenzene	1.0	<0.1	<0.1
	1.0		
Trihalomethanes	1.0		
(Volatiles)	1.0		
Chloroform	1.0		
Dibromochloromethane			
Bromodichloromethane			
Bromoform			
Naphthalene			

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Analytical Results - Soil Duplicates
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH4/D	BH12	BH12/D	BH13	BH13/D
Sample Depth	**Reporting**	0.45-0.6	0.45-0.6	0.55-0.7	0.55-0.7	0.7-0.9	0.7-0.9
Metals:							
Arsenic	5	7.6	8.5	<LOR	2.8	5.1	<LOR
Cadmium	1	<LOR	<LOR	<LOR	<0.5	<LOR	<LOR
Cobalt	1	8			8.5	7.7	
Chromium (total)	1	31	26	29	28	29	33
Copper	2	32	34	10	14	16	17
Mercury	2	<LOR	**1.6** [1]	<LOR	<0.1	<LOR	<LOR
Nickel	0.5	15			14	15	
Lead	10	**446** [1,2]	**440** [1,2]	11	14	43	39
Selenium	5	<LOR			<0.5	<LOR	
Zinc	1	**280** [1]	**270** [1]	17	28	32	32
Manganese	5	200			220	260	
Beryllium	5	1.2			<2		1.1
Molybdenum	5	<LOR			<10		<LOR
Antimony	2	<LOR			<10		<LOR
Tin	2	28			<10		2.8
pH	0.1		**9.2** [1,2]	**9.2** [1,2]			**8.9** [1]
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Acenaphthylene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Acenaphthene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Fluorene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Phenanthrene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Anthracene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Fluoranthrene	0.1	0.1	<LOR	<LOR	<0.1	0.1	
Pyrene	0.1	0.1	<LOR	<LOR	<0.1	0.1	
Benz(a)anthracene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Chrysene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Benzo(b)fluoranthene and	0.1	0.1	<LOR	<LOR	<0.1	0.1	
Benzo(k)fluoranthrene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Benzo(a)pyrene	0.1	0.1	<LOR	<LOR	<0.1	<LOR	
Indeno(1,2,3-cd)pyrene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Dibenz(a,h)anthracene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Benzo(g,h,i)perylene	0.1	<LOR	<LOR	<LOR	<0.1	<LOR	
Total PAH	1	<LOR	<LOR	<LOR		<LOR	

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil Duplicates
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH15 0.7-0.85	BH15/D 0.7-0.85
Metals:			
Arsenic	5	<LOR	2.8
Cadmium	1	<LOR	<0.5
Cobalt	1		9.4
Chromium (total)	1	26	28
Copper.	2	9.9	16
Mercury	2	<LOR	<0.1
Nickel	0.5		11
Lead	10	11	15
Selenium	5		<0.5
Zinc	1	14	26
Manganese	5		260
Beryllium	5		<2
Molybdenum	5		<10
Antimony	2		<10
Tin	2		<10
pH	0.1	**9.3** [1,2]	
Polycyclic Aromatic Hydrocarbons (PAH):			
Naphthalene	0.1		<0.1
Acenaphthylene	0.1		<0.1
Acenaphthene	0.1		<0.1
Fluorene	0.1		<0.1
Phenanthrene	0.1		<0.1
Anthracene	0.1		<0.1
Fluoranthrene	0.1		<0.1
Pyrene	0.1		<0.1
Benz(a)anthracene	0.1		<0.1
Chrysene	0.1		<0.1
Benzo(b)fluoranthene and	0.1		<0.1
Benzo(k)fluoranthrene	0.1		<0.1
Benzo(a)pyrene	0.1		<0.1
Indeno(1,2,3-cd)pyrene	0.1		<0.1
Dibenz(a,h)anthracene	0.1		<0.1
Benzo(g,h,i)perylene	0.1		<0.1
Total PAH	1		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Appendix K

Data Validation

Franklin Street Bus Station

Summary of Quality Control Laboratory Replicates

Location Number	Arsenic					Cadmium				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	7.6	7.5	1	1.01	0.99	<LOR	<LOR	0	1.00	1.00
BH11 (0.8-1.0)	8.9	9.8	10	0.95	1.05	<LOR	<LOR	0	1.00	1.00
BH12/D (0.55-0.7)	2.8	2.8	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	5.1	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH13/D (0.7-0.9)	<LOR	5.0	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
				RSD (%)	2				RSD (%)	0

Location Number	Chromium					Copper				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	31	29	7	1.03	0.97	32	29	10	1.05	0.95
BH11 (0.8-1.0)	11	12	9	0.96	1.04	6	6	5	0.97	1.03
BH12/D (0.55-0.7)	28	26	7	1.04	0.96	14	14	0	1.00	1.00
BH13 (0.7-0.9)	29	29	0	1.00	1.00	16	16	0	1.00	1.00
BH13/D (0.7-0.9)	33	34	3	0.99	1.01	17	17	0	1.00	1.00
				RSD (%)	3				RSD (%)	3

Location Number	Lead					Nickel				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	446	670	40	0.80	1.20	15	14	7	1.03	0.97
BH11 (0.8-1.0)	<LOR	<LOR	0	1.00	1.00					
BH12/D (0.55-0.7)	14	15	7	0.97	1.03	14	12	15	1.08	0.92
BH13 (0.7-0.9)	43	36	18	1.09	0.91	15	15	0	1.00	1.00
BH13/D (0.7-0.9)	39	34	14	1.07	0.93					
				RSD (%)	11				RSD (%)	5

Location Number	Mercury					Zinc				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	<LOR	<LOR	0	1.00	1.00	280	270	4	1.02	0.98
BH11 (0.8-1.0)	<LOR	<LOR	0	1.00	1.00	9.8	10	2	0.99	1.01
BH12/D (0.55-0.7)	<LOR	<LOR	0	1.00	1.00	28	32	13	0.93	1.07
BH13 (0.7-0.9)	<LOR	<LOR	0	1.00	1.00	32	32	0	1.00	1.00
BH13/D (0.7-0.9)	<LOR	<LOR	0	1.00	1.00	32	32	0	1.00	1.00
				RSD (%)	0				RSD (%)	3

Location Number	Cobalt					Selenium				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	8.0	7.6	5	1.03	0.97	<LOR	<LOR	0	1.00	1.00
BH12/D (0.55-0.7)	8.5	8.5	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	7.7	8.1	5	0.97	1.03	<LOR	<LOR	0	1.00	1.00
				RSD (%)	2				RSD (%)	0

Location Number	Manganese					Beryllium				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)						1.2	1.2	0	1.00	1.00
BH12/D (0.55-0.7)	220	210	5	1.02	0.98	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	260	270	4	0.98	1.02	1.1	1.2	9	0.96	1.04
				RSD (%)	2				RSD (%)	3

Franklin Street Bus Station

Summary of Quality Control Laboratory Replicates

Location Number	Molybdenum					Antimony				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	<LOR	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH12/D (0.55-0.7)	<LOR	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	<LOR	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
				RSD (%)	0				RSD (%)	0

Location Number	Tin					Phenol				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	28	26	7	1.04	0.96	<LOR	<LOR	0	1.00	1.00
BH12/D (0.55-0.7)	<LOR	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	2.8	2.6	7	1.04	0.96	<LOR	<LOR	0	1.00	1.00
				RSD (%)	3				RSD (%)	0

Location Number	PAH					Benzo(a)pyrene				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4/D (0.45-0.6)	<LOR	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	<LOR	1.4				<LOR	0.1			
BH15/D (0.7-0.85)						<LOR	<LOR	0	1.00	1.00
				RSD (%)	0				RSD (%)	0

Location Number	TPH					BTEX				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup
BH4 (0.45-0.6)	<LOR	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH12/D (0.55-0.7)						<LOR	<LOR	0	1.00	1.00
BH15/D (0.7-0.85)	<LOR	<LOR	0	1.00	1.00					
				RSD (%)	0				RSD (%)	0

Location Number	OCPs					OPPS				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH13 (0.7-0.9)	<LOR	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
				RSD (%)	0				RSD (%)	0

Location Number	Chlorinated Hydrocarbons (VOCs)					PCBs (A1260)				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH15/D (0.7-0.85)	<LOR	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH7 (0.4-0.55)	<LOR	<LOR	0	1.00	1.00					
				RSD (%)	0				RSD (%)	0

Location Number	pH					Cresols				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH18 (0.4-0.5)	9	9.4	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
				RSD (%)	0				RSD (%)	0

Franklin Street Bus Station

Summary of Quality Control Field Duplicates

Location Number	Arsenic					Cadmium				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	7.6	8.5	11	0.94	1.06	<LOR	<LOR	0	1.00	1.00
BH12 (0.55-0.7)	<LOR	2.8				<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	5.1	<LOR				<LOR	<LOR	0	1.00	1.00
BH15 (0.7-0.85)	<LOR	2.8				<LOR	<LOR	0	1.00	1.00
				RSD (%)	8				RSD (%)	0

Location Number	Chromium					Copper				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	31	26	18	1.09	0.91	32	34	6	0.97	1.03
BH12 (0.55-0.7)	29	28	4	1.02	0.98	10	14	33	0.83	1.17
BH13 (0.7-0.9)	29	33	13	0.94	1.06	16	17	6	0.97	1.03
BH15 (0.7-0.85)	26	28	7	0.96	1.04	9.9	16	47	0.76	1.24
				RSD (%)	6				RSD (%)	16

Location Number	Mercury				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	<LOR	1.6	0	1.00	1.00
BH12 (0.55-0.7)	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	<LOR	<LOR	0	1.00	1.00
BH15 (0.7-0.85)	<LOR	<LOR	0	1.00	1.00
				RSD (%)	0

Location Number	Lead					Zinc				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	446	440	1	1.01	0.99	280	270	4	1.02	0.98
BH12 (0.55-0.7)	11	14	24	0.88	1.12	17	28	49	0.76	1.24
BH13 (0.7-0.9)	43	39	10	1.05	0.95	32	32	0	1.00	1.00
BH15 (0.7-0.85)	11	15	31	0.85	1.15	14	26	60	0.70	1.30
				RSD (%)	11				RSD (%)	21

Location Number	Total PAHs					Benzo(a)pyrene				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	<LOR	<LOR	0	1.00	1.00	0.1	<LOR			
BH12 (0.55-0.7)	<LOR	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
				RSD (%)	0				RSD (%)	0

Note:
Where only one result is below the limit of reporting the RPDs can not be calculated

Communications Document

PROJECT	Notification of Request to Prepare a Site Audit Report 85 – 129 Franklin Street, Adelaide (Bus Station Site)
JOB NO	2004.0421 DATE 24/06/04 TIME 11:28
SENDER	Mr Andrew Nunn
TO	EPA
ATTENTION	Mr Mike Fanning / Ms Wendy Boyce
ADDRESS	
FACSIMILE NO	8204 2025 PAGES 2
CC	

☐ MEMO ☐ DOCUMENT TRANSMITTAL

THESE MATTERS FOR YOUR ☐ COMMENTS ☐ ACTION ☐ INFORMATION ☒ APPROVAL

☐ HAND DELIVERY ☐ POST ☐ COURIER ☒ FACSIMILE ☐ COLLECTION

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Dear Mike / Wendy,

I, Andrew Nunn, a person appointed as an Environmental Auditor (Contaminated Land) by the Environmental Protection Authority under Section 53 of the *Environmental Protection Act 1970 (Vic)*, have been requested to prepare a Site Audit Report for the above site. Details are as follows;

Person requesting Site Audit Report:	Adelaide City Council
Relationship to site:	Owner
Date of request:	8th June 2004
Site address:	85 – 129 Franklin Street, Adelaide
Municipality:	Adelaide City Council
Title details:	See table attached (Page 2)
Site plan attached:	No – Will Follow Shortly
Estimated completion date:	30th June 2009

In notifying EPA of this request, I state that I am not aware of any conflict of interest, and I have not had prior involvement in assessment or clean-up works at the site, which would preclude me from preparing a Site Audit Report for the site.

TRANSMIT NO	SENT BY	DATE	TIME

- ☐ CIVIL INFRASTRUCTURE
- ☐ ENVIRONMENTAL
- ☐ WATER RESOURCES
- ☐ STORMWATER MANAGEMENT
- ☐ ROAD SAFETY AND TRAFFIC
- ☐ BUILDING SURVEYING
- ☐ ELECTRICAL, MECHANICAL

I wish to note that I have discussed with Mike Fanning of SA EPA (17 June 2004) the reasons for the delay in formal notification of my engagement to undertake an audit.

Should you have any queries, please do not hesitate to contact me on 8431 7113.

Yours sincerely,

Andrew Nunn
Environmental Auditor (Contaminated Land)

Certificate of Title	Land Title Details	Site Area (approx m2)
Eastern Site of Bowen Street		
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.8
1751/37	Town Acre 311	648.8
1922/48	Town Acre 263	986.26
5060/608	A 1 DP 32560	580.00
5317/61	A 12 DP 546	149.6
5317/62	A 91 FP 166443	348.89
5317/63	A 92 FP166444	271.50
5317/64	A 93 FP 166445	526.90
5317/65	A 91 FP 170401	816.37
Western Side of Bowen Street		
2023/96	Town Acre 311	260.67
2128/45	Town Acre 311	257.80
2201/187	Town Acre 311	259.70
3479/180	Town Acres 261 & 262	1744.00
3582/78	Town Acre 261	509.7
3582/79	Town Acre 262	490.04
3582/80	Town Acres 261 & 262	1122.90
3841/122	LTRO Plan 546	340.6

12554

REPORT

SITE AUDIT REPORT

CENTRAL WEST PRECINCT

BUS STATION SITE – STAGE 1

30 NOVEMBER 2006

DOC. REF: SG041157 RP01

REVISION 0

FOR

ADELAIDE CITY COUNCIL

SOIL & GROUNDWATER CONSULTING

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Received	8/12/06
Doc. No.	05/06/4455
File No.	05/1101
Response	/ /
Return to	
To	R. Hughes

EXECUTIVE SUMMARY

I, Mr Andrew Nunn of Soil and Groundwater Pty Ltd (S&G), a person appointed by the Victorian Environment Protection Authority ('Vic EPA') under the Environment Protection Act 1970 ('the Act') as an environmental auditor for the purposes of the Act, and endorsed by the South Australian Environment Protection Authority ('SA EPA') under the direction of Special Bulletin No 1 dated 20 October 1995 as an Environmental Auditor in the State of South Australia, having:

1. been requested by Mr Matthew Rodda of Adelaide City Council to prepare a Site Audit Report for Stage 1 of the Bus Station Development site as identified by the following Certificates of Title: Volume 5523 Folio 576, Allotment 91; Volume 5317 Folio 62, Allotment 91; Volume 5960 Folio 473, Allotment 12; Volume 5317 Folio 64, Allotment 93; Volume 5317 Folio 63, Allotment 92; Volume 5060, Folio 608, Allotment 1; Volume 5728 Folio 566, Allotment 94; Volume 5833 Folio 247, Allotment 96; Volume 5712 Folio 545, Allotment 97 and Volume 5735 Folio 127, Allotment 93 located between Franklin, Bowen and Grote Streets, Adelaide, South Australia (Refer to Appendix A).

2. had regard to, among other things:

    a. the uses that may be made of the site;

    b. relevant State legislation;

    c. documentation regarding the assessment of the site

    d. guidelines issued by the South Australian Environment Protection Authority, including:

        - SA EPA Special Bulletin No 1 "The Use of Environmental Auditors: Contaminated Land", October 1995;

        - SA EPA, "Guidance Notes to Environmental Auditors for Audits Undertaken in South Australia", 31 March 1999;

        - Planning SA, "Site Contamination", Planning Circular No. 20, December 2001; and

        - SA EPA Environment Protection (Water Quality) Policy, 2003.

3. completed a Site Audit Report contained within this document.

HEREBY STATE that I am of the opinion that:

- The condition of the land at the site with respect to possible chemical contamination is suitable for commercial / industrial and open space use consistent with the development plan attached, subject to the following conditions:

  1. Soils requiring management measures remain on-site at two locations (Area 1 and Area 2). This report includes a survey plan showing the location of Areas 1 and 2, a copy of which is provided as Figure 9. To restrict exposure of site users to these soils, a Site Management Plan has been prepared for future activities which may expose site users to these soils. The Auditor has reviewed the Site Management Plan, a copy of which is provided as Appendix G of this report. It is the responsibility of the current or future land owners to implement the management conditions relating to the site in accordance with the Site Management Plan.

The following general comments should be considered with respect to future use of the site

- Specialist advice should be sought in determining the geotechnical suitability of any fill material for its intended purpose;

- If excavation or other activities are undertaken generating surplus soils requiring off-site disposal, the waste soils must be managed in accordance with relevant EPA guidelines; and

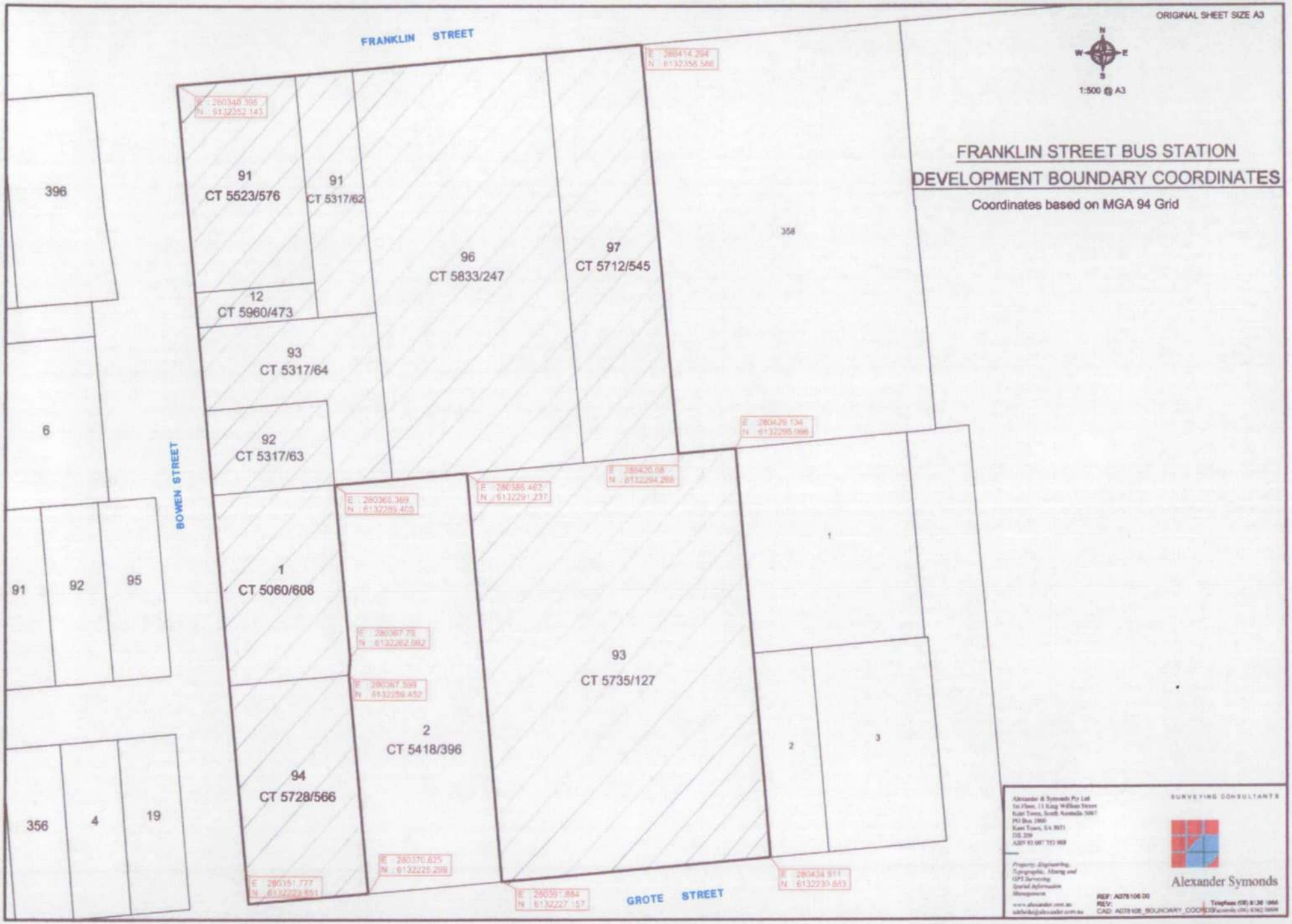
- Any materials imported to site should comply with the National Environment Protection (Assessment of Site Contamination) Measure, 1999, Environmental Investigation Levels (Interim Urban).

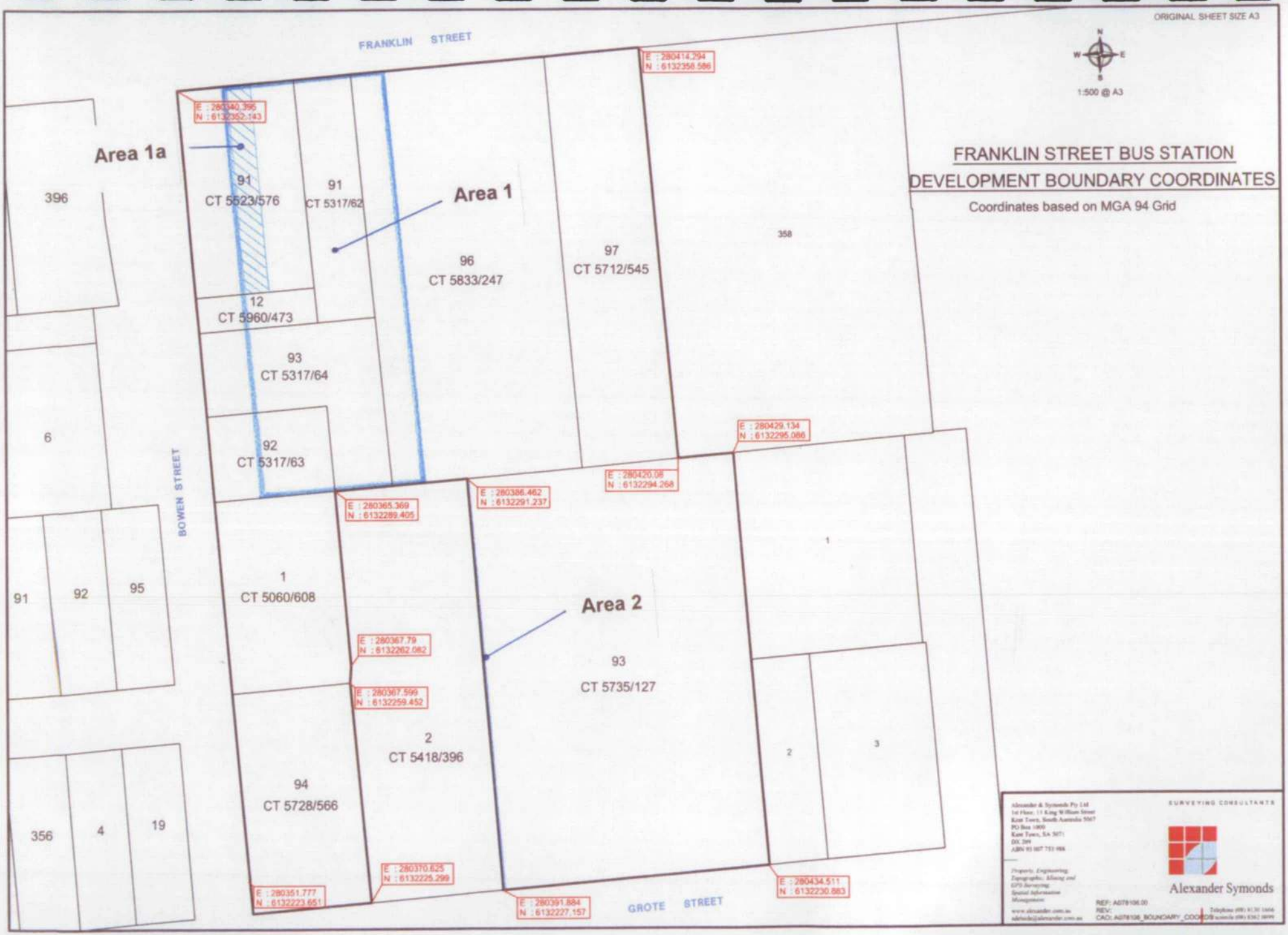
This executive summary forms part of the report "Site Audit Report, Central West Precinct, Bus Station Site - Stage 1" Report No: SG041157 RP01, dated 30 November 2006). Further details regarding the condition of the site may be found in the Site Audit Report.

DATED: 4 December 2006

SIGNED:

Mr Andrew Nunn
Environmental Auditor (Contaminated Land)


ORIGINAL SHEET SIZE A3
N
W
E
S
1:500 @ A3
FRANKLIN STREET BUS STATION
DEVELOPMENT BOUNDARY COORDINATES
Coordinates based on MGA 94 Grid
FRANKLIN STREET
E 280414.294
N 6132358.566
E 280348.396
N 6132352.143
91
CT 5523/576
91
CT 5317/62
96
CT 5833/247
97
CT 5712/545
358
396
12
CT 5960/473
93
CT 5317/64
6
92
CT 5317/63
E 280429.134
N 6132295.066
E 280420.08
N 6132294.266
E 280386.462
N 6132291.237
E 280365.369
N 6132289.405
BOWEN STREET
1
CT 5060/608
1
91
92
95
E 280367.75
N 6132262.062
E 280367.599
N 6132256.452
93
CT 5735/127
2
CT 5418/396
2
3
94
CT 5728/566
356
4
19
E 280370.625
N 6132225.299
E 280351.777
N 6132223.851
E 280391.884
N 6132227.157
GROTE STREET
E 280434.911
N 6132230.643
SURVEYING CONSULTANTS
Alexander Symonds
REF: A078106.00
REV:
CAD: A078106_BOUNDARY_COORDS


ORIGINAL SHEET SIZE A3
FRANKLIN STREET
N
W
E
S
1:500 @ A3
FRANKLIN STREET BUS STATION
DEVELOPMENT BOUNDARY COORDINATES
Coordinates based on MGA 94 Grid
Area 1a
Area 1
Area 2
BOWEN STREET
GROTE STREET
E : 280340.396
N : 6132352.143
E : 280414.294
N : 6132358.586
E : 280429.134
N : 6132295.086
E : 280420.08
N : 6132294.268
E : 280386.462
N : 6132291.237
E : 280365.369
N : 6132289.405
E : 280367.79
N : 6132262.082
E : 280367.599
N : 6132259.452
E : 280370.625
N : 6132225.299
E : 280351.777
N : 6132223.651
E : 280391.884
N : 6132227.157
E : 280434.511
N : 6132230.883
396
91
CT 5523/576
91
CT 5317/62
96
CT 5833/247
97
CT 5712/545
358
12
CT 5960/473
93
CT 5317/64
92
CT 5317/63
6
91
92
95
1
CT 5060/608
93
CT 5735/127
1
2
CT 5418/396
2
3
94
CT 5728/566
356
4
19
SURVEYING CONSULTANTS
Alexander Symonds
REF: A078106.00
REV:

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5523 FOLIO 576 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 5317/65
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : RT 8246071
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 15/04/1998
SEARCHED ON : 04/12/2006 AT : 15:13:24	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 91 FILED PLAN 170401
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

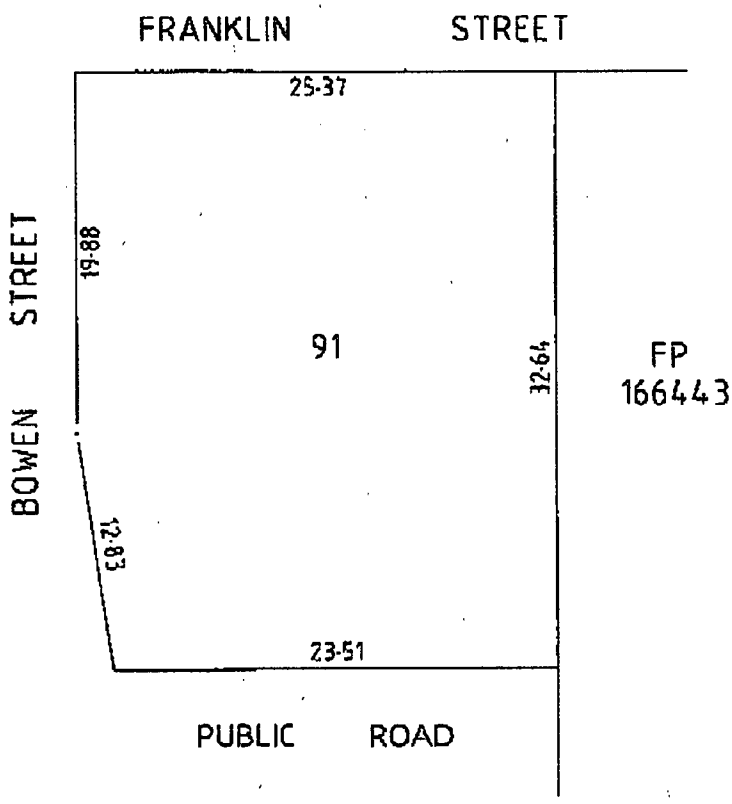
REGISTRAR-GENERAL'S NOTES

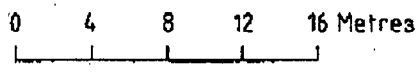
PLAN FOR LEASE PURPOSES GP 521/95
WITH NEXT DEALING LODGE CT 5317/65
THIS TITLE ISSUED VIDE 8246071
AMENDMENT TO DIAGRAM VIDE 10378611

END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5523 FOLIO 576

SEARCH DATE : 04/12/2006 TIME: 15:13:24





CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886

South Australia

VOLUME 5317 FOLIO 62

Edition 2

Date Of Issue 05/01/1996

Authority CD 6987000

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL

WARNING: BEFORE DEALING WITH THIS LAND, SEARCH THE CURRENT CERTIFICATE

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 91 FILED PLAN 166443
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

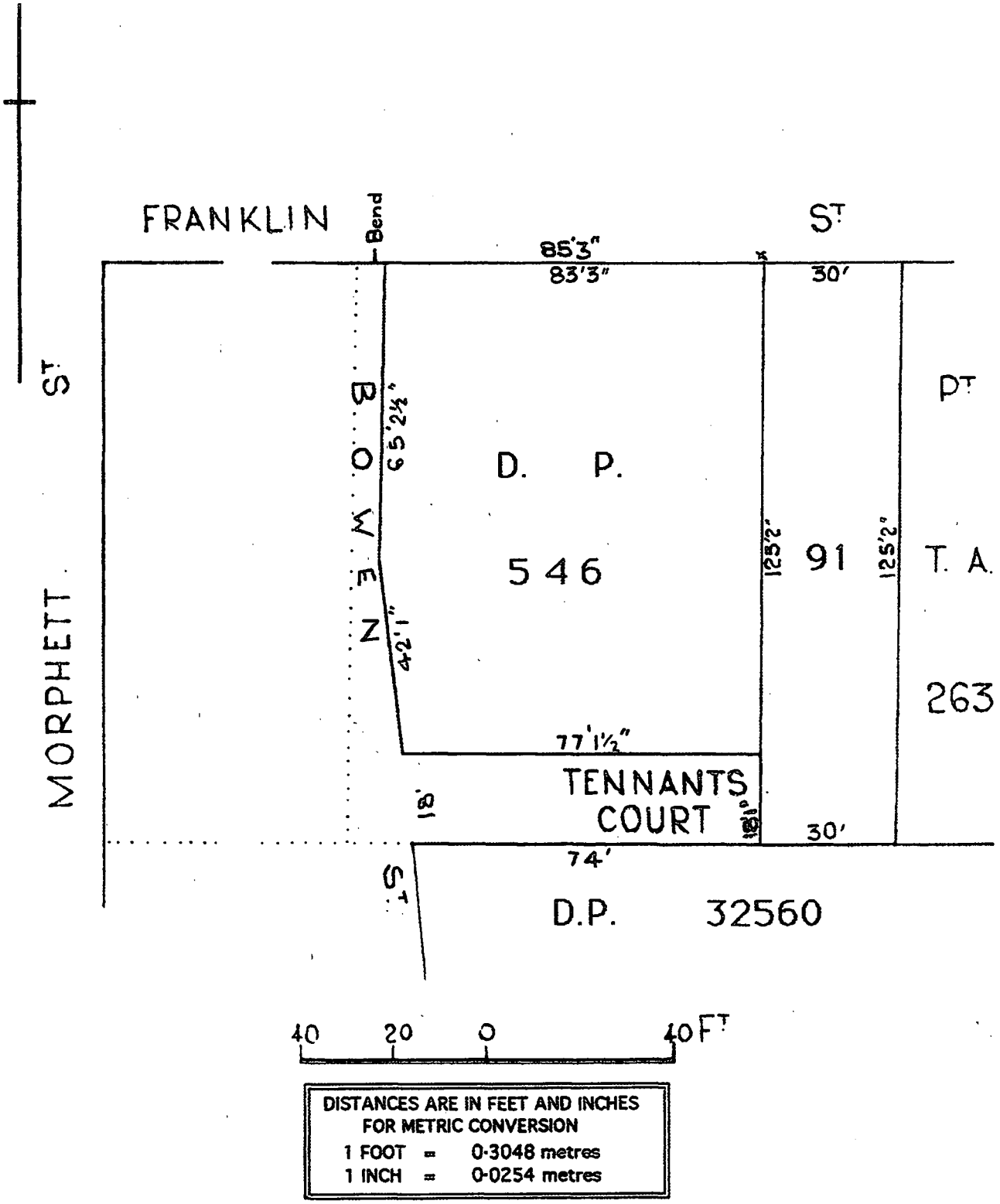
NIL

SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001

End of Text.

This plan is scanned for Certificate of Title 2762/200



DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION		
1 FOOT	=	0·3048 metres
1 INCH	=	0·0254 metres

Note : Subject to all lawfully existing plans of division

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5960 FOLIO 473 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 5317/61
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : N 10378611
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 21/03/2006
SEARCHED ON : 04/12/2006 AT : 15:13:26	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND (ROAD)

ALLOTMENT 12 DEPOSITED PLAN 546
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

BEING A PUBLIC ROAD

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

NIL

END OF TEXT.

CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886

South Australia

VOLUME 5317 FOLIO 64

Edition 2

Date Of Issue 05/01/1996

Authority CD 6987000

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL

WARNING, BEFORE DEALING WITH THIS LAND, SEARCH THE CURRENT CERTIFICATE

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 93 FILED PLAN 166445
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

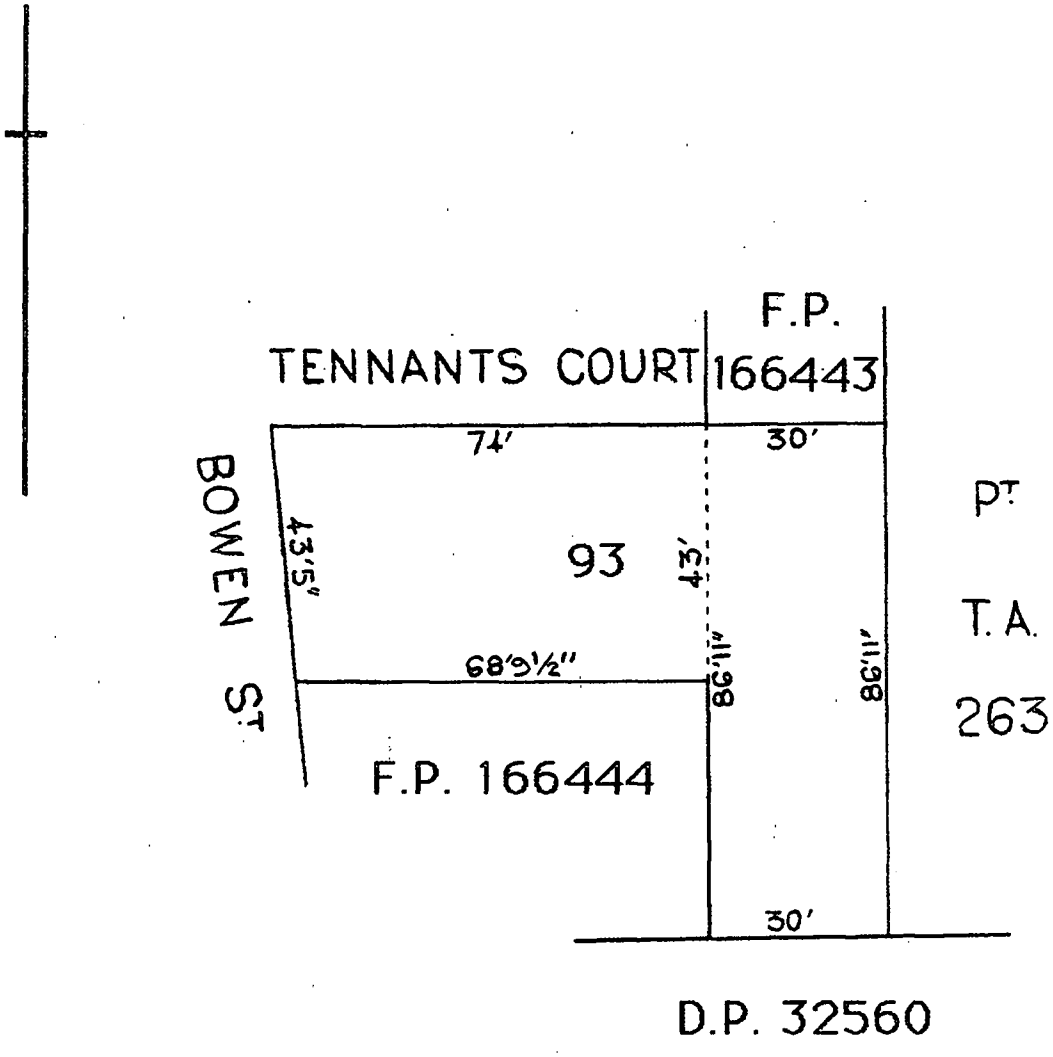
NIL

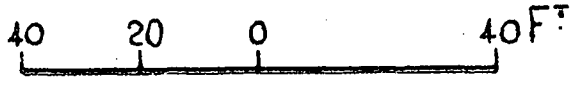
SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001

End of Text.

This plan is scanned for Certificate of Title 2762/199





DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION		
1 FOOT	=	0·3048 metres
1 INCH	=	0·0254 metres

Note : Subject to all lawfully existing plans of division

CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886

South Australia

VOLUME 5317 FOLIO 63

Edition 2

Date Of Issue 05/01/1996

Authority CD 6987000

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 92 FILED PLAN 166444
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001

End of Text.

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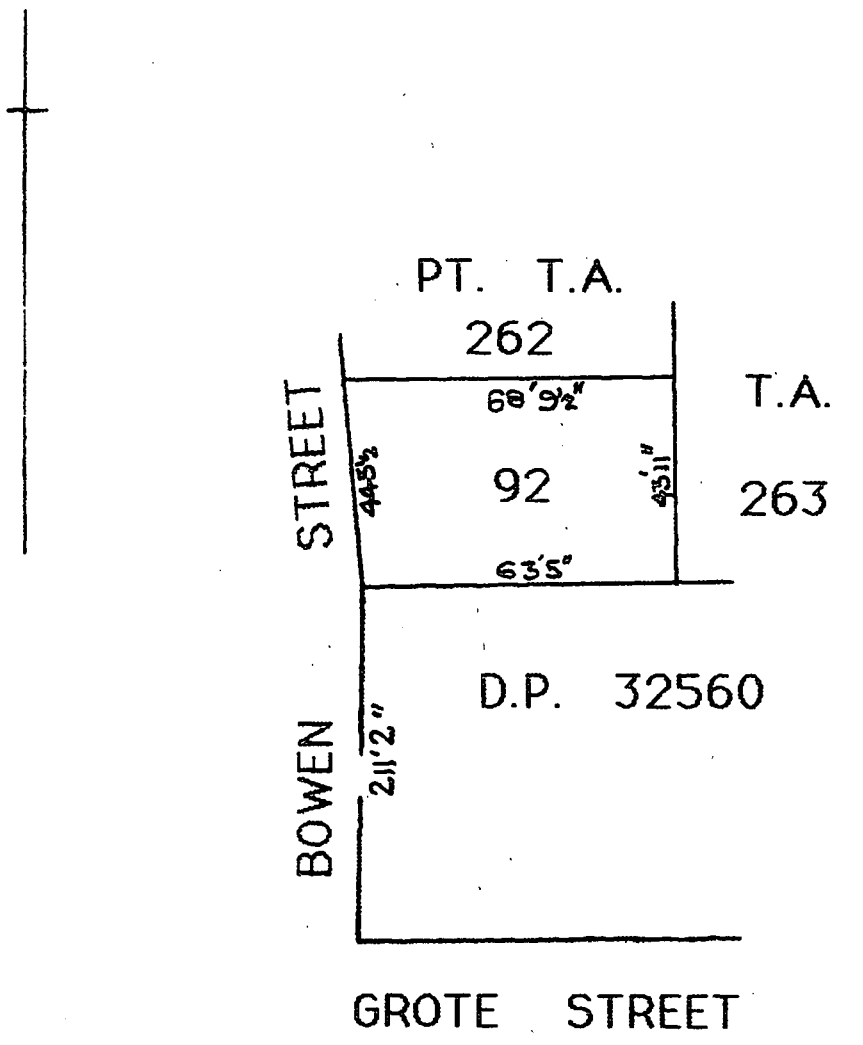


DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION		
1 FOOT	=	0·3048 metres
1 INCH	=	0·0254 metres

Note : Subject to all lawfully existing plans of division

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5060 FOLIO 608 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 4391/861
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : CONVERTED TITLE
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 20/01/1992
SEARCHED ON : 04/12/2006 AT : 15:13:29	EDITION : 2

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF TOWN HALL ADELAIDE SA 5000

DESCRIPTION OF LAND

ALLOTMENT 1 DEPOSITED PLAN 32560
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

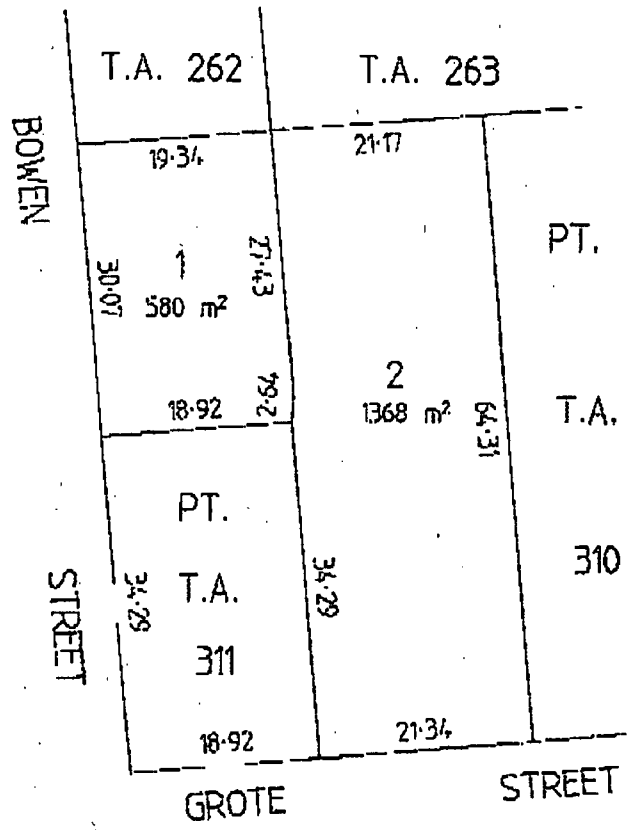
REGISTRAR-GENERAL'S NOTES

NIL

END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5060 FOLIO 608

SEARCH DATE : 04/12/2006 TIME: 15:13:29



0 7·5 15 22·5 30 Metres

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5728 FOLIO 566 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 1751/37
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : CONVERTED TITLE
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 27/01/2000
SEARCHED ON : 04/12/2006 AT : 15:13:32	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 94 FILED PLAN 199651
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

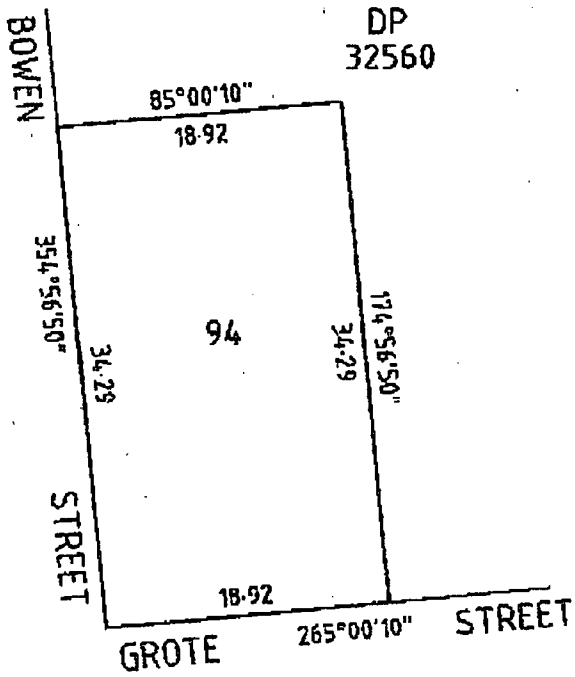
APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788
CONVERTED TITLE WITH NEXT DEALING LODGE CT 1751/37

END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5728 FOLIO 566

SEARCH DATE : 04/12/2006 TIME: 15:13:32

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1751/37



0 5 10 15 20 Metres

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5833 FOLIO 247 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 226 /124
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : CONVERTED TITLE
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 11/01/2001
SEARCHED ON : 04/12/2006 AT : 15:13:38	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 96 FILED PLAN 199653
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

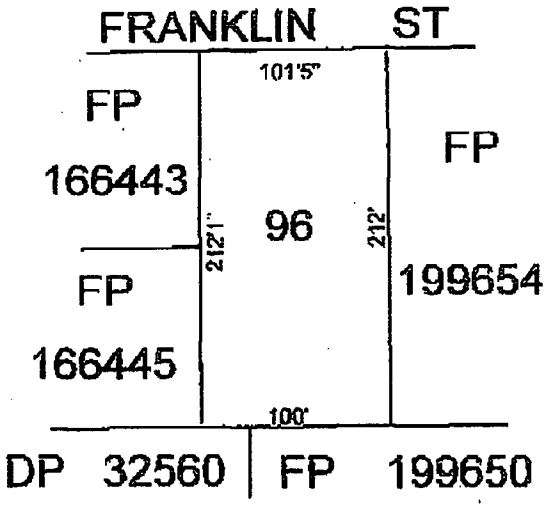
APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788
CONVERTED TITLE-WITH NEXT DEALING LODGE CT 226/124

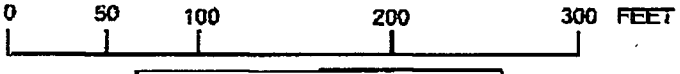
END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5833 FOLIO 247

SEARCH DATE : 04/12/2006 TIME: 15:13:38

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 226/124





DISTANCES ARE IN FEET FOR METRIC CONVERSION		
1 FOOT	=	0·3048 METRES
1 INCH	=	0·0254 METRES

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5712 FOLIO 545 *

COST	: $16.10 (GST exempt)	PARENT TITLE	: CT 1922/48
REGION	: GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY	: CONVERTED TITLE
AGENT	: GRFL BOX NO : 000	DATE OF ISSUE	: 22/11/1999
SEARCHED ON	: 04/12/2006 AT : 15:13:44	EDITION	: 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 97 FILED PLAN 199654
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

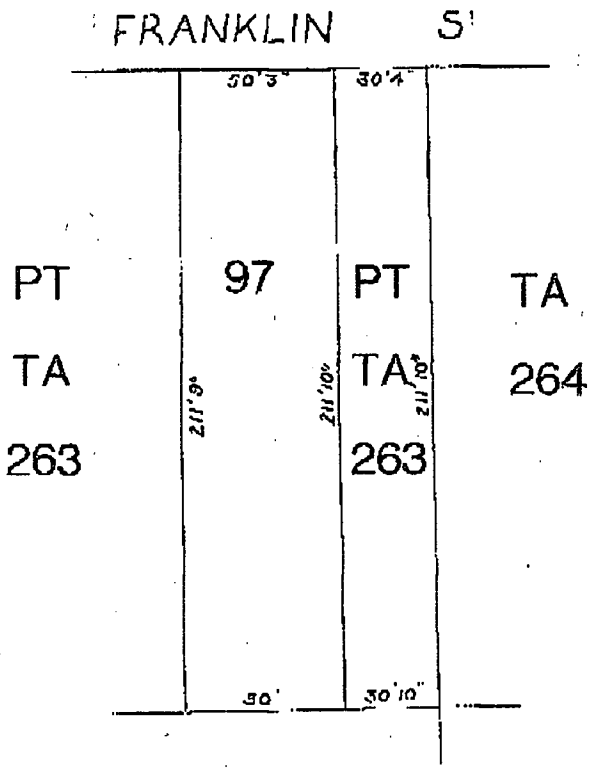
APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788
CONVERTED TITLE-WITH NEXT DEALING LODGE CT 1922/48

END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5712 FOLIO 545

SEARCH DATE : 04/12/2006 TIME: 15:13:44

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1922/48



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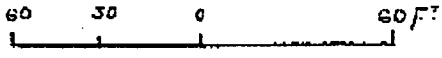


DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION	
1 FOOT	= 0·3048 METRES
1 INCH	= 0·0254 METRES

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5735 FOLIO 127 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 1639/119
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : CONVERTED TITLE
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 17/02/2000
SEARCHED ON : 04/12/2006 AT : 15:13:48	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 93 FILED PLAN 199650
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

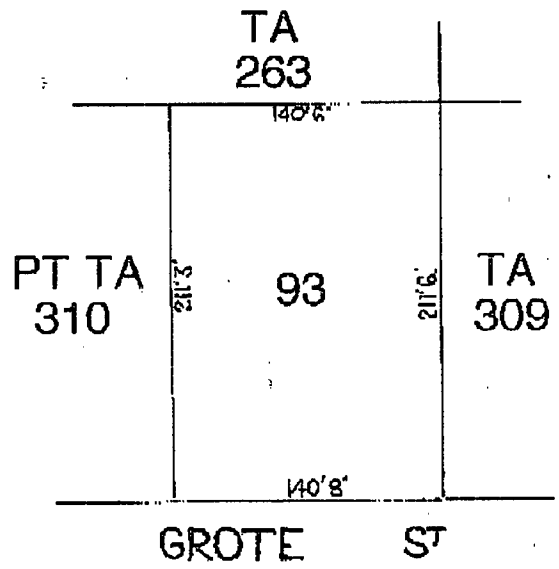
APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788
CONVERTED TITLE-WITH NEXT DEALING LODGE CT 1639/119

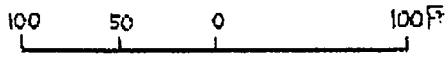
END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5735 FOLIO 127

SEARCH DATE : 04/12/2006 TIME: 15:13:48

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1639/119





DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION	
1 FOOT	= 0·3048 METRES
1 INCH	= 0·0254 METRES

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... ES(I)

1. INTRODUCTION 1
   1.1 Background Information 1
   1.2 Guidance Documents 2

2. REVIEW OF ENVIRONMENTAL ASSESSMENT WORK COMPLETED 4
   2.1 Documentation Reviewed 4
   2.2 Site Description 4
   2.3 Former Site Status 5
   2.4 Site History Review 5
   2.5 Potential for Contamination 6
   2.6 Geology and Hydrogeology 6
      2.6.1 Geology and Site Soils 6
      2.6.2 Hydrogeology 6
      2.6.3 Nearest Surface Water Body 7

3. SOIL ASSESSMENT 8
   3.1 Potential Land Use 8
   3.2 Soil Guidelines 8
      3.2.1 Ecological Screening Guidelines 8
      3.2.2 Human Health Guidelines 9
      3.2.3 Soil Guidelines Summary 9
   3.3 Soil Investigation 10
      3.3.1 Rust PPK Environmental Site Assessment (June 1997) 10
      3.3.2 BC Tonkin and Associates Site Audit Report (July 1997) 11
      3.3.3 Maunsell Soil and Groundwater Investigation (November 2004) 11
      3.3.4 Tierra Additional Investigations (July 2005) 11
      3.3.5 Ecophyte Ground Penetrating Radar Investigation (July 2005) 13
   3.4 Remediation and Validation Works 13
      3.4.1 Remedial Works 13
      3.4.2 Validation Sampling 14
      3.4.3 Stockpiled Materials 15
   3.5 Current Status of On-Site Soils 16
   3.6 Aesthetics of Site Soils 17
   3.7 Adequacy of the Assessor's Investigation Program 17

4. GROUNDWATER ASSESSMENT 18
   4.1 Protected Environmental Values 18
   4.2 Water Quality Criteria 18
   4.3 Groundwater Investigations and Sampling 19
      4.3.1 Standing Water Levels 19
      4.3.2 Sampling and Analysis 19
      4.3.3 Results 19
   4.4 Assessment of Potential Risks to Protected Environmental Values 20
      4.4.1 Potable 20
      4.4.2 Fresh and Marine Aquatic Ecosystem 20
      4.4.3 Irrigation 20

TABLE OF CONTENTS (cont)

4.4.4 Livestock 20
4.4.5 Industrial Use 20
4.5 Conclusion on Groundwater Quality 21

5. QUALITY CONTROL 22
5.1 Field Duplicates 22
5.2 Analytical Laboratories Used 23
5.3 Results of Soil Blind Duplicate Analyses 23
5.3.1 Rust PPK Environmental Site Assessment (July 1997) 23
5.3.2 Maunsell Investigation (November 2004) 24
5.3.3 Tierra Additional Investigation (July 2005) 24
5.3.4 Tierra Remediation Report (September 2006) 24
5.4 Results of Soil Inter-Laboratory Duplicate Analyses 25
5.4.1 Rust PPK Environmental Site Assessment (July 1997) 25
5.4.2 Maunsell Investigation (November 2004) 25
5.4.3 Tierra Additional Investigation (July 2005) 26
5.4.4 Tierra Remediation Report (September 2006) 26
5.5 Groundwater Quality Control 27
5.6 Rinsate, Field and Trip Blanks 28
5.7 Internal Laboratory Quality Control 28
5.8 Conclusions on QA/QC 28

6. CONCLUSIONS 29
6.1 Site History 29
6.2 Data Quality 30
6.3 Remediation Works 30
6.4 Soil Assessment 30
6.4.1 Evaluation of Soil Contamination – Ecological 30
6.4.2 Evaluation of Soil Contamination – Human Health 30
6.5 Groundwater Assessment 31
6.6 Aesthetic Assessment 31
6.7 Geotechnical Issues 32
6.8 Summary of Conclusions 32

7. REFERENCES 34

APPENDICES

Appendix A Certificates of Title / Development Plan

Appendix B BC Tonkin and Associates Audit Report (incorporating Rusk PPK Site History Report and Rust PPK Environmental Site Assessment)

Appendix C Maunsell Soil and Groundwater Investigation Report

Appendix D Tierra Additional Investigations

Appendix E Tierra Remediation Report

Appendix F Groundwater Database Search Results

Appendix G Tierra Site Management Plan

DOCUMENT INFORMATION

Rev.	Status	Date	Company	Name
0	Final	30 November 2006	Adelaide City Council	Mr Matthew Rodda
			Soil and Groundwater Consulting	File
			Adelaide City Council	Planning Department
			Environment Protection Authority	Ms Rebecca Hughes

1. INTRODUCTION

1.1 Background Information

Mr Andrew Nunn is an appointed Environmental Auditor under Section 53(S) of the Victorian *Environment Protection Act* 1970 and is endorsed by the South Australian Environment Protection Authority ('SA EPA') under the direction of Special Bulletin No 1 dated 20 October 1995 as an Environmental Auditor in the State of South Australia.

Mr Nunn was requested to undertake an environmental audit of the site identified by various Certificates of Title as detailed in Table 1. The site subject to audit is described in the Franklin Street Bus Station Development Boundary Coordinates prepared by Alexander Symonds (Ref: A078106.00) provided as Figure 1.

The site is located between Franklin and Grote Streets in the Adelaide CBD and is known as Stage 1 Bus Station Site of the Central West Precinct development being undertaken by the Adelaide City Council. Stage 1 is currently vacant and the proposed use of the land is for a new bus station development comprising bus parking bays, a passenger terminal, a retail building and a paved plaza area. It is noted that the existing Church of Christ building is currently located adjacent to the Stage 1 site area however, does not form part of the Audit Site. The site subject to audit is provided in Figure 1 and the relevant Certificates of Title and the proposed development plan are provided as Appendix A.

This report details the outcome of the environmental audit of the subject site and relevant details associated with the audit are presented in Table 1.

Table 1 – Summary of Audit Information

Category	Details
Name of Auditor	Mr Andrew Nunn
Term of Appointment	Initial Appointment 16th April 2001 Current appointment to 29th July 2008
Person and Organisation requesting Audit	Mr Matthew Rodda of Adelaide City Council
Date Environmental Audit Requested	8 June 2004
Site Address	85-107 Franklin Street 2-40 Bowen Street 84-94 Grote Street 102-106 Grote Street
Property Description	Allotment 91, Certificate of Title Volume 5523 Folio 576 Allotment 91, Certificate of Title Volume 5317 Folio 62 Allotment 12, Certificate of Title Volume 5960 Folio 473 Allotment 93, Certificate of Title Volume 5317 Folio 64 Allotment 92, Certificate of Title Volume 5317 Folio 63 Allotment 1, Certificate of Title 5060 Folio 608 Allotment 94, Certificate of Title 5728 Folio 566 Allotment 96, Certificate of Title 5833 Folio 247 Allotment 97, Certificate of Title 5712 Folio 545 Allotment 93, Certificate of Title 5735 Folio 127

Category	Details
Site Area	Approximately 9,156 m^2
Current Site Zoning	F8 Franklin Street East Precinct
Local Government Authority	Adelaide City Council
Current Site Owner	Adelaide City Council
Current Site Use	Vacant
Completion Date of Audit	30 November 2006
Primary Assessment Consultants	Rust PPK Pty Ltd Maunsell Australia Pty Ltd Tierra Environment Pty Ltd

1.2 Guidance Documents

Based on our understanding of SA EPA requirements regarding the undertaking of Environmental Audits in South Australia, the audit should follow the approach outlined in the *National Environment Protection (Assessment of Site Contamination) Measure 1999.*

The National Environment Protection Measure (NEPM) for the assessment of the site contamination was issued by the Commonwealth Government under Section 14 of the *National Environment Protection Council Act 1994.* This Measure is to be implemented by the laws and other arrangements participating jurisdictions consider necessary. Accordingly, the Measure (and its relevant guidelines) is taken into account as necessary when reviewing site assessment information and completing environmental audits.

In addition, a number of other guidelines should also be considered. These include:

- ANZECC/NHMRC, 1992. Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites. Australian and New Zealand Environment and Conservation Council/National Health and Medical Research Council.
- EPA, 1995. *The Use of Environmental Auditors: Contaminated Land. Special Bulletin No.1.* 20 October 1995.
- EPA, 1999. *Guidance Notes to Environmental Auditors for Audits Undertaken in South Australia.* 31 March 1999.
- EPA, 2003. *Guidance Letter to Environmental Consultants undertaking the Assessment of Site Contamination in SA for a site proposed for a sensitive land use.* 3 April 2003.
- EPA, 2003. *Letter to all Planning Authorities on Site Contamination.* 15 May 2003.
- Planning SA, 2001. *Advisory Notice – Planning 20 – Site Contamination.* December 2001
- Standards Australia, 1997. *Australian Standard, Guide to the sampling and investigation of potentially contaminated soil (Part 1: Non-volatile and semi-volatile compounds).*

- Standards Australia, 1999. *Australian Standard, Guide to the sampling and investigation of potentially contaminated soil (Part 2: Volatile substances).*

- SA EPA *Composite soil sampling: site contamination assessment and management.* March 2005.

- ANZECC, 1999. *Guidelines for the Assessment of On-site Containment of Contaminated Soil.*

2. REVIEW OF ENVIRONMENTAL ASSESSMENT WORK COMPLETED

2.1 Documentation Reviewed

The documents reviewed for the purposes of this audit were as follows:

- Rust PPK Pty Ltd. March 1997. Site History Report for the Franklin Street Bus Station. 85-129 Franklin Street, Adelaide.
- Rust PPK Pty Ltd. June 1997. Environmental Site Assessment. Franklin Street Bus Station and Car Parks.
- BC Tonkin & Associates. July 1997. Site Audit Report. Franklin Street Bus Station and Car Parks. A complete copy of this Audit Report and the Rust PPK Assessment Reports are provided as Appendix B of this report.
- Maunsell Australia Pty Ltd. November 2004. Soil and Groundwater Investigation Central West Precinct. Franklin Street Bus Station and Car Parks. A complete copy of this report is provided as Appendix C of this report.
- Tierra Environment. 26 July 2005. Balfours and Bus Stations Redevelopment. Additional Investigations, Bus Station Site. A complete copy of this report is provided as Appendix D of this report.
- Tierra Environment. 20 September 2006. Central West Precinct, Remediation Report. Bus Station Site – Stage 1. A complete copy of this report is provided as Appendix E of this report.
- Tierra Environment. 16 November 2006. Central West Precinct, Site Management Plan, Bus Station Site, Stage 1 Remediation. A complete copy of this report is provided as Appendix G of this report.

2.2 Site Description

The site subject to audit is irregular in shape and comprises several parcels of land located between Franklin Street and Grote Streets to the east of Bowen Street. The site comprises an area of approximately 9,000 m^2 and the redevelopment of the site incorporated the relocation of Bowen Street further east of its original location and the removal of all fill materials across the entire surface of the audit site until natural underlying materials were exposed. The existing Church of Christ building is located along Grote Street between the eastern and western portion of the site. The Church is not included as part of the current environmental audit of the site.

The Auditor and his representatives have undertaken numerous inspections of the site over the duration of the assessment and remediation works. The site is currently vacant and all buildings and associated car parking areas have been cleared to expose natural underlying soils.

The site is bounded by Franklin Street to the north, the former Bowen Street to the west, the Church of Christ and Grote Street to the south and commercial properties to the east.

2.3 Former Site Status

The site was previously occupied by the following:

- The Greyhound and McCafferty's Express bus terminals and canopy on the north eastern side of Bowen Street adjoining Franklin Street.
- A single storey house, a private car park, a toilet block and a two storey building and associated car parking facilities. This area of the site located along the south eastern portion of Bowen Street was utilised by the Adelaide City Mission.
- Two public car parks, the Grote Street Car Park and the Franklin Street Car Park comprised the eastern portion of the site.

2.4 Site History Review

A site history review was undertaken by Rust PPK in March 1997 and included a site inspection, a historical title search, a review of the Adelaide City Council archives and an aerial photograph search (between 1949 and 1995). The site history review provided the following general information:

- From 1850 until the early 1900s, the land was generally used for residential purposes and some shops, a bakehouse and a private road.
- In 1900 the eastern side of Bowen Street comprised private premises, comprising a number of residential properties, some vacant land, shops, a bakehouse (off Franklin Street) and the United Disciples Church.
- From the 1920s various small light industries were established on the site which included a garage, workshop, stables, forge, showroom, houses, a plumber, a welder and radio and electrical companies, shops and offices.
- The Corporation of the City of Adelaide had acquired most of the land on the eastern side of Bowen Street by 1972. The land was then cleared and by 1979 the bus terminal (Greyhound Pioneer Australia) and associated car parks had been constructed.
- A new terminal building (McCafferty's Express Coaches) was constructed on Bowen Street between 1989 and 1995, on what was previously either car or bus parking spaces.
- All buildings were demolished and associated car parking areas were cleared in 2006 and the site is currently vacant.

2.5 Potential for Contamination

The site history review identified the following potential sources of contamination as a result of past activities undertaken at the site:

- Polycyclic Aromatic Hydrocarbons (PAH) from the historical use of tarry based bitumen materials and from ash wastes associated with the burning of coal products.
- Organochlorine pesticides associated with the possible spraying of termite control substances underneath former buildings at the site.
- Total petroleum hydrocarbons (TPH) associated with the leakage of fuel and/or oil from parked vehicles.
- Various heavy metals associated with the importation of fill materials or the historical use of the site by various industries including, plumbers, welders and wreckers.

2.6 Geology and Hydrogeology

2.6.1 Geology and Site Soils

The Auditor referred to the Adelaide geological map sheet (1:50,000) prepared by the SA Department of Mines and Energy (1980) and the Soil Association Map of the Adelaide Region (1989) to characterise the regional geology. The site is underlain by Brown Solonized Soils comprising brown sandy to clayey soils with abundant earthy lime and calcrete in subsoil. The Brown Solonized soil layer generally comprises of a thickness up to 3 metres, this is underlain by Hindmarsh Clay which comprise mainly clays with lenses of fluvial sandy, silty, micaceous and gravelly materials.

The soil profile at the site, as identified through the investigation work completed by Rust PPK, Maunsell and Tierra is generally consistent with the regional geology. With the exception of fill and reworked natural materials present to a maximum depth of 1.5 metres below the site surface. Filling was encountered at most locations across the site. The underlying natural soils comprised brown to orange brown clays, light brown to cream sandy silty clay and light green/grey clays to depths of greater than 3.5 metres.

2.6.2 Hydrogeology

The Auditor conducted a search of the Department of Water, Land and Biodiversity Conservation groundwater database to determine the presence of licensed groundwater wells in the vicinity of the site. The search reported the presence of 103 wells within a 0.5 km radius of the site. The results of the groundwater database search are provided as Appendix F of this report.

The PIRSA data suggests that shallow groundwater in the vicinity of the site generally occurs at depths between 12.5 and 21 metres below ground. Standing water levels (SWL) ranged between 2.18 and 20 metres. TDS concentrations were reported to be between 882 and 2,00 mg/L, indicating that the groundwater was likely to be suitable for a variety of uses including potable.

The regional groundwater flow direction is anticipated to be in a westerly direction towards the Gulf St Vincent.

2.6.3 Nearest Surface Water Body

The nearest surface water body is the River Torrens and is located approximately 900 m north at its closest point to the site.

3. SOIL ASSESSMENT

3.1 Potential Land Use

In Victoria, the protected beneficial uses for the specific segments / land uses are outlined in the *State environmental protection policy, Prevention and Management of Contamination of Land* (No. S95, June 2002). In South Australia, the assessment and management of site contamination is generally covered by the *National Environment Protection (Assessment of Site Contamination) Measure* (NEPM, 1999). Based on these documents and with regard to the possible residential development of the site, the potential uses of the site considered in this audit are:

- Maintenance of Ecosystems (modified and highly modified);
- Human Health;
- Buildings and Structures;
- Aesthetics; and
- Production of food and flora.

On the basis of the proposed residential use of the site, the assessment includes the consideration of:

- Ecological impacts with respect to contaminant effects on plants;
- Human health issues associated with the chemical quality of the soils as a result of human contact with the soils or from vapours generated from the soils;
- Aesthetic considerations associated with the physical nature of the residual soils, including olfactory and visual impacts and the presence of anthropogenic materials such as building rubble and gravel; and
- Concentrations of contaminants (pH and sulphate) which may become corrosive to concrete structures.

3.2 Soil Guidelines

3.2.1 Ecological Screening Guidelines

Certain contaminants, for example heavy metals, are phytotoxic and human health based levels may not afford protection to some species of plants if grown on the site. In order to consider the potential for phytotoxicity, contaminant concentrations have been initially compared to the ecological investigation levels (EILs) presented in *Guideline on Investigation Levels for Soil and Groundwater, National Environment Protection (Assessment of Site Contamination) Measure* (NEPM) (NEPC, 1999).

The EILs provide guidelines for site assessment, as they are typically lower than the human health based guidelines and therefore provide a conservative assessment of the contamination status of the site soils. The Auditor considers that the EILs are appropriate for the assessment of this site.

For analytes for which ecological investigation levels have not been recommended by NEPM (1999), the environmental investigation guidelines presented in *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*, (ANZECC/NHMRC, 1992) have generally been used.

The guidelines selected for Total Petroleum Hydrocarbons are the soil threshold concentrations for sensitive land use from the NSW EPA *Guidelines for Assessing Service Station Sites* (December, 1994).

Where guidelines are not available in the above publications, various recognised national and international references are used. The ANZECC 1992 guidelines recommend the use of the "Dutch B" guidelines that represent a level at which further consideration or action is required. The Dutch authorities have since adopted a modified series of guidelines (MHSPE, 2000) which incorporate only two values, a Reference or "Target" Value and "Intervention" Value (similar to the former Dutch A and Dutch C guidelines respectively). The average of the Target value and the Intervention value for some analytes is similar to the former B value and can be conveniently used as the investigation threshold. It should be noted that the Dutch values are based on Netherlands environmental and cultural factors and their relevance to Australian conditions has not been tested.

3.2.2 Human Health Guidelines

In 1996, the National Environmental Health Forum (NEHF) published human health-based investigation levels that had been developed for various contaminants and a range of land uses. These guidelines have been adopted as the Health Investigation Levels (HILs) in NEPM (1999). The NEPM includes HILs for standard residential land use (Setting A), high density residential land use (Setting D), public open space (Setting E) and commercial/industrial land use (Setting F).

The site is to be assessed with respect to commercial use for the bus station development and associated retail and open space use for the West Central Plaza area and therefore the appropriate HILs for assessing the contamination status of soil with respect to human health are the HIL Setting 'E' and 'F' values.

Soil pH values have been assessed on the basis of guidance provided in *A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in SA*, (SAHC, 1993), which suggests that soil pH values ranging from 5 to 9 pose minimal risk to human health.

3.2.3 Soil Guidelines Summary

The soil guidelines and the order in which have been selected by the Auditor for screening purposes are as follows:

3.2.3.1 Ecological

- The NEPM Ecological Investigation Levels (EILs);
- The ANZECC/NHMRC Environmental Investigation 'B" levels;
- NSW-EPA threshold concentrations for sensitive land use – soils
- The Dutch Target Values provided in Annex A to February 2000 Circular by the Ministry of Housing Spatial Planning and Environment, 2000.

3.2.3.2 Human Health

- The NEPM Health Investigation Levels (HILs) for open space use (Setting "E") for the West Central Plaza Area
- The NEPM Health Investigation Levels (HILs) for commercial/industrial use (Setting "F") for the remaining areas of the site.

3.3 Soil Investigation

Field investigations were carried out in various stages as summarised in the following sections of this report. Complete copies of each investigation report are presented in Appendices B, C, D, and E of this report. It is noted that the earlier investigations undertaken by Rust PPK, Maunsell and Tierra incorporated the entire Bus Station Development Site. The following sections provide a summary of the investigations undertaken for the Audit site only. Sampling locations for soil investigations undertaken by Rust PPK, Maunsell and Tierra between 1997 and 2005 are all provided on Figure 2 of this report.

3.3.1 Rust PPK Environmental Site Assessment (June 1997)

As part of the initial assessment of the site, Rust PPK undertook grid based sampling in accessible areas of the site including car parks and garden beds. Twelve soil bores (BH5, BH6, BH9, BH11, BH12, BH13, BH14, BH15, BH16, BH17, BH19 and BH20) were drilled across the site to a maximum depth of 2.3 metres.

A total of twelve soil samples were collected from depths of between 0.55 and 2.0 metres and analysed for a range of contaminants including metals (antimony, arsenic, beryllium, cadmium, cobalt, chromium, copper, mercury, molybdenum, nickel, lead, selenium, tin and/or zinc), polycylic aromatic hydrocarbons (PAH), phenols, cresols, organochlorine pesticides, organophosphate pesticides, total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylene (BTEX), polychlorinated biphenyls (PCB) and a volatile organic compound scan.

The results of the limited assessment indicated that concentrations of copper (450 mg/kg) at one location and zinc (up to 2,000 mg/kg) at two locations exceeded the NEPM EILs. In addition, lead (1,600 mg/kg) at one location exceeded the NEPM E and F HILs for one sampling location. It is

noted that near surface soil samples up to a depth of 0.5 metres were not analysed as part of the assessment undertaken by Rust PPK.

3.3.2 BC Tonkin and Associates Site Audit Report (July 1997)

An environmental auditor, Mr Adrian Hall of BC Tonkin and Associated completed a Site Audit Report for the entire Bus Station site comprising both portions located east and west of Bowen Street, in July 1997. The Site Audit Report was based on the Site History Report prepared by Rust PPK and the Environmental Site Assessment Report also prepared by Rust PPK. The auditor concluded that the audit site (confined to the accessible areas of the site only) was suitable for the continuation of existing uses.

3.3.3 Maunsell Soil and Groundwater Investigation (November 2004)

Maunsell drilled thirteen soil sampling locations (BUS9 to BUS17 and BUS10 to BUS21) also in areas of the site which were readily accessible. However, the purpose of the investigation was to provide a better characterisation of the contamination status of near surface fill materials and underlying natural soils.

A total of twenty soil samples were collected from both near surface fill materials and underlying natural soils and analysed variously for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, benzene, toluene, ethylbenzene and xylene (BTEX), organochlorine pesticides, polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), phenols, cresols and total petroleum hydrocarbons (TPH).

Concentrations of all contaminants were below the adopted Auditors criteria, where available. with the exception of:

- An elevated copper concentration (690 mg/kg) exceeded the NEPM EIL of 100 mg/kg for a surficial fill sample collected at one location (BUS17-A).
- Total PAH concentrations (113.5 mg/kg) and a benzo(a)pyrene concentration (12 mg/kg) exceeded the NEPM 'E' and NEPM 'F' HILs for a surficial fill sample collected at one location BUS16-A.

3.3.4 Tierra Additional Investigations (July 2005)

In order to address a number of issues raised by the Auditor, Tierra undertook additional investigations at the Bus Station site in July 2005.

Tierra undertook targeted soil sampling in areas of the site previously not investigated as follows:

- One location (BUS 30) underneath the toilet block immediately west of the church and one location (BUS 29) in the vacant area behind this building.
- Two locations (BUS 31 and BUS 43) underneath the two storey building previously occupied by the Adelaide Central Mission.

- Two locations (BUS 38 and BUS 39) underneath McCafferty's Bus Terminal building and five locations (BUS 40, BUS41, BUS42, BUS44 and BUS45) underneath the Greyhound Bus Terminal building.

- Four locations (BUS 22A, BUS23, BUS24 and BUS25) were investigated in the Franklin and Grote car parks in order to confirm the results of previous investigations.

Soil samples were collected from fill and natural soils at all locations. All samples were analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), polycyclic aromatic hydrocarbons (PAH), pH, cyanide, organochlorine pesticides, benzene, toluene, ethylbenzene and xylene (BTEX), total petroleum hydrocarbons (TPH), phenols, cresols, polychlorinated biphenyls (PCB) and chlorinated hydrocarbons. Samples BUS22A, BUS23, BUS24 and BUS25 collected from the Grote and Franklin Street car parks were analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc) and polycyclic aromatic hydrocarbons (PAH).

Concentrations of all contaminants were below the adopted Auditors criteria, where available with the exception of the following:

- Sample (BUS 30-B) collected from fill materials underlying the former toilet block in the south western portion of the site reported concentrations of lead (350 mg/kg) and zinc (750 mg/kg) exceeding the NEPM EILs.

- Concentrations of arsenic (between 93 and 130 mg/kg) and zinc (940 mg/kg) exceeded the NEPM ecological investigation levels for samples of fill material (BUS 31-A, BUS 43-A and BUS 43-B) collected from underneath the two storey building formerly occupied by the Adelaide Central Mission.

- Samples (BUS 40-A, BUS 41-A and BUS 44-B) collected from fill materials underneath the Greyhound bus terminal building reported concentrations of antimony (190 mg/kg), chromium (430 mg/kg), copper (450 mg/kg), lead (480 mg/kg), tin (up to 1,500 mg/kg) and/or zinc (1,400 mg/kg) exceeded the ecological investigation levels at all three locations. In addition, concentrations of lead at sampling locations BUS 40-A (1,700 mg/kg) and BUS 44-B (800 mg/kg) collected from fill materials and BUS 44-C (800 mg/kg) collected from underlying natural soils exceeded the human health investigation levels for open space use (600 mg/kg) and/or commercial/industrial use (1,500 mg/kg).

- Concentrations of copper (up to 450 mg/kg), lead (550 mg/kg) and zinc (up to 2,000 mg/kg) exceeded the NEPM EILs from fill materials collected from sampling location BUS 24-B in the Franklin Street car park. In addition, a concentration of benzo(a)pyrene (11 mg/kg) exceeded the NEPM human health investigation levels for both open space (2 mg/kg) and commercial/industrial use (5 mg/kg).

3.3.5 Ecophyte Ground Penetrating Radar Investigation (July 2005)

Due to the potential presence of underground storage tanks (USTs) associated with some of the historical uses of the site in particularly maintenance garages and workshops, Ecophyte undertook a ground penetrating radar investigation. The investigation incorporated the entire Audit site with the exception of the two storey building formerly occupied by the Adelaide City Mission and immediately surrounding area.

A number of anomalies were identified during the investigation and most of these were found to be associated with infrastructure and utilities present on the site at the time of the investigation. Ecophyte recommended the further investigation of three anomalies present on the car park areas. Tierra investigated these areas further by drilling soil bores. There was no evidence of USTs, stained or odorous soils, therefore it was concluded that USTs were unlikely to have been present on the Audit site.

3.3.6 Remediation and Validation Works

The remediation and validation works undertaken at the site have been reported in the Central West Precinct Remediation Report prepared by Tierra, September 2006 (Appendix E) and discussed in the following sections.

3.3.7 Remedial Works

Two pits were excavated to depths of between 7 and 8 metres in the north western portion of the site on the corner of Franklin and Bowen Streets. The first pit was approximately 30 metres long by 25 metres wide by 6 metres deep. The second pit was located immediately to the south and adjoined the first pit was approximately 25 metres long by 25 metres wide by 8 metres deep. The pits were excavated to provide a re-use area for geotechnically unsuitable and/or contaminated fill materials identified across the surface of the site. Natural clay soils underline both pits to depths of approximately 17 metres below ground surface, therefore providing a significant barrier to potential groundwater contamination. Once the excavation of the pits was completed, the co-ordinates and relative levels of the base and walls of both pits were surveyed to provide a reference for future purposes. The survey information for both pits is provided as Figure 3 of this Audit Report.

All visible fill materials present across the entire surface of the site were excavated to depths of between 0.2 and 1.45 metres or until natural material was encountered with the exception of an area along the eastern boundary of the church allotment where excavation was undertaken to the extent practicable without undermining fences and foundations, therefore fill material remains within a strip of land approximately 0.5 metres of the eastern church property boundary. The fill materials predominantly consisted of sand, clay and silt with smaller quantities of concrete, bricks, tiles and other construction and demolition wastes, timber, plastic, steel, ash and slag also present.

The fill materials were progressively backfilled in layers of between 300 mm to 400 mm. Tierra maintained a re-use fill sample register to document the type of material placed in each layer and the validation samples corresponding to each layer of fill placed in both pits. Approximately 6,850 m^3 of fill materials were backfilled into both pits. Once backfilling was complete, the walls and the base of both pits were once again surveyed for future reference. The survey information is provided as Figure 4 of this report. The survey information indicated that backfilling was complete to between 0.8 and 1.2 metres below ground surface. A marker layer was placed over the fill materials contained in the re-use area to provide a visual indicator of where the contaminated materials are located to future users of the site.

Natural clay soils located at depths between 2 and 7 metres were excavated from the two re-use pits and used to provide a capping layer over the backfilled re-use area. Generally between 1.0 and 1.2 metres of clay capping was achieved over both pits, with the exception of a small strip of the northern most pit located adjacent to Bowen Street. This area as provided in Figure 5 of this Audit Report achieved a clay capping thickness of 0.8 m and was considered to be an acceptable buffer zone between the future site users and the underlying contaminated fill materials.

3.3.8 Validation Sampling

3.3.8.1 Excavated Site Surface

A total of twenty validation samples (ISB-1A to ISB20-A) were collected from the excavated surface of the entire site area. All sampling locations are provided in Figure 6 of this report. All validation samples were analysed for metals (arsenic, cadmium, chromium, mercury, nickel, lead and zinc), pH and PAH. In addition, three samples were also analysed for Victorian EPA Screens. Concentrations of all contaminants were reported to be below the NEPM EILs or below the laboratory detection limits therefore suggesting that remediation of the fill materials across the site was successful.

3.3.8.2 Re-use Area

Validation samples were collected from each compacted fill layer at 2 or 3 sampling locations within the two re-use pits. A rectangular sampling grid was used for each of the re-use pits as outlined in Figure 7 of this report. A total of ninety validation samples were collected from 6,850 m3 of backfilled materials. All samples were analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin, vanadium and zinc) and polycyclic aromatic hydrocarbons. In addition, 50% of collected samples were subjected to leachability testing to confirm the potential leachability of contaminants and the suitability of the material for re-use. Approximately 10% of samples were tested for a wide range of screening parameters referred to as a Victorian EPA Screen which comprised metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin, vanadium and zinc), pH, benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), phenols, cresols, cyanide, chlorinated hydrocarbons, organochlorine pesticides, organophosphorus pesticides and polychlorinated biphenyls (PCB).

Concentrations of contaminants within the fill materials used to backfill the re-use pits were below the adopted ecological and human health investigation levels, where available with the exception of the following:

- Concentrations of zinc (up to 280 mg/kg) at two locations and mercury (up to 3 mg/kg) at one location exceeded the ecological investigation levels within the re-use area.

- Concentrations of benzo(a)pyrene (between 2.8 and 5.9 mg/kg) at two locations exceeded the NEPM 'E' and/or NEPM 'F' human health investigation levels within the re-use area.

Therefore, indicating that the majority of soils deposited in the re-use area were not contaminated. The 95% UCL of the arithmetic mean for benzo(a)pyrene were calculated for soils in the re-use area. The 95% UCL was calculated to be 0.704 mg/kg therefore indicating that concentrations of benzo(a)pyrene in soils used to fill the re-use area does not exceed the NEPM 'E' human health investigation level for open space of 2 mg/kg.

Leachability testing of soils used to backfill the re-use pits indicated that leachable concentrations of metals and PAH were low and generally did not exceed laboratory detection limits, therefore indicating that soils were unlikely to present a future risk to groundwater in the re-use portion of the site.

3.3.9 Stockpiled Materials

A total of five stockpiles were generated during the remediation works at the site:

- Stockpile 1 comprised an approximate volume of 700 m3 of gravel fill material which was encountered during excavation works at the site. A total of ten samples were collected of the gravel material and analysed for metals (arsenic, cadmium, chromium, mercury, nickel, lead and zinc), PAH, pH, TPH, BTEX and organochlorine pesticides. In addition, two samples were also analysed for Victorian EPA Screens. Concentrations of all contaminants were below the adopted ecological investigation levels.

- Approximately 600 m3 of gravel fill from Stockpile 1 was re-used on site as subgrade in an area approximately 10 metres wide by 60 metres long located along the north eastern boundary of the site. The remaining 100 m3 of material was transported to a site located at Kalbeeba Road for re-use.

- Approximately 1,200 m3 of gravel fill encountered during site excavations was stockpiled (Stockpile 2) on-site. Twenty seven samples were collected of the gravel materials, of which ten were analysed for metals (arsenic, cadmium, chromium, mercury, nickel, lead and zinc), PAH, pH, TPH, BTEX and organochlorine pesticides, two were analysed for Victorian EPA Screens and fifteen samples were analysed for PAH. Concentrations of all contaminants were below the adopted ecological investigation levels.

- Approximately 600 m3 of this material was re-used on site as subgrade in an area approximately 10 metres wide by 60 metres long located along the north eastern boundary of the site. The remaining 600m3 of material was placed in the re-use area pits.

- Stockpile 3 comprised an approximate volume of 1,250 m3 of gravel fill encountered during site excavations. Twelve sample of the gravel fill material were collected and analysed for metals (arsenic, cadmium, chromium, copper, mercury, nickel, lead and zinc), PAH, pH and organochlorine pesticides. In addition, one sample was analysed for a Victorian EPA Screen. Concentrations of all contaminants were below the adopted ecological investigation levels.

- Approximately 600 m3 of material from Stockpile 3 was re-used on site in an area bounded by Bowen Street, Grote Street and the church allotment. The remaining 650 m3 of material was transported off site to Kalbeeba Road for re-use.

- Approximately 50 m3 of fill material derived from further excavation of the vicinity of the church allotment boundaries was stockpiled on-site following the completion of the re-use pits. Two samples were collected and analysed for metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin, vanadium and zinc), PAH, chlorinated hydrocarbons, polychlorinated biphenyls, phenols, cresols and total recoverable hydrocarbons. Concentrations of all contaminants were below the adopted ecological investigation levels. These materials were surplus to site requirements and were taken off site for disposal to Garden Island.

- Stockpile 5 comprised approximately 3,600 m3 of natural clay materials generated during the excavation of the re-use pits. Three samples were collected of the natural materials and analysed for metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin, vanadium and zinc), PAH, chlorinated hydrocarbons, polychlorinated biphenyls, phenols, cresols and total recoverable hydrocarbons. Concentrations of all contaminants were below the adopted ecological investigation levels. These materials were surplus to site requirements and were taken to a site located in Brompton for re-use.

3.4 Current Status of On-Site Soils

The results of the soil investigation have indicated that soils remaining on-site following the removal of surficial fill materials across the entire surface of the site reported contaminant concentrations for all analytes below the adopted ecological screening criteria with the exception of the following:

- Samples collected of the fill materials following placement in the re-use area indicated that concentrations of zinc (up to 280 mg/kg) at two locations and concentrations of mercury (up to 3 mg/kg) at one location exceeded the ecological investigation levels within the re-use area. Leachability testing undertaken for a large number of soil samples representative of the materials placed in the re-use area indicated that leachable concentrations of metals were very low and generally below the laboratory detection limits. Therefore, slightly elevated metal concentrations reported at three locations are unlikely to be mobilised and are not considered to present a risk to groundwater at the site. On the basis that all re-used materials were placed at depths greater than 1.2 metres below ground surface, it is considered unlikely that elevated zinc and mercury concentrations would provide a risk to plant life at the site. In order to maintain the clay capping and

mitigate exposure of plant life to contaminants in the soil, a Site Management Plan has been prepared which restricts the planting of deep rooted plant species in the vicinity of the re-use area.

- Concentrations of benzo(a)pyrene (2.8 mg/kg and 5.9 mg/kg) at two locations within the re-use area exceeded the NEPM 'E' and/or NEPM 'F' human health investigation levels. On the basis that elevated benzo(a)pyrene concentrations were reported at depths greater than 1.2 metres, it is considered highly unlikely that humans at the site will be exposed to reported contamination. In addition, leachable concentrations of PAH were determined to be low, generally below the laboratory detection limits. Therefore, slightly elevated PAH concentrations reported at two locations are unlikely to be mobilised and are not considered to present a risk to groundwater at the site.

- In order to prevent exposure of plants and/or humans to the contaminated soils a Site Management Plan has been prepared which ensures that any excavation and/or maintenance works undertaken in the vicinity of the re-use area at the site are carried out in accordance with appropriate environmental management measures (refer Appendix G of this report).

3.5 Aesthetics of Site Soils

The investigations identified fill material comprising sand, clay and silt with smaller quantities of concrete, bricks, tiles and other construction and demolition wastes, timber, plastic, steel, ash and slag also present. The fill and anthropogenic materials have been placed at depths greater than 1.2 metres in the re-use area of the site, in addition, a small quantity of fill remains within 0.5 metres of the church allotment eastern boundary. The presence of these fill materials are not considered to compromise the aesthetic amenity of the land for the proposed commercial and open space use.

3.6 Adequacy of the Assessor's Investigation Program

The site comprises an area of approximately 9,000 m^2. For this area, the Australian Standard (AS4482.1) indicates that to detect hot spots of contamination of 25 m diameter with a confidence of 95%, then 20 sample points arranged in a grid over the site are required.

Soil sampling was conducted at twenty validation grid locations across this site. This sampling density met the requirements of the Australian Standard, and is considered sufficient to characterise the contamination status of the soils at the site.

4. GROUNDWATER ASSESSMENT

4.1 Protected Environmental Values

This section considers groundwater issues as required by the SA EPA *Guidance Notes to Environmental Auditors for Audits Undertaken in South Australia*, 31 March 1999.

Groundwater in South Australia is assessed in accordance with the *Environment Protection (Water Quality) Policy, 2003.* The policy covers all waters in the State including marine, estuarine and inland (surface and underground) waters. The steps involved in setting the water quality objectives entail:

- Setting the environmental values that are required to be protected;
- Determining water quality characteristics that are important for these values;
- Setting guidelines for each characteristic that adequately protect each environmental value; and
- Choosing the most stringent set of guidelines for the environmental values applicable to each water body.

In line with the *National Water Quality Management Strategy*, the policy recognises that the protected environmental values or uses are:

- Aquatic ecosystem (fresh and marine waters);
- Potable use;
- Recreation and aesthetics (primary contact, secondary contact and aesthetics);
- Agriculture/aquaculture (including irrigation, livestock); and
- Industrial use.

4.2 Water Quality Criteria

Table 1 (Schedule 2) of the *Environment Protection (Water Quality) Policy, 2003* specifies the water quality criteria required to assess whether a protected environmental value has been impacted by contaminants. It is noted that Schedule 2 of the EPP does not contain criteria for total petroleum hydrocarbons. In the absence of specific TPH guidelines, the Dutch Intervention Values (MHSPE, 2000) have been adopted as appropriate groundwater screening levels.

4.3 Groundwater Investigations and Sampling

A total of three groundwater monitoring wells (MW7, MW8 and MW9) were installed across the site by Maunsell in 2004 as follows:

- Well MW7 was located in the central portion of the site to the north of the church;
- Well MW8 was located in the north eastern corner of the site; and
- Well MW9 was located in the south eastern corner of the site.

All wells were adequately screened to monitor the shallow aquifer at the site and reported TDS concentrations between 2,475 mg/L and 3,597 mg/L.

Refer to Figure 8 attached to this Audit Report for locations of all monitoring wells.

Prior to sampling, bores were gauged for depth to groundwater and selected field parameters including, dissolved oxygen, electrical conductivity, redox potential, pH and temperature were recorded.

Following development, groundwater samples were collected from all wells using dedicated disposable bailers.

4.3.1 Standing Water Levels

The depth to groundwater was measured to be between 19.3 and 21.8 metres below the top of the well casing.

The relative groundwater levels indicate that groundwater flows in a north-north-westerly direction consistent with expected regional groundwater flow.

4.3.2 Sampling and Analysis

Groundwater samples were collected from all three wells and analysed for: metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, BTEX, total recoverable hydrocarbons, PAH, PCB, organochlorine pesticides, phenols, cresols and chlorinated hydrocarbons.

4.3.3 Results

The results of groundwater testing have indicated that concentrations of all contaminants were below either the laboratory detection limits and/or the adopted EPP screening criteria with the exception of a slightly elevated selenium concentration (0.007 mg/L) which exceeded the EPP fresh aquatic water quality criterion of 0.005 mg/L for well MW9. All remaining selenium concentrations were reported to be below the adopted screening criterion.

Concentrations of selenium were below laboratory detection limits for all analysed soil samples, therefore indicating that the site is not a source of elevated selenium concentrations in groundwater.

Remaining wells MW7 and MW8 did not report elevated concentrations of selenium, therefore, it is unlikely that elevated selenium concentrations are likely to be associated with an on-site source.

4.4 Assessment of Potential Risks to Protected Environmental Values

An assessment of potential risks to the Protected Environmental Values of groundwater is provided in the following sections.

4.4.1 Potable

TDS concentrations for all wells ranged between 2,475 mg/L and 3,597 mg/L indicating that the groundwater is not suitable for use as potable water without treatment.

4.4.2 Fresh and Marine Aquatic Ecosystem

The nearest freshwater body is the River Torrens located approximately 900 north of the site and may potentially receive groundwater from the site.

It is noted that selenium concentrations in on-site soils were not reported at concentrations exceeding the laboratory detection limits. On this basis it is concluded that the site is not a source of elevated selenium concentrations in groundwater.

In the event that groundwater from the site discharges to the River Torrens, it is considered that over the distance to the River (approximately 900 m), processes such as dilution, dispersion and attenuation on the clayey substrate are likely to reduce metal concentrations to an acceptable level. Therefore it is concluded, that the Environmental Value Fresh Aquatic Ecosystems are unlikely to be impacted by elevated selenium concentration in the groundwater at the site.

4.4.3 Irrigation

Concentrations of all contaminants were below the EPP Irrigation Water Quality Criteria, therefore this use of groundwater is unlikely to be precluded.

4.4.4 Livestock

Concentrations of all contaminants were below the Livestock Water Quality Criteria, therefore, this use of groundwater is also considered unlikely to be precluded.

4.4.5 Industrial Use

Contaminant concentrations are not expected to adversely affect the use of groundwater for industrial watering purposes.

4.5 Conclusion on Groundwater Quality

Groundwater was sampled and tested at three on-site locations. The results of analytical testing of the groundwater indicated that all potential uses of groundwater are unlikely to be precluded by concentrations of contaminants reported for the groundwater at the site.

5. QUALITY CONTROL

Established quality assurance/quality control (QA/QC) procedures were followed throughout the project to assure data quality.

The QA/QC program undertaken as part of the assessment included the following:

- transport of samples under Chain of Custody documentation;
- preservation of samples during transport from the field to the laboratory;
- compliance with sample holding times;
- collection of blind and split duplicate samples;
- collection of rinsate blanks;
- use of NATA accredited laboratories;
- review of results of duplicate and blank samples; and
- review of internal laboratory analysis of matrix spike/matrix spike duplicates, duplicates, blanks and spike recoveries.

5.1 Field Duplicates

In accordance with AS4482.1, at least one blind duplicate sample in twenty primary samples (submitted to the primary laboratory) was collected for analyses through the course of the investigation. A similar sampling density is required for field split duplicates that are to be analysed by an independent laboratory.

The blind duplicates provide a measure of the precision of the primary laboratory, that is, the ability to repeat the result. The field split duplicate provides an independent measure of the accuracy of the primary laboratory.

The assessment of the quality control samples was undertaken using the relative percentage differences (RPDs) method as described in AS4482.1. The RPDs were calculated by dividing the difference between each analyte concentration in a sample and its duplicate, by the average concentration in the two samples. This can be expressed by the following formula

$$RPD = (X1 - X2) / [(X1 + X2) / 2]$$

Where: X1 = concentration of analyte in sample;

X2 = concentration of analyte in duplicate.

It should be noted that:

- In instances where samples and/or their corresponding duplicates return concentrations of analytes below method detection limits, quantitative comparison of samples and their duplicates could not be carried out

- Variations in low concentrations of analytes may result in high RPDs that are not necessarily significant when the concentrations are compared against the screening guidelines

- Results of the analysis of duplicate samples are provided in the Appendices of the Rust PPK ESA report, Maunsell Investigation and Tierra Additional Investigations and Remediation Report provided as Appendices B, C, D and E of this report.

5.2 Analytical Laboratories Used

Australian Government Analytical Laboratories (AGAL) was the primary laboratory used for the analysis of soil samples during the Rust PPK investigation. MGT was used as the secondary or QA/QC laboratory.

MGT Environmental Consulting Pty Ltd (MGT) was the primary laboratory used for the analysis of soil samples during the Maunsell investigation. ALS Environmental (ALS) was used as the secondary or QA/QC laboratory.

MGT Environmental Consulting Pty Ltd (MGT) was the primary laboratory used for the analysis of soil samples during the Tierra investigations. Ecowise Environmental was used as the secondary of QA/QC laboratory.

Laboratory Reports are provided in the appendices of the various reports provided as Appendices B to E of this Audit Report. All laboratories are accredited by NATA for the analyses performed. All reports included copies of the associated NATA endorsed laboratory analytical results sheets.

5.3 Results of Soil Blind Duplicate Analyses

5.3.1 Rust PPK Environmental Site Assessment (July 1997)

Two blind duplicate pairs of soil samples {(BH4 and BH4D) and (BH12 and BH12/D)} were collected during the Rust PPK ESA undertaken in July 1997. The sample pairs were analysed variously for metals (arsenic, cadmium, copper, mercury, nickel, lead and zinc) and PAH. All calculated RPD results were within the recommended maximum range (30-50%) indicating good reproducibility of analytical results.

5.3.2 Maunsell Investigation (November 2004)

Four blind duplicate pairs of soil samples {(BUS6-A and BUS6-AA), (BUS7-A and BUS7-AA), (BUS12-A and BUS12-AA) and (BUS20-A and BUS20-AA) were collected during the Maunsell investigation undertaken in November 2004. The sample pairs were analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, organochlorine pesticides, polycyclic aromatic hydrocarbons (PAH), total recoverable hydrocarbons (TRH), polychlorinated biphenyls (PCB), phenols, cresols, benzene, toluene, ethylbenzene, toluene and xylene (BTEX) and chlorinated hydrocarbons.

A total of forty seven sample pairs were available for assessment and all RPDs were within the recommended maximum range with the exception of:

- Cadmium (75%) for sample pair BUS6-A and BUS6-AA; and
- Lead (56%), zinc (60%) and a number of individual polycyclic aromatic hydrocarbon compounds (between 55 and 120%) for sample pair BUS20-A and BUS20-AA;

All elevated RPD values were attributed to small differences in very low analyte concentrations.

5.3.3 Tierra Additional Investigation (July 2005)

Three blind duplicate pairs of soil samples {(BUS 22-A and BUS 22-D), (BUS 27-A and BUS 27-D) and (BUS 34-A and BUS 34-D) were collected during the additional investigation undertaken by Tierra in July 2005.

The sample pairs were analysed variously for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, BTEX, organochlorine pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, phenols, cresols and total recoverable hydrocarbons.

All calculated RPD results were within the recommended maximum range (30 – 50%) with the exception of lead (138%), zinc (115%) and dieldrin (142%) for sample pair BUS 34-A and BUS 34-D. It is noted that all elevated RPD values were attributed to small differences in very low analyte concentrations.

5.3.4 Tierra Remediation Report (September 2006)

A total of nine blind duplicate pairs of soil samples {(1SB1-A and 1SB1-A), (1STF1-A and 1STF1-X), (1STF21A and 1STF21-X), (1STF41-A and 1STF41-X), (1RF1-A and 1RF1-X), (1RF21-A and 1RF21-X), (1RF41-A and 1RF41-X), (1RF61-A and 1RF61-X) and (1RF81-A and 1RF81-X)} were collected by Tierra during their remediation/validation works at the site.

The sample pairs were analysed variously for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead mercury, molybdenum, nickel, selenium, tin and zinc), benzene,

toluene, ethylbenzene, xylene (BTEX), total recoverable hydrocarbons (TRH), organochlorine pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls and chlorinated hydrocarbons.

A total of 86 sample pairs were available for assessment and all RPDs were within the recommended maximum range with the exception of:

- Zinc (73%) for sample pair 1STF1-A and 1STF1-X
- Arsenic (59%), aldrin (66%) and chlordane (52%) for sample pair 1STF41-A and 1STF41-X
- Aldrin (52%), chlordane (50%) and benzo(f)fluoranthene (66%) for sample pair 1RF1-A and 1RF1-X
- Zinc (56%) and chlordane (66%) for sample pair 1RF21-A and 1RF21-X
- Various individual polycyclic aromatic hydrocarbon compounds (ranging between 161% to 185%) for sample pair 1RF61-A and 1RF61-X
- Lead (77%) for sample pair 1RF81-A and 1RF81-X and various individual polycyclic aromatic hydrocarbon compounds (between 52% and 120%).

Most elevated RPD concentrations were attributed to small differences in very low analyte concentrations, therefore indicating that the overall quality of the data set is reliable.

5.4 Results of Soil Inter-Laboratory Duplicate Analyses

5.4.1 Rust PPK Environmental Site Assessment (July 1997)

Two inter-laboratory duplicate pairs of soil samples {(BH12 and BH12/D) and (BH15 and BH15D)} were collected by Rust PPK as part of the 1997 ESA investigation. The sample pairs were analysed variously for metals (arsenic, cadmium, copper, mercury, nickel, lead and zinc), phenols, TPH, BTEX, PAH and organochlorine pesticides. All calculated RPD results were within the recommended maximum range (30-50%) indicating good reproducibility of analytical results.

5.4.2 Maunsell Investigation (November 2004)

Three pairs of inter-laboratory soil duplicate samples {(BUS7-A and BUS7-AA), (BUS12-A and BUS12-AA) and (BUS20-AA and BUS20-AA)} were collected by Maunsell during the 2004 investigation. The sample pairs were analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, organochlorine pesticides, polycyclic aromatic hydrocarbons (PAH), total recoverable hydrocarbons (TRH), polychlorinated biphenyls (PCB), phenols, cresols, benzene, toluene, ethylbenzene, toluene and xylene (BTEX) and chlorinated hydrocarbons.

A total of forty one sample pairs were available for assessment and all RPDs were within the recommended maximum range with the exception of:

- Lead (105%) for sample pair BUS12-A and BUS12-AA; and
- Chromium (61%), zinc (68%) and a number of individual polycyclic aromatic hydrocarbon compounds (between 84% and 200%) for sample pair BUS20-A and BUS20-AA.

All elevated RPD values were attributed to small differences in very low analyte concentrations.

5.4.3 Tierra Additional Investigation (July 2005)

Three inter-laboratory soil duplicate samples {(BUS 23-A and BUS23-D), (BUS 30-A and BUS 30-D) and (BUS 43-C and BUS 43-C) were collected by Tierra during the July 2005 Additional Investigation.

The sample pairs were analysed variously for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, BTEX, organochlorine pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, phenols, cresols and total recoverable hydrocarbons.

A total of twenty nine sample pairs were available for assessment and all RPDs were within the recommended maximum range with the exception of:

- Copper (58%), lead (139%), mercury (154%), zinc (83%) and several individual polycyclic aromatic hydrocarbon compounds (between 91% and 160%)

All elevated RPD values were attributed to small differences in very low analyte concentrations.

5.4.4 Tierra Remediation Report (September 2006)

A total of 10 inter-laboratory soil duplicate samples {1SB1-A and 1SB1-Y), (1STF-A and 1STF1-Y), (1STF21A and 1STF21-Y), (1STF41-A and 1STF21-Y), (1STN1-A and 1STF21-Y), (1RF1-A and 1RF1-Y), (1RF21-A and 1RF21-Y), (1RF41-A and 1RF41-Y), (1RF61-A and 1RF61-Y) and (1RF81-A and 1RF81-Y)} were collected by Tierra during the remediation/validation works undertaken at the site.

The sample pairs were analysed variously for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead mercury, molybdenum, nickel, selenium, tin and zinc), benzene, toluene, ethylbenzene, xylene (BTEX), total recoverable hydrocarbons (TRH), organochlorine pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls and chlorinated hydrocarbons.

A total of 104 sample pairs were available for assessment and all RPDs were within the recommended maximum range with the exception of:

- Nickel (75%) for sample pair 1SB1-A and 1SB1-Y (low concentrations)
- Lead (138%) for sample pair 1STF-A and 1STF1-Y (low concentrations)
- Lead (147%) and zinc (141%) for sample pair 1STF41-A and 1STF21-Y (low concentrations)
- Chromium (66%) and lead (53%) for sample pair 1STN1-A and 1STF21-Y (low concentrations)
- Lead (90%), tin (72%), aldrin (61%), benzo(k)fluoranthene (80%) for sample pair 1RF1-A and 1RF1-Y
- Benzo(a)pyrene (66%) for sample pair 1RF21-A and 1RF21-Y (low concentrations)
- Lead (166%) and zinc (157%) for sample pair 1RF41-A and 1RF41-Y
- Lead (72%) and various individual polycyclic aromatic hydrocarbon compounds (between 57% and 160%) for sample pair 1RF61-A and 1RF61-Y
- Mercury (185%) and various individual polycyclic aromatic hydrocarbon compounds (between 52% and 120%) for sample pair 1RF81-A and 1RF81-Y

Most elevated RPD values were attributed to small differences in very low analyte concentrations, therefore indicating that the analytical results are reproducible.

5.5 Groundwater Quality Control

Only one groundwater investigation was undertaken as part of the various assessments of the site. Maunsell installed three groundwater monitoring wells during the November 2004 investigation. It is noted that Maunsell did not collect groundwater blind or inter-laboratory duplicate samples as part of this investigation.

This oversight by Maunsell is unlikely to affect the overall conclusions of the audit because groundwater concentrations for all three wells were low and generally did not exceed laboratory detection limits. These results are consistent with regional expectations given that groundwater was encountered at depths greater than 19 metres and a source of groundwater contamination was not identified on the site or the immediate vicinity of the site.

On this basis, it is concluded that the absence of groundwater quality control samples, whilst not desirable is considered unlikely to affect the conclusions regarding the contamination status of groundwater at the site.

5.6 Rinsate, Field and Trip Blanks

Rinsate, field and trip blank samples were not collected as part of the Rust PPK 1997 and Maunsell 2004 investigations.

One rinsate blank (1R1) was collected during the two phases of work undertaken by Tierra. The samples was analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead mercury, molybdenum, nickel, selenium, tin and zinc), benzene, toluene, ethylbenzene, xylene (BTEX), total recoverable hydrocarbons (TRH), organochlorine pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls and chlorinated hydrocarbons.

All analytes were not reported at concentrations exceeding the laboratory detection limits.

Whilst this is below a standard typically adopted, the Auditor has reviewed the soil sampling protocols, and based on this and the results provided, it is concluded that the practices employed during the investigation did not contribute to the contamination status of the samples collected during the investigation.

5.7 Internal Laboratory Quality Control

MGT Environmental, AGL, ALS and Ecowise performed internal laboratory quality control, including duplicate analyses, matrix spikes and method blanks.

The internal duplicate analyses performed by the laboratories showed good consistency with all RPDs for the various investigations reported to be generally less than 30%.

Matrix spikes are field samples that are spiked with a known quantity of the recommended compound for that particular analysis. This is conducted to assess the effects of the specific sample matrix (i.e. clay, sand, etc) on the recovery of analytes. Matrix spike recoveries were generally within the acceptable range of 75% to 125%

5.8 Conclusions on QA/QC

The QA/QC measures employed throughout the assessment have enabled the quality of the field sample collection and laboratory analysis procedures to be examined and verified.

It is concluded that although groundwater quality control samples were not collected by Maunsell during the only groundwater investigation undertaken at the site, the absence of these samples is unlikely to affect the conclusions reached with respect to the quality of data collected for groundwater due to the significant depth to groundwater (greater than 19 metres) and the absence of significant soil contamination at the site.

It is concluded that the overall data quality is acceptable and is considered reliable to draw conclusions regarding the environmental condition of the site.

6. CONCLUSIONS

The Auditor has reviewed the environmental investigations of the site located between Franklin, Bowen and Grote Streets in the Adelaide CBD. It is noted that the Audit site comprises an area of approximately 9,000m^2 and forms a portion (Stage 1) of the larger site referred to as the Central West Precinct development.

Stage 1 is currently vacant and the proposed use of the land is for a new bus station development comprising bus parking bays, a passenger terminal, a retail building and a paved plaza area.

The Auditor understands that the site is to be used for commercial purposes comprising a new bus station development comprising bus parking bays, a passenger terminal, a retail building and an open space paved plaza area. The Audit findings have been considered in the context of this proposed use.

6.1 Site History

A site history review was undertaken by Rust PPK in March 1997 and included a site inspection, a historical title search, a review of the Adelaide City Council archives and an aerial photograph search (between 1949 and 1995). The site history review provided the following general information:

- From 1850 until the early 1900s, the land was generally used for residential purposes and some shops, a bakehouse and a private road.
- In 1900 the eastern side of Bowen Street comprised private premises, comprising a number of residential properties, some vacant land, shops, a bakehouse (off Franklin Street) and the United Disciples Church.
- From the 1920s various small light industries were established on the site which included a garage, workshop, stables, forge, showroom, houses, a plumber, a welder and radio and electrical companies, shops and offices.
- The Corporation of the City of Adelaide had acquired most of the land on the eastern side of Bowen Street by 1972. The land was then cleared and by 1979 the bus terminal (Greyhound Pioneer Australia) and associated car parks had been constructed.
- A new terminal building (McCafferty's Express Coaches) was constructed on Bowen Street between 1989 and 1995, on what was previously either car or bus parking spaces.
- All buildings were demolished and associated car parking areas were cleared in 2006 and the site is currently vacant.

6.2 Data Quality

The QA/QC activities undertaken by various consultants including Rusk PPK, Maunsell and Tierra provide confidence that the testing of the soils and groundwater are adequately representative of the conditions at the site and enable the conclusions reached herein.

6.3 Remediation Works

Remediation works at the site involved the removal of all surficial fill materials, between depths of 0.2 metres and 1.45 metres or until natural soil was encountered, across the entire surface of the site and the construction of a clay capped soil re-use area for the containment of the fill materials.

6.4 Soil Assessment

Validation samples were collected at twenty locations on a grid basis across the site. Samples were collected from natural underlying soils to and analysed for a broad range of contaminants including Victorian EPA Screens. The soil sampling density for the broader site adopted by Tierra met the requirement stipulated in AS4482.1 – 1997.

6.4.1 Evaluation of Soil Contamination – Ecological

The results of soil testing have shown that soils remaining on-site following remediation works reported contaminant concentrations for analytes below the adopted ecological screening criteria with the exception of the following:

Samples collected of the fill materials placed in the re-use area indicated that concentrations of zinc (up to 280 mg/kg) at two locations and concentrations of mercury (up to 3 mg/kg) at one location exceeded the ecological investigation levels within the re-use area. Leachability testing undertaken for a large number of soil samples representative of the materials placed in the re-use area indicated that leachable concentrations of metals were very low and generally below the laboratory detection limits. Therefore, slightly elevated metal concentrations reported at three locations are unlikely to mobilise and present a risk to groundwater at the site. On the basis that all re-used materials were placed at depths greater than 1.2 metres below ground surface, it is considered unlikely that elevated zinc and mercury concentrations would pose a risk to plant life at the site. In order to maintain the clay capping and mitigate exposure of plant life to contaminants in the soil, a Site Management Plan has been prepared which restricts the planting of deep rooted plant species in the vicinity of the re-use area. In addition, the Site Management Plan includes environmental management measures to ensure that any construction, excavation and/or maintenance works undertaken in the vicinity of the re-use area at the site are carried out in an appropriate manner and maintain the integrity of the clay capping.

6.4.2 Evaluation of Soil Contamination – Human Health

The investigation results indicated that concentrations of contaminants in site soils did not exceed NEPM 'E' HILs for open space or NEPM 'F' HILs for commercial/industrial use with the exception of concentrations of benzo(a)pyrene (2.8 mg/kg and 5.9 mg/kg) at two locations within the constructed

re-use area which exceeded the NEPM 'E' and/or NEPM 'F' human health investigation levels. On the basis that elevated benzo(a)pyrene concentrations were reported at depths greater than 1.2 metres, it is considered highly unlikely that humans at the site will be exposed to reported contamination. In addition, the results of leachability testing carried out for contained soils reported concentrations of PAH generally not exceeding the laboratory detection limits.

However, in order to prevent exposure of plants and/or humans to the contaminated soils a Site Management Plan has been prepared to ensure that any construction, excavation and/or maintenance works undertaken in the vicinity of the re-use area at the site are carried out in an appropriate manner and to maintain the integrity of the clay capping.

6.5 Groundwater Assessment

A total of three groundwater monitoring wells have been installed across the Stage 1 development site.

The results of groundwater testing have indicated that concentrations of all contaminants were below either the laboratory detection limits and/or the adopted EPP screening criteria with the exception of an elevated selenium concentration (0.007 mg/L) which exceeded the EPP potable fresh aquatic water quality criterion of 0.005 mg/L for well MW9. All remaining selenium concentrations were reported to be below the adopted screening criterion.

It is noted that selenium concentrations in on-site soils were not reported at concentrations exceeding the laboratory detection limits. On this basis it is concluded that the site is not a source of elevated selenium concentrations in groundwater.

In the event that groundwater from the site discharges to the River Torrens, it is considered that over the distance to the River (approximately 900 m), processes such as dilution, dispersion and attenuation on the clayey substrate are likely to reduce metal concentrations to an acceptable level. Therefore it is concluded, that the Environmental Value Fresh Aquatic Ecosystems are unlikely to be impacted by elevated selenium concentration in the groundwater at the site.

On the basis of the investigations undertaken at the site, it is concluded that all potential uses of groundwater are unlikely to be precluded by concentrations of contaminants reported for the groundwater at the site.

6.6 Aesthetic Assessment

The investigations identified fill material comprising sand, clay and silt with smaller quantities of concrete, bricks, tiles and other construction and demolition wastes, timber, plastic, steel, ash and slag also present. The fill and anthropogenic materials have been placed at depths greater than 1.2 metres in the constructed re-use area of the site, in addition, a small quantity of fill remains within 0.5 metres of the church allotment eastern boundary. The presence of these fill materials are not considered to compromise the aesthetic amenity of the land for the proposed commercial and open space use.

6.7 Geotechnical Issues

This site audit report does not address the geotechnical issues associated with development of the site. The site owner is therefore advised to seek independent geotechnical advice regarding the suitability of the site for its intended use and the suitability of any placed, backfill materials, or any other matters relevant to the geotechnical stability of the site.

6.8 Summary of Conclusions

In summary, the information provided by various assessment consultants has led the Auditor to the opinion that:

- The condition of the land at the site with respect to possible chemical contamination is suitable for commercial / industrial and open space use consistent with the development plan attached, subject to the following conditions:

    1. Soils requiring management measures remain on-site at two locations (Area 1 and Area 2). This report includes a survey plan showing the location of Areas 1 and 2, a copy of which is provided as Figure 9. To restrict exposure of site users to these soils, a Site Management Plan has been prepared for future activities which may expose site users to these soils. The Auditor has reviewed the Site Management Plan, a copy of which is provided as Appendix G of this report. It is the responsibility of the current or future land owners to implement the management conditions relating to the site in accordance with the Site Management Plan.

The following general comments should be considered with respect to future use of the site

- Specialist advice should be sought in determining the geotechnical suitability of any fill material for its intended purpose;

- If excavation or other activities are undertaken generating surplus soils requiring off-site disposal, the waste soils must be managed in accordance with relevant EPA guidelines; and

- Any materials imported to site should comply with the National Environment Protection (Assessment of Site Contamination) Measure, 1999, Environmental Investigation Levels (Interim Urban).

This executive summary forms part of the report "Site Audit Report, Central West Precinct, Bus Station Site - Stage 1" Report No: SG041157 RP01, dated 30 November 2006). Further details regarding the condition of the site may be found in the Site Audit Report.

DATED: 4 December 2006

SIGNED:

Mr Andrew Nunn
Environmental Auditor (Contaminated Land)

7. REFERENCES

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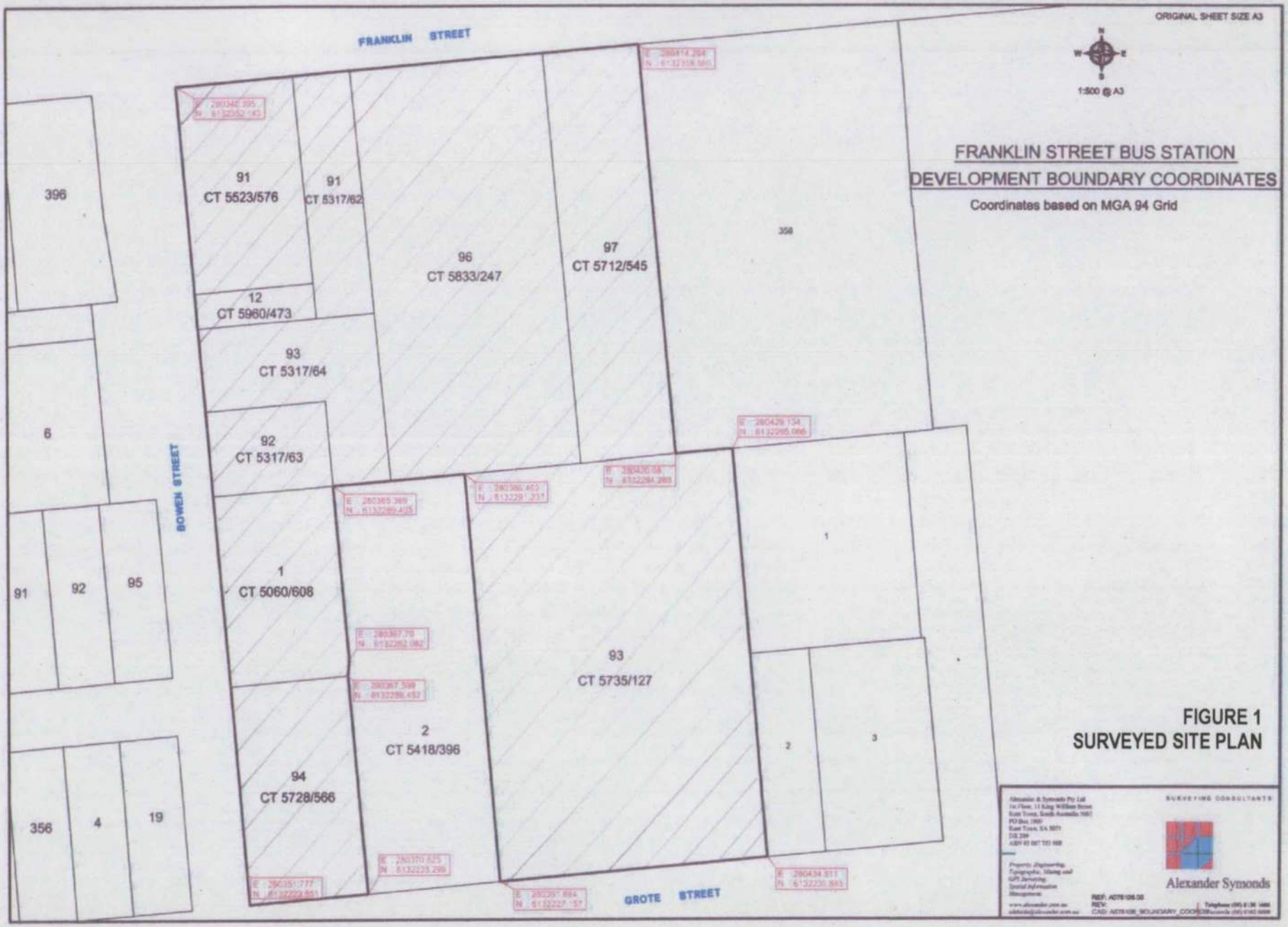
FIGURES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FRANKLIN STREET
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FRANKLIN STREET BUS STATION
DEVELOPMENT BOUNDARY COORDINATES
Coordinates based on MGA 94 Grid
396
91
CT 5523/576
91
CT 5317/62
96
CT 5833/247
97
CT 5712/545
358
12
CT 5960/473
93
CT 5317/64
92
CT 5317/63
6
BOWEN STREET
1
CT 5060/608
91
92
95
93
CT 5735/127
1
2
CT 5418/396
2
3
94
CT 5728/566
356
4
19
GROTE STREET
FIGURE 1
SURVEYED SITE PLAN
Alexander Symonds

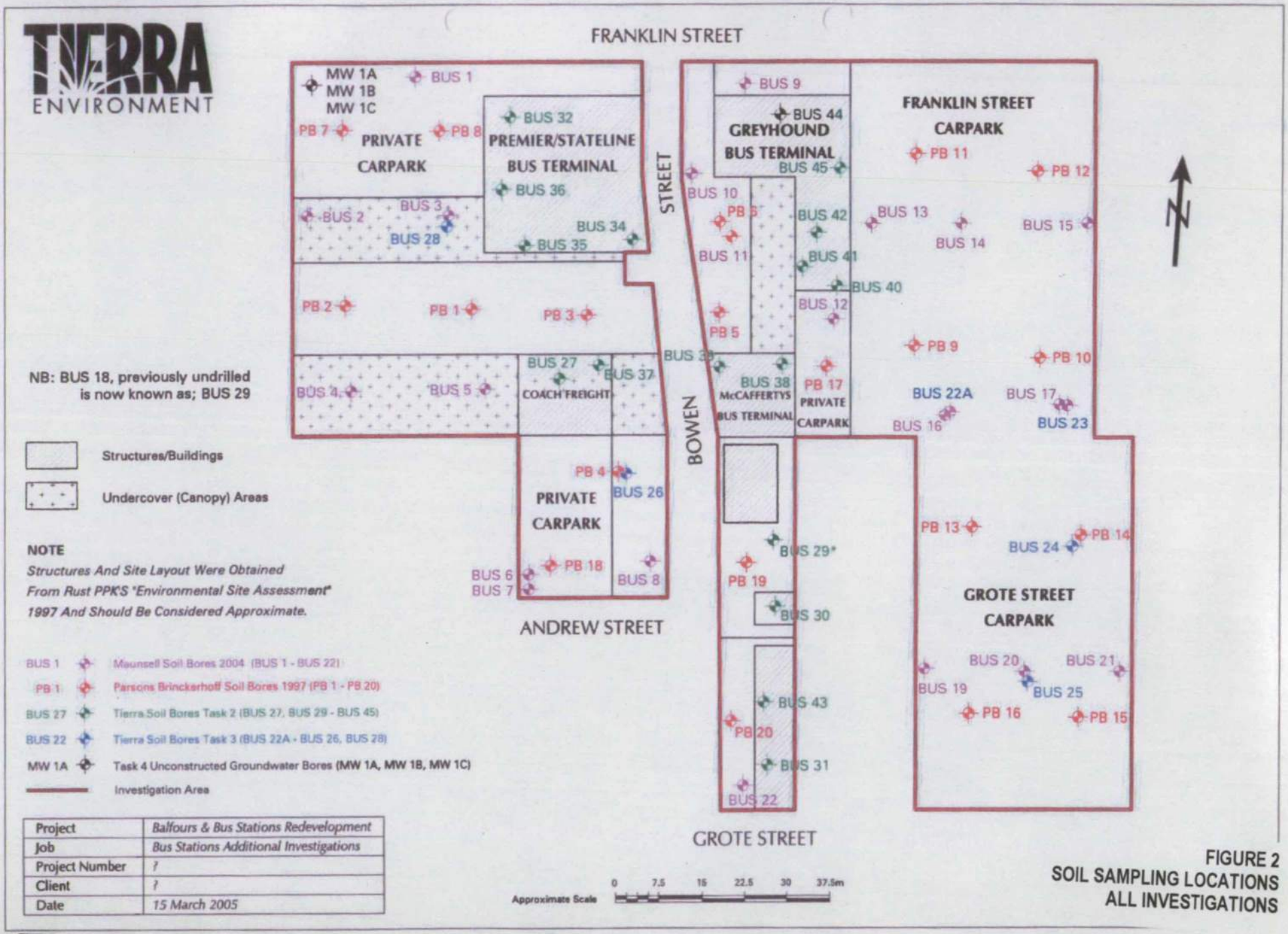


FIGURE 2
SOIL SAMPLING LOCATIONS
ALL INVESTIGATIONS

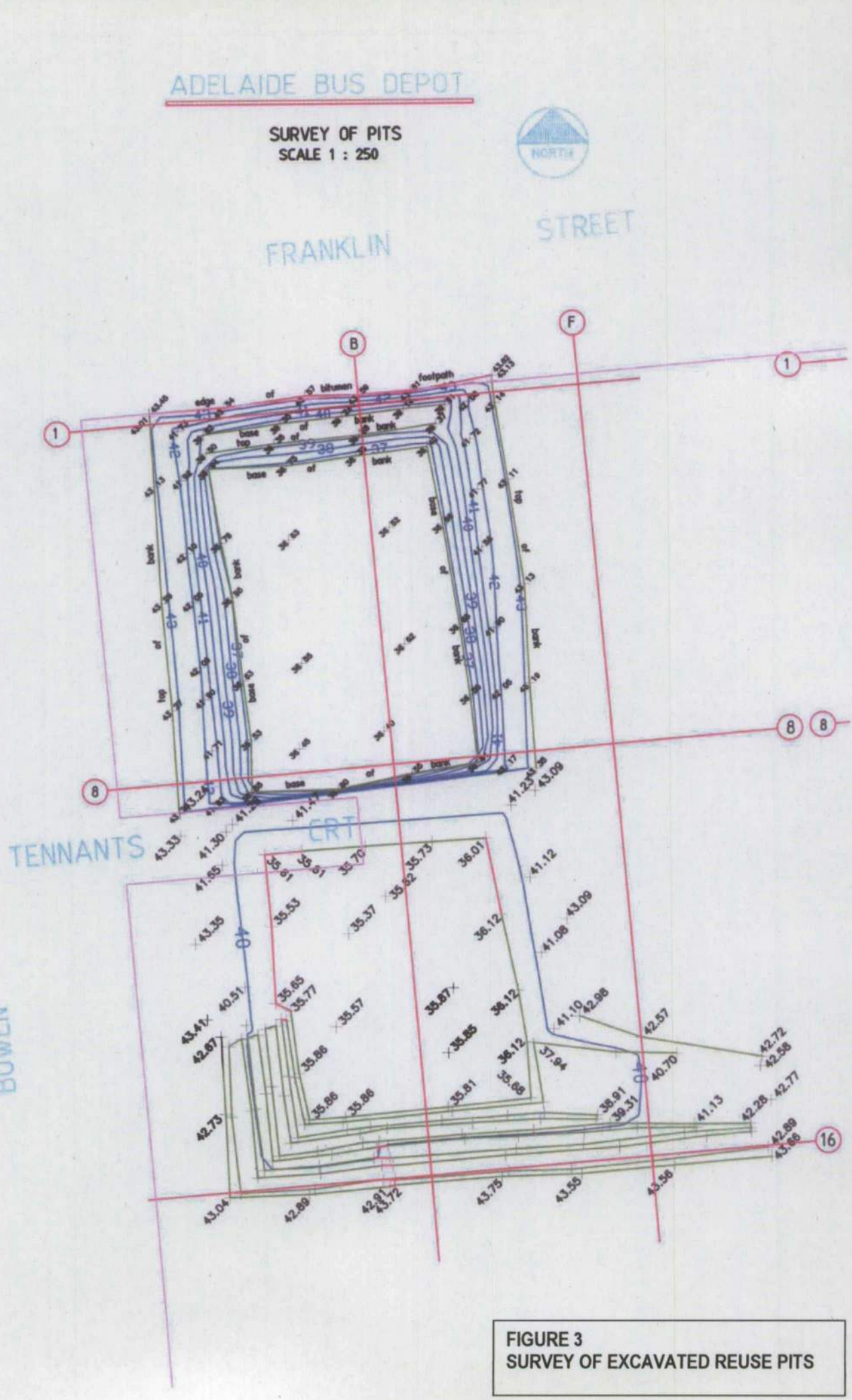


FIGURE 3
SURVEY OF EXCAVATED REUSE PITS

ADELAIDE BUS DEPOT

SURVEY OF TOP OF CONTAMINATED FILL
SCALE 1 : 250

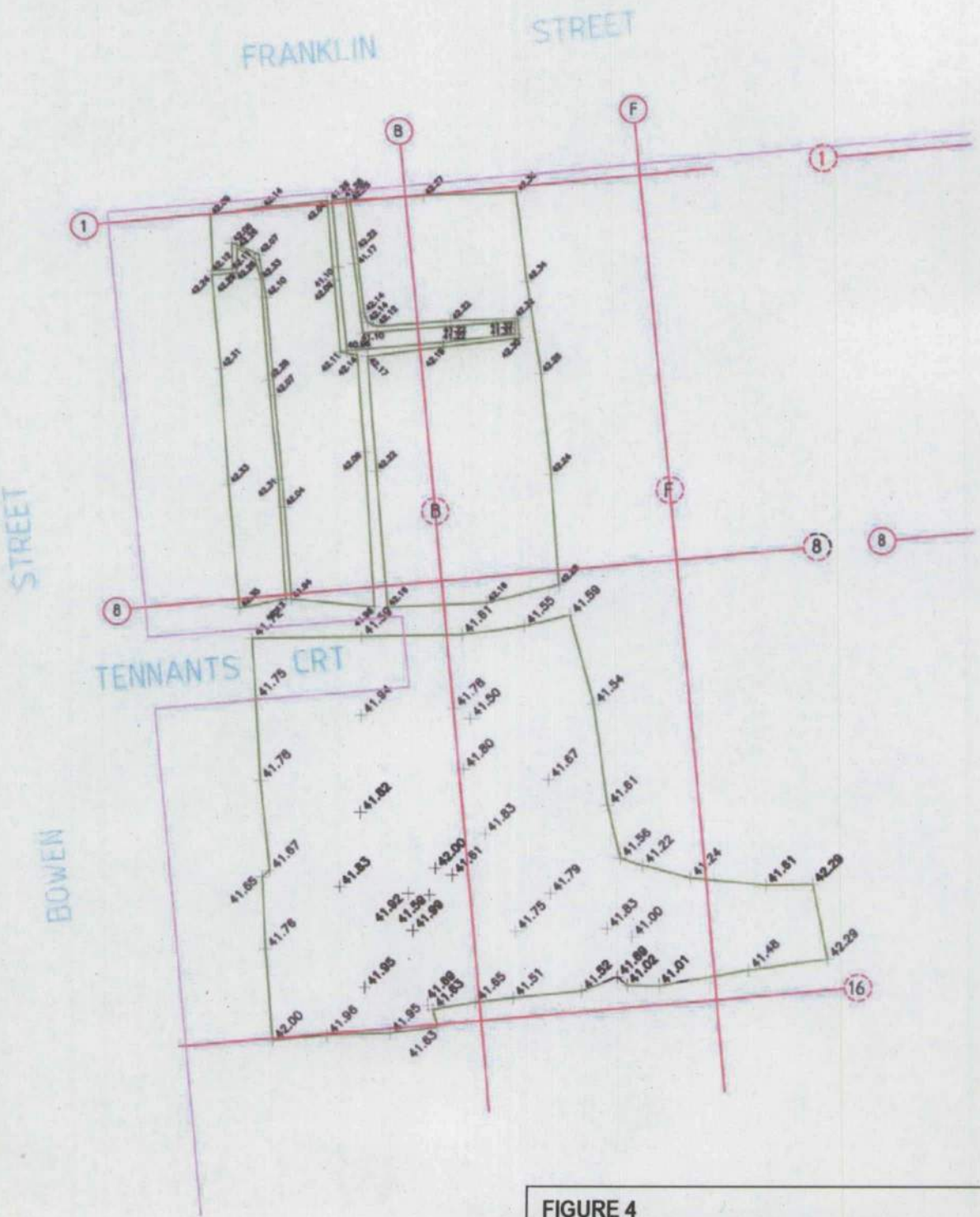


FIGURE 4
SURVEY OF TOP OF CONTAMINATED FILL
REUSE AREA

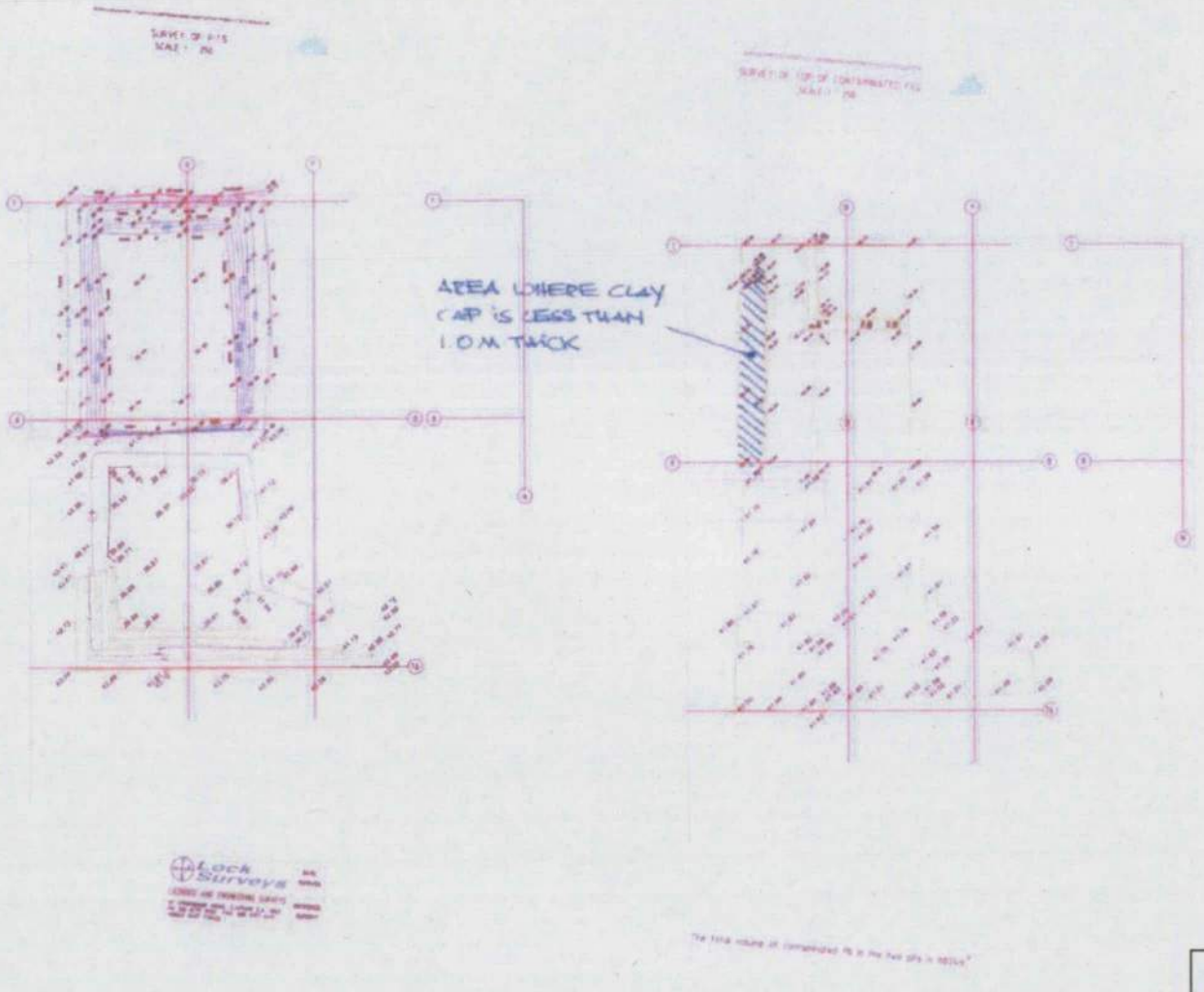
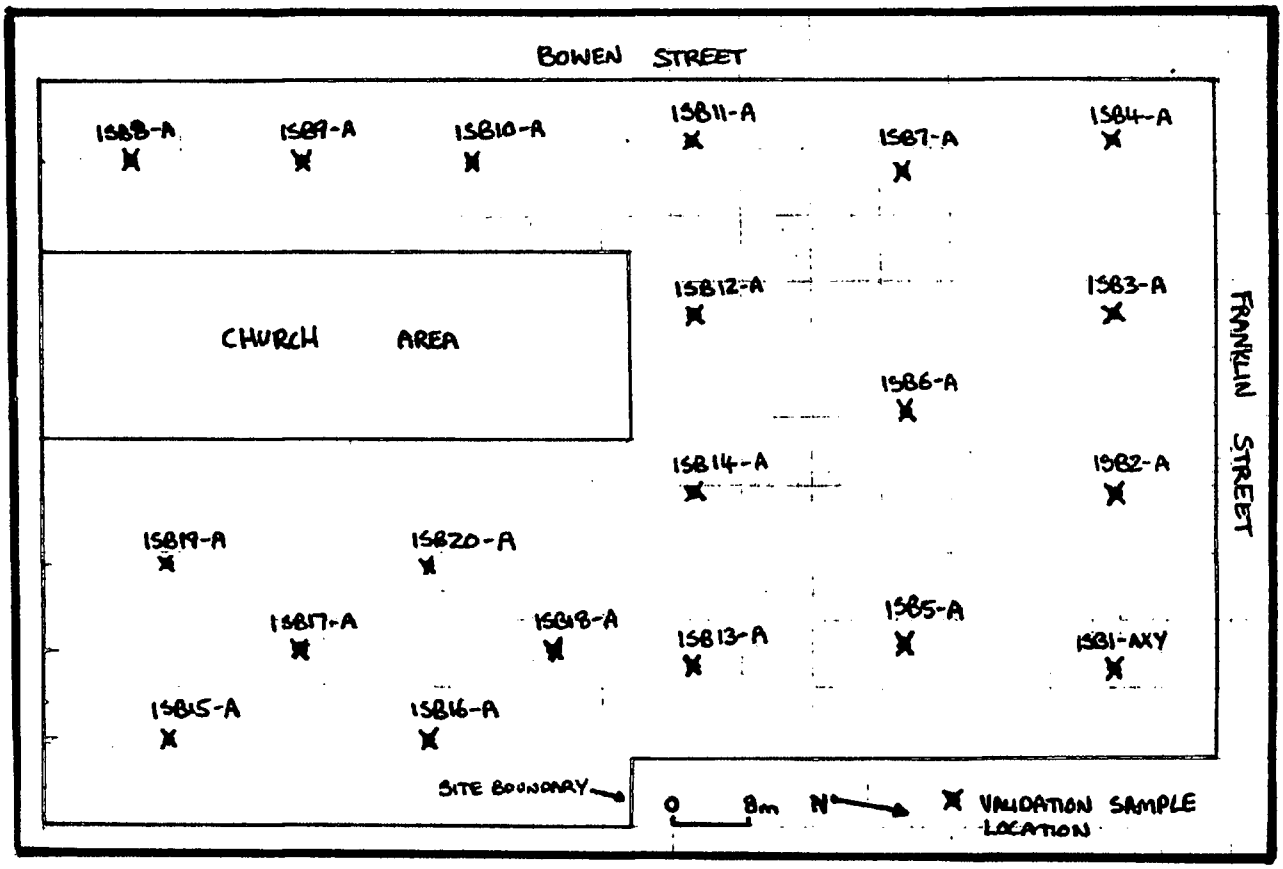


FIGURE 5
AREA NOT ACHIEVING 1.0 M BACKFILL THICKNESS

Project:	Bus Station Redevelopment	Project No:	AAA 05 002 02
Principal:	Adelaide City Council	Date:	3/07/2006
Contractor:	P.D Excavations	Plan No.	**BS0002**
Description:	Base of Excavations Validation Sample Locations		

Tierra Environment Pty Ltd
ABN: 84 111 615 680

71 Belair Road,
Kingswood SA 5062
T: 08 8373 2512
F: 08 8373 2515
general@tierra.com.au



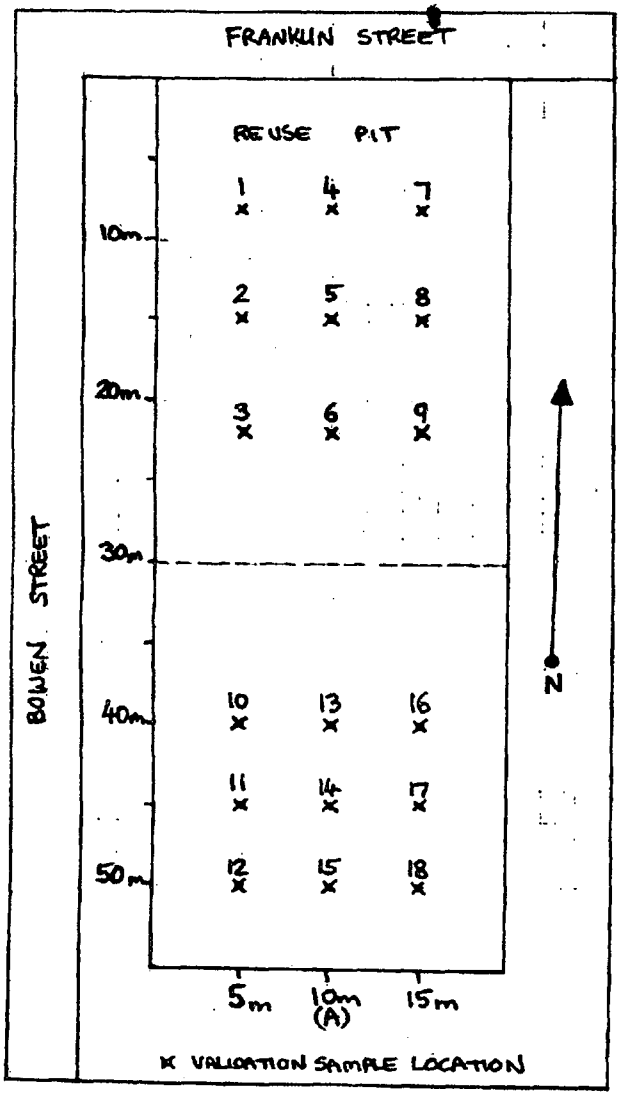
J:\05\AAA_05_002\02\BS0002.doc

FIGURE 6
EXCAVATION VALIDATION SAMPLING LOCATIONS

Project:	Bus Station Redevelopment	Project No:	AAA 05 002 02
Principal:	Adelaide City Council	Date:	27/06/2006
Contractor:	P.D Excavations	Plan No.	**BS0001**
Description:	Validation Locations in Reuse Pit		

Tierra Environment Pty Ltd
ABN: 84 111 615 680

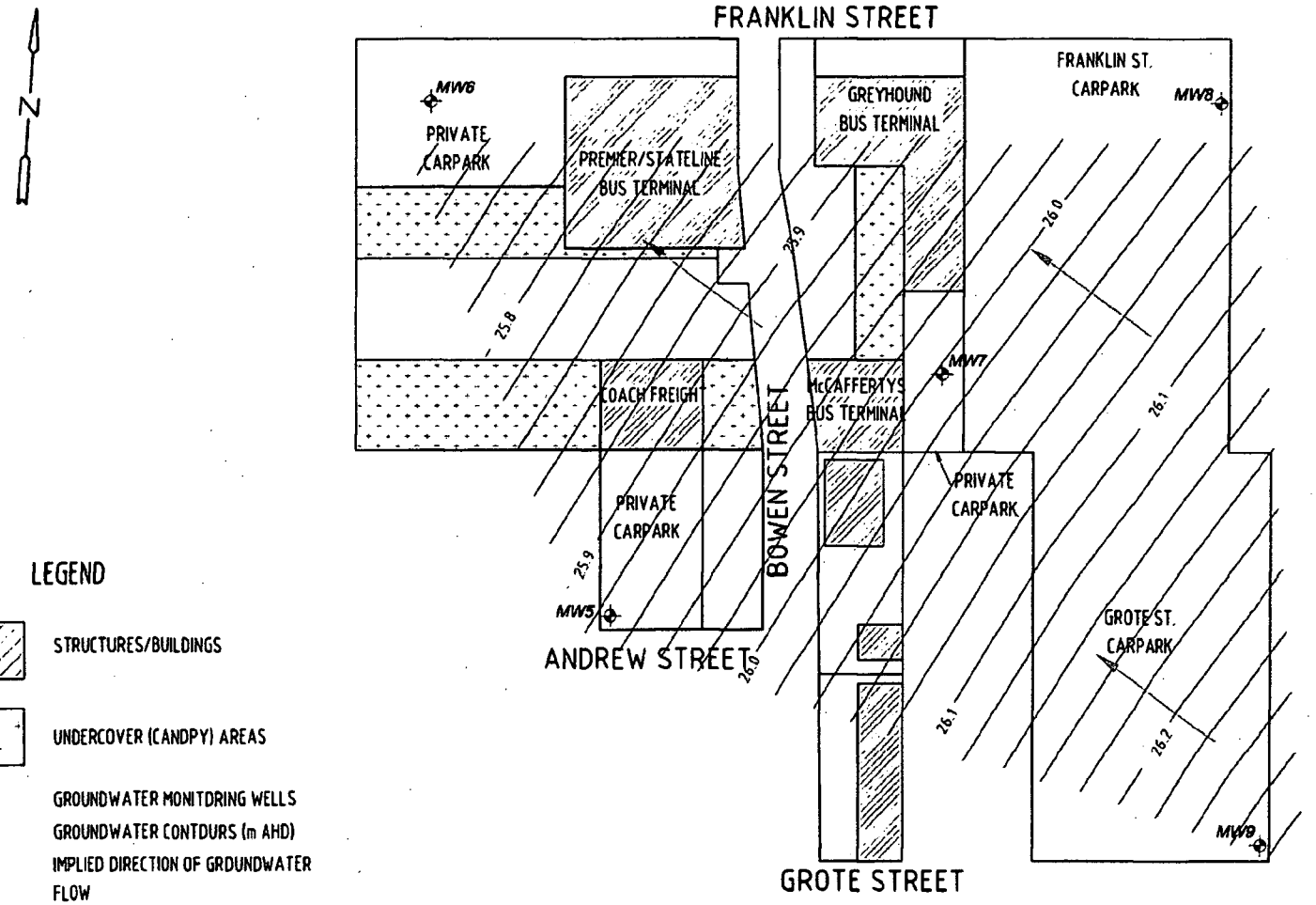
71 Belair Road,
Kingswood SA 5062
T: 08 8373 2512
F: 08 8373 2515
general@tierra.com.au



J:\05\AAA_05_002\02\BS0001.doc

FIGURE 7
VALIDATION OF RE-USE PITS

maunsell



LEGEND

- STRUCTURES/BUILDINGS
- UNDERCOVER (CANOPY) AREAS
- MW1 — GROUNDWATER MONITORING WELLS
- 25.9 — GROUNDWATER CONTOURS (m AHD)
- IMPLIED DIRECTION OF GROUNDWATER FLOW

NOTES

1. STRUCTURES AND SITE LAYOUT WERE OBTAINED FROM Rust PPK's "Environmental Site Assessment" 1997 AND SHOULD BE CONSIDERED APPROXIMATE.
2. GROUNDWATER CONTOURS BASED ON LEVELS OBTAINED ON 6th OCTOBER 2004.

FIGURE 8

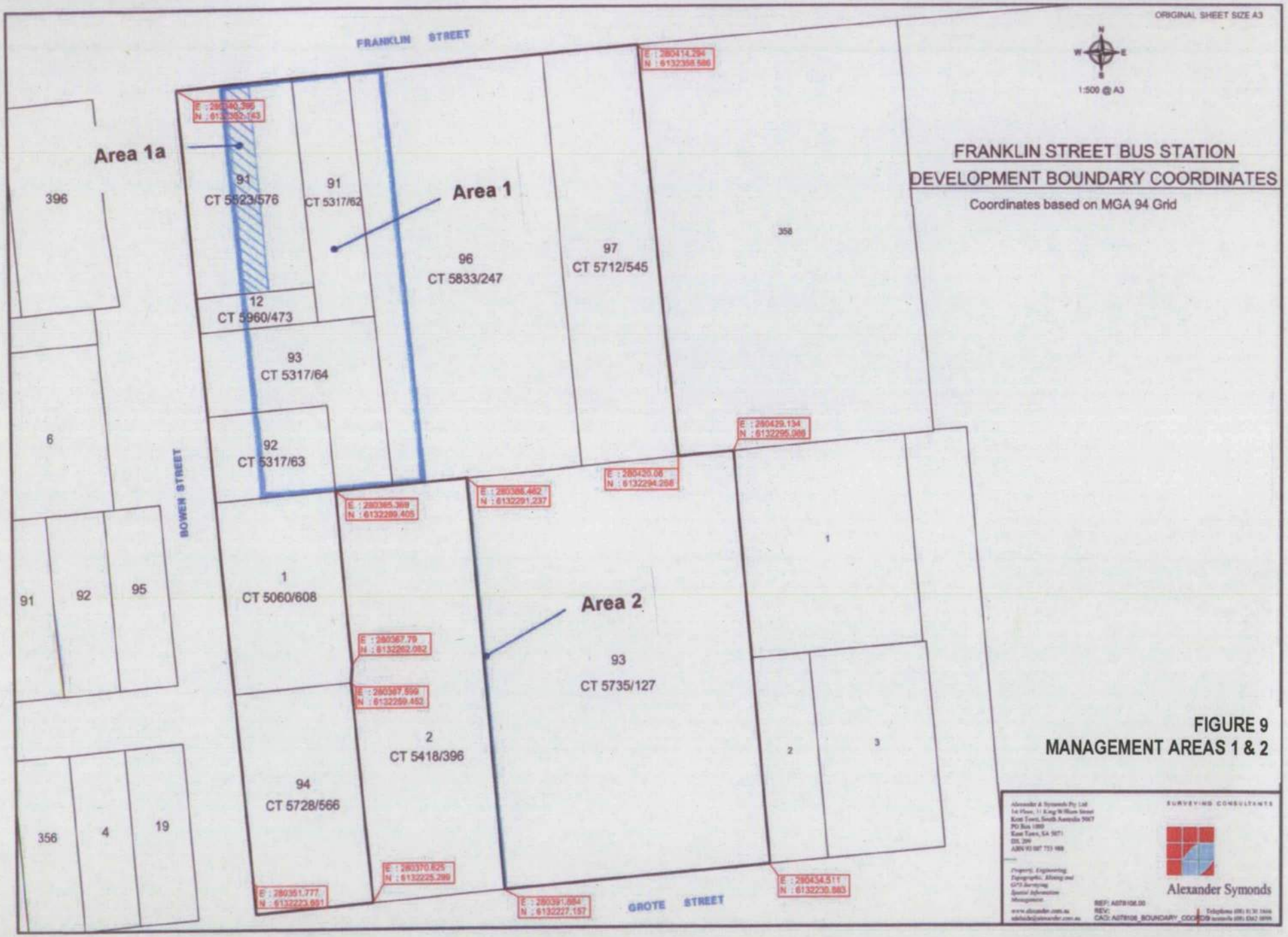
CENTRAL WEST PRECINCT
FRANKLIN STREET BUS STATION
GROUNDWATER MONITORING WELL LOCATIONS AND GROUNDWATER CONTOURS

CENTRAL WEST PRECINCT
FRANKLIN STREET BUS STATION
40032004.01.dwg

APPROXIMATE SCALE 0 7.5 15 22.5 30 37.5m

Revision: A
Date: September 2004

28/10/2004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N
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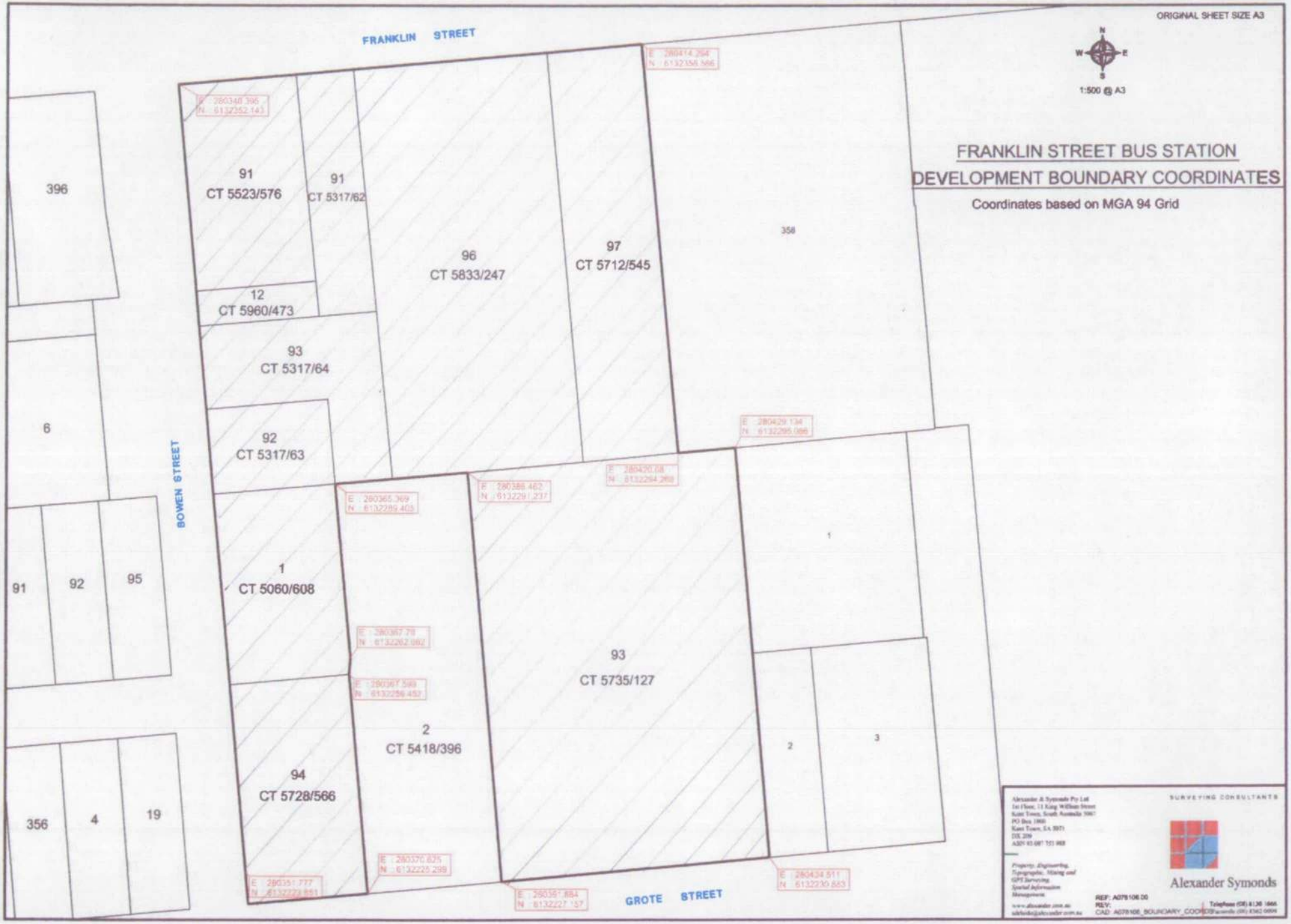
E
S
1:500 @ A3
FRANKLIN STREET BUS STATION
DEVELOPMENT BOUNDARY COORDINATES
Coordinates based on MGA 94 Grid
FRANKLIN STREET
BOWEN STREET
GROTE STREET
Area 1a
Area 1
Area 2
396
91
CT 5923/576
91
CT 5317/62
96
CT 5833/247
97
CT 5712/545
358
12
CT 5960/473
93
CT 5317/64
92
CT 5317/63
6
91
92
95
1
CT 5060/608
2
CT 5418/396
94
CT 5728/566
93
CT 5735/127
1
2
3
356
4
19
E : 280340.399
N : 6132352.163
E : 280414.294
N : 6132358.586
E : 280429.134
N : 6132295.006
E : 280420.08
N : 6132294.256
E : 280386.462
N : 6132291.237
E : 280365.369
N : 6132299.405
E : 280367.79
N : 6132262.082
E : 280367.599
N : 6132259.452
E : 280370.825
N : 6132225.299
E : 280351.777
N : 6132223.691
E : 280391.884
N : 6132227.157
E : 280434.511
N : 6132230.983
FIGURE 9
MANAGEMENT AREAS 1 & 2
SURVEYING CONSULTANTS
Alexander Symonds
REF: A078106.00
REV:
CAD: A078106_BOUNDARY_COORDS

APPENDIX A

CERTIFICATES OF TITLE/DEVELOPMENT PLAN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1:500 @ A3
FRANKLIN STREET BUS STATION
DEVELOPMENT BOUNDARY COORDINATES
Coordinates based on MGA 94 Grid
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BOWEN STREET
GROTE STREET
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CT 5728/566
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CT 5735/127
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356
4
19
SURVEYING CONSULTANTS
Alexander Symonds
REF: A078106.00
REV:
CAD: A078106_BOUNDARY_COORDS

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5523 FOLIO 576 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 5317/65
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : RT 8246071
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 15/04/1998
SEARCHED ON : 04/12/2006 AT : 15:13:24	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 91 FILED PLAN 170401
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

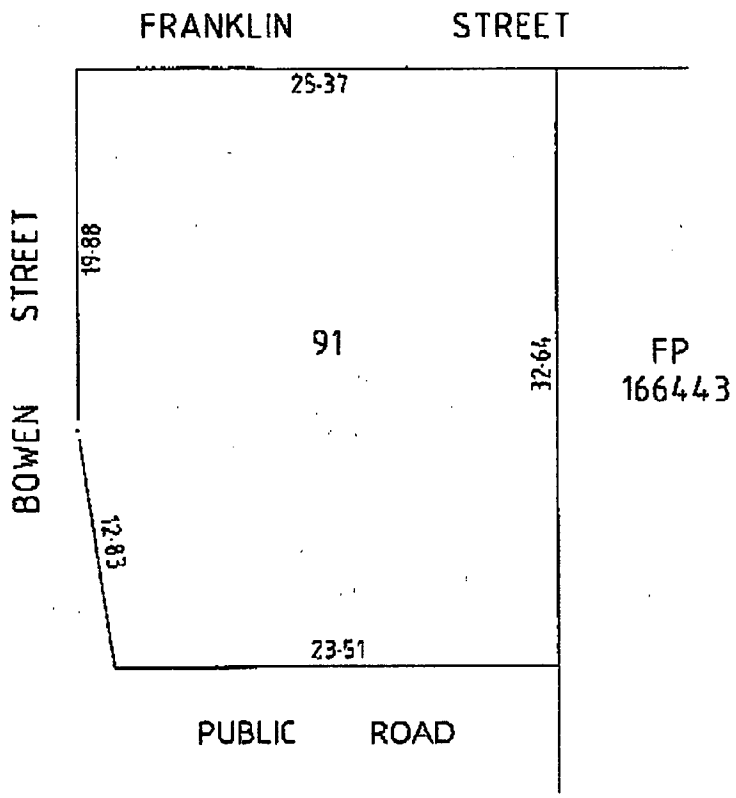
REGISTRAR-GENERAL'S NOTES

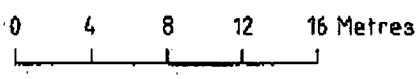
PLAN FOR LEASE PURPOSES GP 521/95
WITH NEXT DEALING LODGE CT 5317/65
THIS TITLE ISSUED VIDE 8246071
AMENDMENT TO DIAGRAM VIDE 10378611

END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5523 FOLIO 576

SEARCH DATE : 04/12/2006 TIME: 15:13:24





CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886

South Australia

VOLUME 5317 FOLIO 62

Edition 2

Date Of Issue 05/01/1996

Authority CD 6987000

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL

WARNING: BEFORE DEALING WITH THIS LAND, SEARCH THE CURRENT CERTIFICATE

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 91 FILED PLAN 166443
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

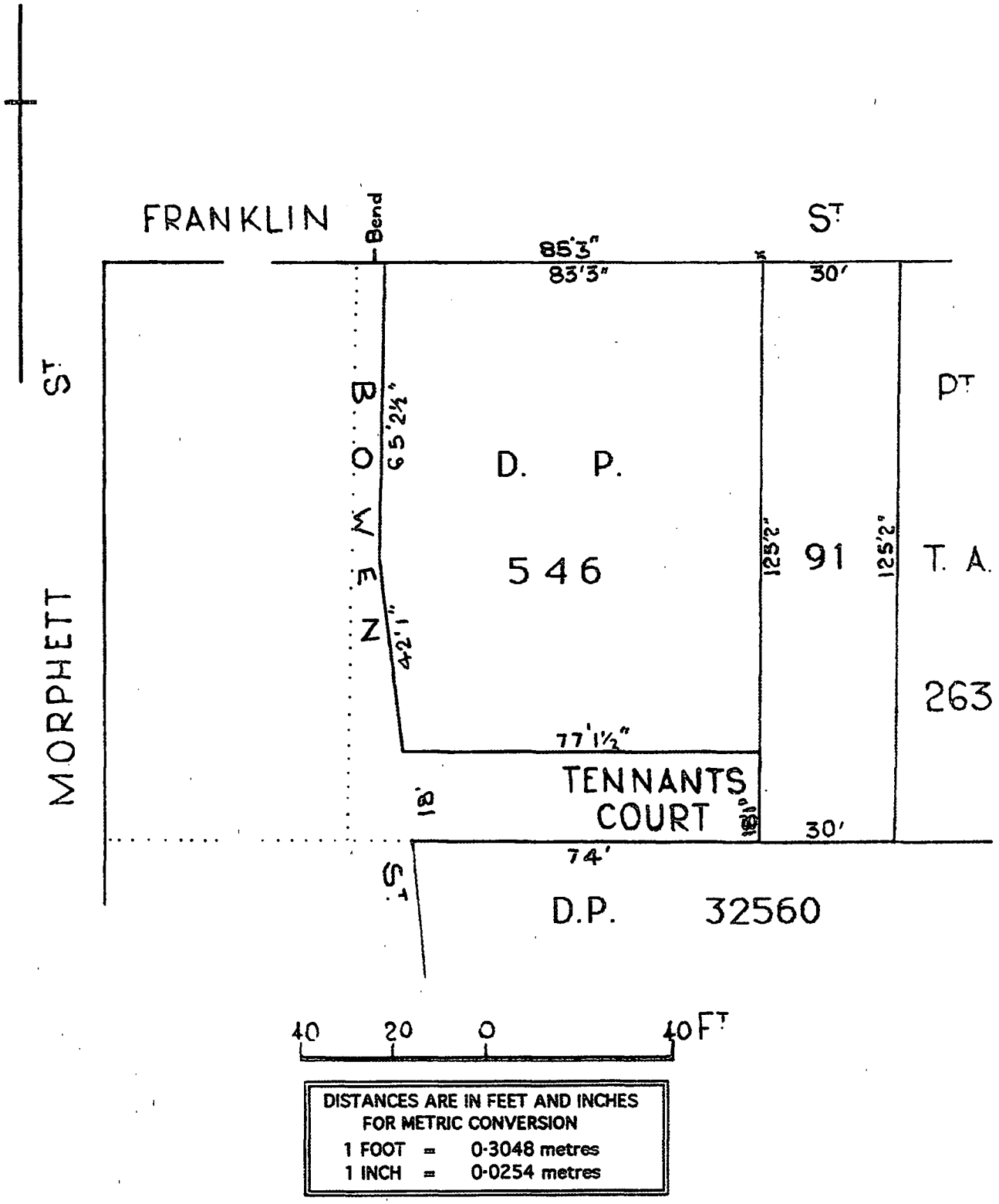
EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001

End of Text.



DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION		
1 FOOT	=	0·3048 metres
1 INCH	=	0·0254 metres

Note : Subject to all lawfully existing plans of division

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5960 FOLIO 473 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 5317/61
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : N 10378611
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 21/03/2006
SEARCHED ON : 04/12/2006 AT : 15:13:26	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND (ROAD)

ALLOTMENT 12 DEPOSITED PLAN 546
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

BEING A PUBLIC ROAD

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

NIL

END OF TEXT.

CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886

South Australia

VOLUME 5317 FOLIO 64

Edition 2

Date Of Issue 05/01/1996

Authority CD 6987000

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL

REGISTRAR-GENERAL SOUTH AUSTRALIA

WARNING: BEFORE DEALING WITH THIS LAND, SEARCH THE CURRENT CERTIFICATE

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 93 FILED PLAN 166445
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

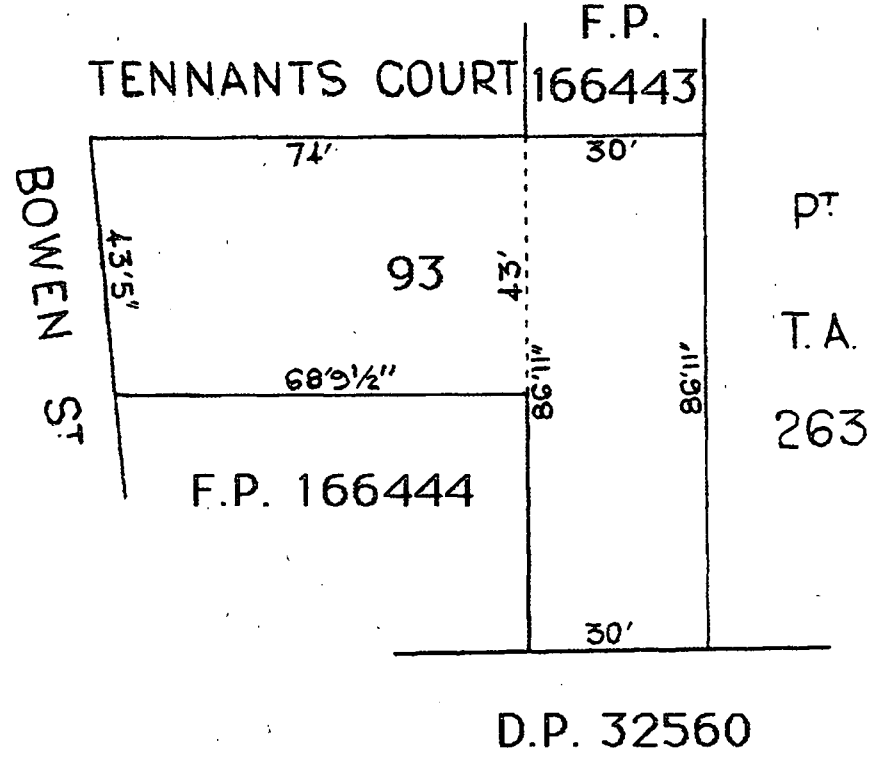
EASEMENTS

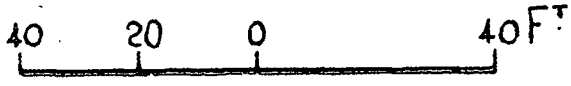
NIL

SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001

End of Text.





DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION		
1 FOOT	=	0·3048 metres
1 INCH	=	0·0254 metres

Note : Subject to all lawfully existing plans of division

CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886

South Australia

VOLUME 5317 FOLIO 63

Edition 2

Date Of Issue 05/01/1996

Authority CD 6987000

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL

REGISTRAR-GENERAL SOUTH AUSTRALIA

WARNING: BEFORE DEALING WITH THIS LAND, SEARCH THE CURRENT CERTIFICATE

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 92 FILED PLAN 166444
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

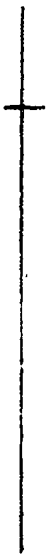
NIL

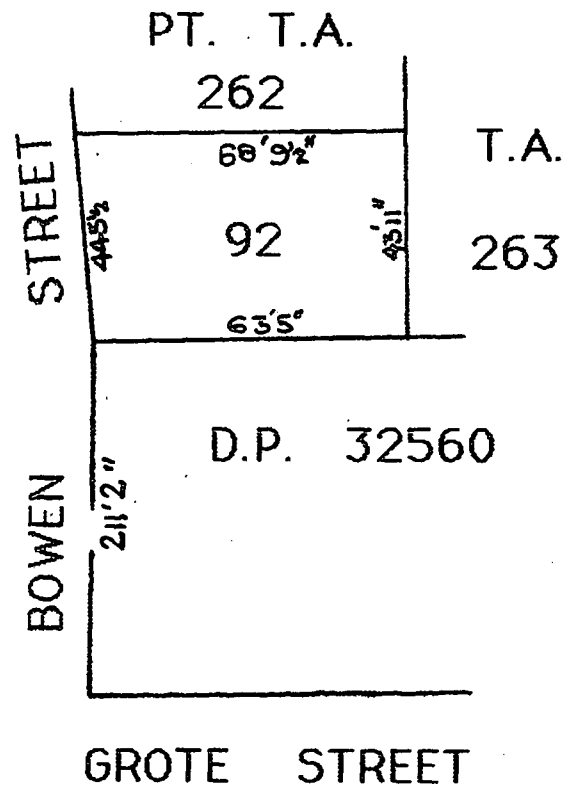
SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001

End of Text.

This plan is scanned for Certificate of Title 161/121





DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION		
1 FOOT	=	0·3048 metres
1 INCH	=	0·0254 metres

Note : Subject to all lawfully existing plans of division

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5060 FOLIO 608 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 4391/861
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : CONVERTED TITLE
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 20/01/1992
SEARCHED ON : 04/12/2006 AT : 15:13:29	EDITION : 2

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF TOWN HALL ADELAIDE SA 5000

DESCRIPTION OF LAND

ALLOTMENT 1 DEPOSITED PLAN 32560
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

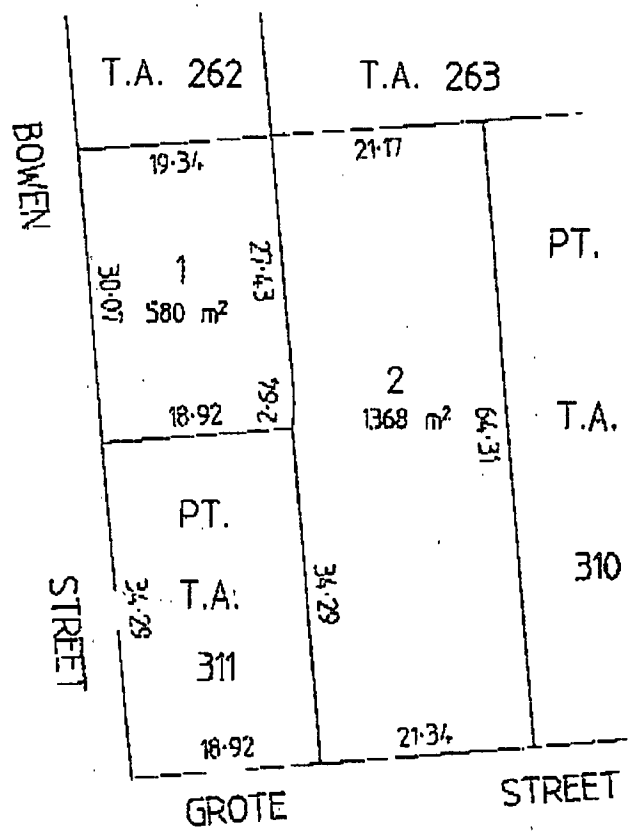
REGISTRAR-GENERAL'S NOTES

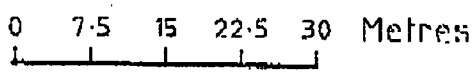
NIL

END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5060 FOLIO 608

SEARCH DATE : 04/12/2006 TIME: 15:13:29





LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5728 FOLIO 566 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 1751/37
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : CONVERTED TITLE
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 27/01/2000
SEARCHED ON : 04/12/2006 AT : 15:13:32	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 94 FILED PLAN 199651
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

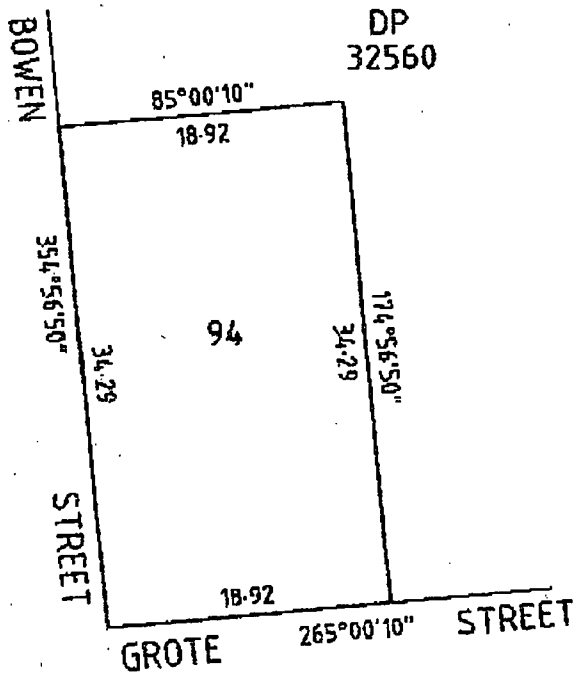
APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788
CONVERTED TITLE WITH NEXT DEALING LODGE CT 1751/37

END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5728 FOLIO 566

SEARCH DATE : 04/12/2006 TIME: 15:13:32

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1751/37



0 5 10 15 20 Metres

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5833 FOLIO 247 *

COST	: $16.10 (GST exempt)	PARENT TITLE	: CT 226 /124
REGION	: GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY	: CONVERTED TITLE
AGENT	: GRFL BOX NO : 000	DATE OF ISSUE	: 11/01/2001
SEARCHED ON	: 04/12/2006 AT : 15:13:38	EDITION	: 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 96 FILED PLAN 199653
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

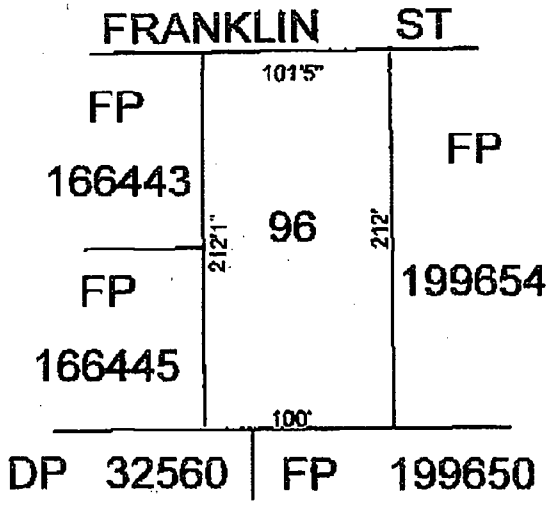
APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788
CONVERTED TITLE-WITH NEXT DEALING LODGE CT 226/124

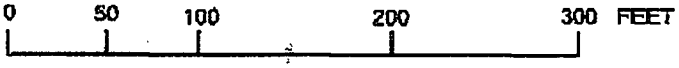
END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5833 FOLIO 247

SEARCH DATE : 04/12/2006 TIME: 15:13:38

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 226/124





DISTANCES ARE IN FEET FOR METRIC CONVERSION		
1 FOOT	=	0·3048 METRES
1 INCH	=	0·0254 METRES

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5712 FOLIO 545 *

COST : $16.10 (GST exempt)	PARENT TITLE : CT 1922/48
REGION : GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY : CONVERTED TITLE
AGENT : GRFL BOX NO : 000	DATE OF ISSUE : 22/11/1999
SEARCHED ON : 04/12/2006 AT : 15:13:44	EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 97 FILED PLAN 199654
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

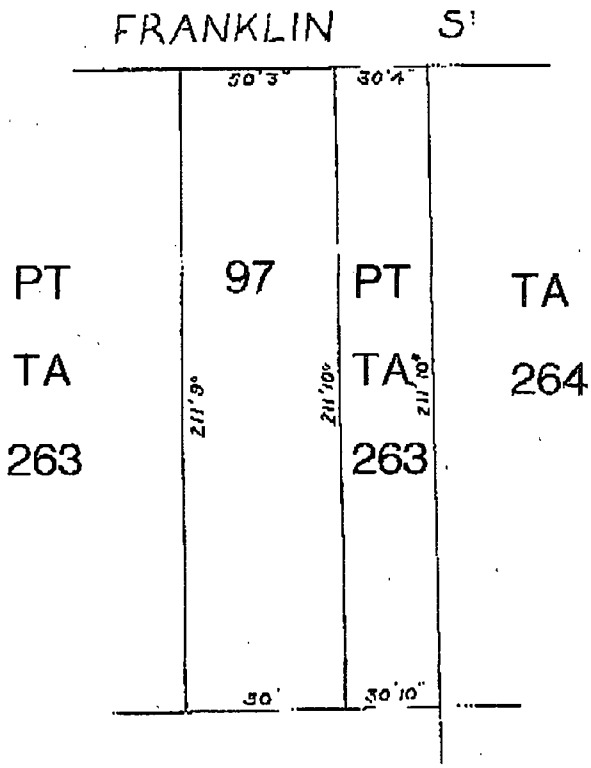
APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788
CONVERTED TITLE-WITH NEXT DEALING LODGE CT 1922/48

END OF TEXT.

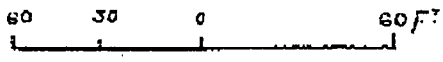
DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5712 FOLIO 545

SEARCH DATE : 04/12/2006 TIME: 15:13:44

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1922/48



TA 310



DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION	
1 FOOT	= 0·3048 METRES
1 INCH	= 0·0254 METRES

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5735 FOLIO 127 *

COST	: $16.10 (GST exempt)	PARENT TITLE	: CT 1639/119
REGION	: GROUND FLOOR, L.T.O. - LGHP12	AUTHORITY	: CONVERTED TITLE
AGENT	: GRFL BOX NO : 000	DATE OF ISSUE	: 17/02/2000
SEARCHED ON	: 04/12/2006 AT : 15:13:48	EDITION	: 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 93 FILED PLAN 199650
IN THE AREA NAMED ADELAIDE
HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

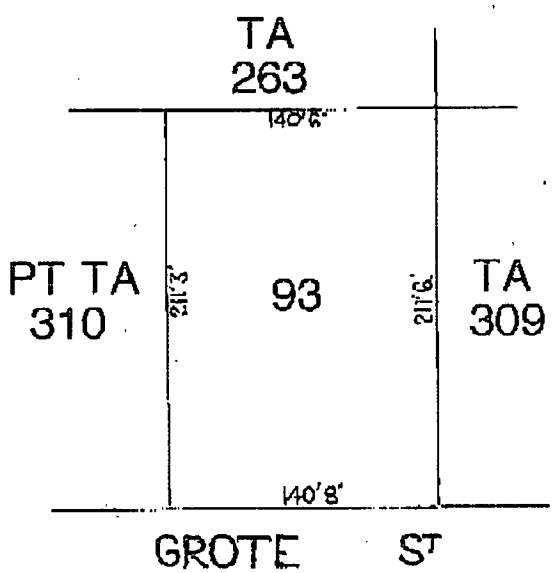
APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788
CONVERTED TITLE-WITH NEXT DEALING LODGE CT 1639/119

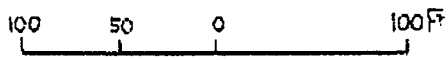
END OF TEXT.

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5735 FOLIO 127

SEARCH DATE : 04/12/2006 TIME: 15:13:48

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1639/119





DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION
1 FOOT = 0·3048 METRES
1 INCH = 0·0254 METRES

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

APPENDICES B – G (ON CD)

APPENDIX B – BC TONKIN AUDIT REPORT (JULY 1997)
INCLUDING RUST PPK SITE HISTORY REPORT (MARCH 1997) & RUST PPK ESA (JULY 1997)
APPENDIX C – MAUNSELL SOIL & GROUNDWATER INVESTIGATION (NOVEMBER 2004)
APPENDIX D – TIERRA ADDITIONAL INVESTIGATIONS (JULY 2005)
APPENDIX E – TIERRA REMEDIATION REPORT (SEPTEMBER 2006)
APPENDIX F - GROUNDWATER DATABASE SEARCH RESULTS
APPENDIX G – TIERRA SITE MANAGEMENT PLAN (NOVEMBER 2006)

COPY

Communications Document

PROJECT	Notification of Request to Prepare a Site Audit Report 85 – 129 Franklin Street, Adelaide (Bus Station Site)
JOB NO	2004.0421 DATE 24/06/04 TIME 11:28
SENDER	Mr Andrew Nunn
TO	EPA
ATTENTION	Mr Mike Fanning / Ms Wendy Boyce
ADDRESS	
FACSIMILE NO	8204 2025 PAGES 2
CC	

☐ MEMO ☐ DOCUMENT TRANSMITTAL

THESE MATTERS FOR YOUR ☐ COMMENTS ☐ ACTION ☐ INFORMATION ☒ APPROVAL

☐ HAND DELIVERY ☐ POST ☐ COURIER ☒ FACSIMILE ☐ COLLECTION

Dear Mike / Wendy,

I, Andrew Nunn, a person appointed as an Environmental Auditor (Contaminated Land) by the Environmental Protection Authority under Section 53 of the *Environmental Protection Act 1970 (Vic)*, have been requested to prepare a Site Audit Report for the above site. Details are as follows;

Person requesting Site Audit Report:	Adelaide City Council
Relationship to site:	Owner
Date of request:	8th June 2004
Site address:	85 – 129 Franklin Street, Adelaide
Municipality:	Adelaide City Council
Title details:	See table attached (Page 2)
Site plan attached:	No – Will Follow Shortly
Estimated completion date:	30th June 2009

In notifying EPA of this request, I state that I am not aware of any conflict of interest, and I have not had prior involvement in assessment or clean-up works at the site, which would preclude me from preparing a Site Audit Report for the site.

TRANSMIT NO	SENT BY	DATE	TIME

T & R NOMINEES PTY LTD ACN 007 006 600 AS TRUSTEE FOR T & R UNIT TRUST ADN 69 630 962 861 TRADING AS TONKIN CONSULTING AND JONES TONKIN
MEMBERS OF THE ASSOCIATION OF CONSULTING ENGINEERS AUSTRALIA

ADELAIDE
TONKIN CONSULTING
5 COOKE TERRACE
WAYVILLE SA 5034
T +61 8 8273 3100
F +61 8 8273 3110
E adelaide@tonkin.com.au

MOUNT GAMBIER
JONES TONKIN
1 KRUMMEL STREET
MOUNT GAMBIER SA 5290
PO BOX 1192
MOUNT GAMBIER SA 5291
T +61 8 8723 5002
F +61 8 8723 5004
E mtgambier@tonkin.com.au

I wish to note that I have discussed with Mike Fanning of SA EPA (17 June 2004) the reasons for the delay in formal notification of my engagement to undertake an audit.

Should you have any queries, please do not hesitate to contact me on 8431 7113.

Yours sincerely,

Andrew Nunn
Environmental Auditor (Contaminated Land)

Certificate of Title	Land Title Details	Site Area (approx m2)
Eastern Site of Bowen Street		
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.6
1751/37	Town Acre 311	648.8
1922/48	Town Acre 263	986.26
5060/608	A 1 DP 32560	580.00
5317/61	A 12 DP 546	149.6
5317/62	A 91 FP 166443	348.69
5317/63	A 92 FP166444	271.50
5317/64	A 93 FP 166445	526.90
5317/65	A 91 FP 170401	816.37
Western Side of Bowen Street		
2023/96	Town Acre 311	260.67
2128/45	Town Acre 311	257.80
2201/187	Town Acre 311	259.70
3479/180	Town Acres 261 & 262	1744.00
3582/78	Town Acre 261	509.7
3582/79	Town Acre 262	490.04
3582/80	Town Acres 261 & 262	1122.90
3841/122	LTRO Plan 546	340.6

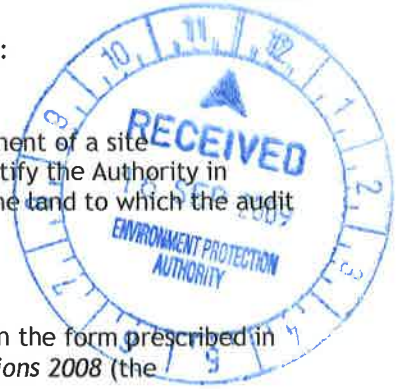
Received 8/09/09
DM.

85 – 107 FRANKLIN STREET, ADELAIDE – FORMER BUS STATION SITE

Name Of Auditor	Andrew Nunn
Name of Auditor's Company or Business	Soil and Groundwater Consulting
EPA Reference	14295
Name of Audit Site	Former Franklin Street Bus Station site
Address of Audit Site	85-107 Franklin Street, Adelaide
Name, Business Address and Position of Person who Terminated the Audit:	Mr Andrew Nunn Environmental Auditor 207 The Parade, Norwood
Certificates of Title	**Stage 1** – Site Audit Review was completed for this site in October 2006 **Stage 2 Certificate of Titles** Volume 5557 Folio 418, FP 181238 Allotment 396 Volume 5557 Folio 419, DP 546 Allotment 3 Volume 5810 Folio 890, DP 546 Allotment 5 Volume 5557 Folio 419, DP 546 Allotment 2 Volume 5810 Folio 890, DP 546 Allotment 6 Volume 5557 Folio 420, DP 546 Allotment 1 Volume 5704 Folio 698, FP 199648 Allotment 91 Volume 5692 Folio 9, FP 199649 Allotment 92 Volume 5688 Folio 796, FP 199652 Allotment 95 Volume 5843 Folio 256, RP 6347, Allotment A
Authority of Person who Terminated the Audit	Auditor
Date Audit Terminated	30 June 2009
Reasons for Termination	In accordance with the requirements of the *Environment Protection (Site Contamination) Regulations 2008*, this audit which was commenced under the Victorian Audit system is being terminated to facilitate transfer of the Audit to the SA Audit system on 1st July 2009.

SITE CONTAMINATION AUDIT SYSTEM
NOTIFICATION BY AUDITOR AFTER COMMENCEMENT OF AUDIT

EPA South Australia



INSTRUCTIONS

Section 103Z(1) of the *Environment Protection Act 1993* (the Act), requires that:

103Z—Requirements relating to site contamination audits

(1) A site contamination auditor must, within 14 days after the commencement of a site contamination audit for which the auditor is the responsible auditor, notify the Authority in writing of the person who commissioned the audit and the location of the land to which the audit is to relate.

Penalty: Division 5 fine.

As required under section 103Z(3), a notification under subsection (1) must be in the form prescribed in Schedule 4, Part 1 of the *Environment Protection (Site Contamination) Regulations 2008* (the Regulations).

The form, *Notification by auditor after commencement of audit*, must be completed by the 'responsible auditor' under the Act and the Regulations. This is the auditor who personally carried out or directly supervised the work involved in the audit.

Please ensure that all sections of the form are completed, requested information and attachments (where necessary) are provided and labelled as indicated.

Please do not modify the form and do not write within the areas for EPA USE ONLY.

Commencement of audit forms must be sent to:

Manager, Site Contamination Branch
Environment Protection Authority
GPO Box 2607
Adelaide SA 5001

For any enquiries or questions relating to the site contamination audit system, contact the EPA Site Contamination Branch on:

Telephone: (08) 8204 2004

Email: <epainfo@epa.sa.gov.au>

16 9 2009
05/9/4295
05/13314
DANELLE MERCORELLA

EPA GENI Reference

6017

(EPA use only)

NOTIFICATION BY AUDITOR AFTER COMMENCEMENT OF AUDIT
(under section 103Z of the *Environment Protection Act 1993*)

SECTION A: AUDITOR DETAILS	
Name of auditor*: ** This form must be completed by the 'responsible auditor' under the Act and Regulations. This is the auditor who personally carried out or directly supervised the work involved in the audit.*	**Andrew Nunn**
Auditor's accreditation number:	**2009019**
Term of auditor's accreditation:	**1 July 2009 to 1 July 2012**
Name of auditor's company or business:	**Soil and Groundwater Consulting**
Auditor's project reference:	**SG041157**
SECTION B: AUDIT SITE DETAILS	
Name of audit site [*if applicable*]:	**Franklin Street Bus Station Stage 2**
Address of audit site:	**Franklin Street, Adelaide**
Name of council for area in which audit site is situated [*if within council area*]:	**Adelaide City Council**
Provide the following particulars** relating to the relevant land and the audit site: *** If insufficient space, details may be annexed to this form*	
- certificates of title of all the relevant land and an indication of whether the audit site comprises all or part only of the land shown on or described in the certificates of title	**Stage 2 Certificate of Titles** Volume 5557 Folio 418, FP 181238 Allotment 396 Volume 5557 Folio 419, DP 546 Allotment 3 Volume 5810 Folio 890, DP 546 Allotment 5 Volume 5557 Folio 419, DP 546 Allotment 2 Volume 5810 Folio 890, DP 546 Allotment 6 Volume 5557 Folio 420, DP 546 Allotment 1 Volume 5704 Folio 698, FP 199648 Allotment 91 Volume 5692 Folio 9, FP 199649 Allotment 92 Volume 5688 Folio 796, FP 199652 Allotment 95 Volume 5843 Folio 256, RP 6347, Allotment A
- sufficient details to identify the location of the land, including section or allotment numbers, area and hundred and AMG co-ordinates (GDA 94, UTM 53 and 54)	**E: 280312.38, N: 6132331.32**
- audit plans indicating the location and extent of the audit site (which must comply with the guidelines issued by the EPA from time to time)	**Please refer to attached plan.**
Name of owner of audit site:	**Corporation of The City of Adelaide**
Name of occupier of audit site:	**Partially occupied by various commercial uses**

SECTION C: AUDIT DETAILS	
Name, business address and position of person who commissioned audit:	**Alan Faunt, Consultant, Adelaide City Council, 25 Pirie Street, ADELAIDE, SA, 5000**
Indicate authority of person who commissioned audit:	EPA Yes ☐ No ☒ Owner Yes ☒ No ☐ Occupier Yes ☐ No ☒ Developer Yes ☐ No ☒ Other [*please specify*]
Indicate reasons for audit [*indicate all reasons*]:	Required under the Development Act 1993 Yes ☒ No ☐ Required under the Environment Protection Act 1993 Yes ☐ No ☒ Other [*please specify*]
If audit is required under the *Environment Protection Act 1993*, provide EPA reference number:	**N/A**
Indicate audit purposes [*indicate all purposes*]:	Determining the nature and extent of any site contamination present or remaining on or below the surface of the site. Yes ☒ No ☐ Determining the suitability of the site for a sensitive use or another use or range of uses. Yes ☒ No ☐ Determining what remediation is or remains necessary for a specified use or range of uses. Yes ☒ No ☐ [*NB: an audit under the Development Act 1993 may be required for all of the above purposes.*]
Date of commencement of audit:	**1st July 2009**
Estimated date of completion of audit:	**31st December 2010**

If this audit is one of a series of audits to be undertaken in relation to the audit site, indicate the total number of audits proposed to be undertaken (if known) and the completion or estimated completion dates for those audits (if known)**:

** *If insufficient space, details may be annexed to this form.*

1
2
3
4

Indicate:

Proposed site use:	**Residential**
Current site use, or, if currently unoccupied, most recent site use:	**Former Bus Station**

Notification by auditor after commencement of audit

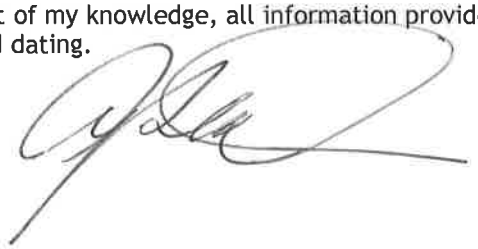
If audit is required for development consent under the *Development Act 1993* indicate:

relevant planning authority:	**Development Assessment Commission**
development application number [if known]:	**N/A**
site zoning:	**Mixed Use Zone**

DECLARATION

I am not aware of any conflict of interest within the meaning of section 103X of the *Environment Protection Act 1993* that would preclude me from undertaking this audit.

To the best of my knowledge, all information provided in this form is current and correct at the time of signing and dating.

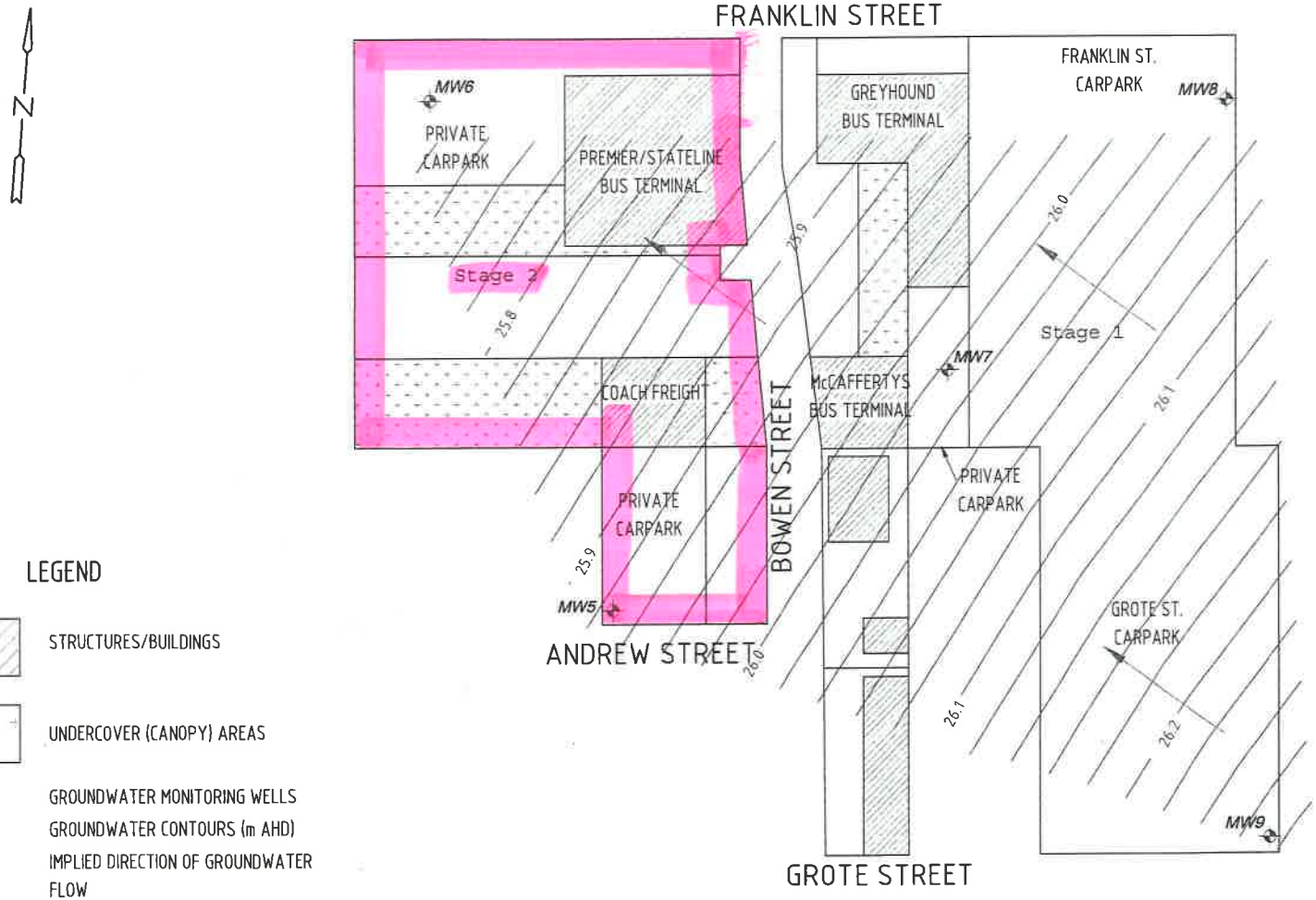
Signed:  [*auditor must personally sign the form*]

Dated: 15 September 2009.

This notification must be lodged with the EPA.

Details of this notification will be recorded in the public register kept by the EPA under section 109 of the Environment Protection Act 1993.

maunsell



LEGEND

- STRUCTURES/BUILDINGS
- UNDERCOVER (CANOPY) AREAS
- MW1 — GROUNDWATER MONITORING WELLS
- 25.9 — GROUNDWATER CONTOURS (m AHD)
- IMPLIED DIRECTION OF GROUNDWATER FLOW

NOTES

1. STRUCTURES AND SITE LAYOUT WERE OBTAINED FROM Rust PPK's "Environmental Site Assessment" 1997 AND SHOULD BE CONSIDERED APPROXIMATE.
2. GROUNDWATER CONTOURS BASED ON LEVELS OBTAINED ON 6th OCTOBER 2004.

28/10/2004

FIGURE No. 2

CENTRAL WEST PRECINCT
FRANKLIN STREET BUS STATION
GROUNDWATER MONITORING WELL LOCATIONS AND GROUNDWATER CONTOURS

CENTRAL WEST PRECINCT
FRANKLIN STREET BUS STATION
40032004.01.dwg

APPROXIMATE SCALE 0 7.5 15 22.5 30 37.5m

Revision: A
Date: September 2004

SITE CONTAMINATION AUDIT SYSTEM
NOTIFICATION BY AUDITOR AFTER TERMINATION (BEFORE COMPLETION) OF AUDIT

EPA
South Australia

INSTRUCTIONS

Section 103Z(2) of the *Environment Protection Act 1993* (the Act), requires that:

103Z—Requirements relating to site contamination audits

(2) A site contamination auditor must, within 14 days after the termination before completion of a site contamination audit for which the auditor was the responsible auditor, notify the Authority in writing of the termination and the reasons for the termination.

Penalty: Division 5 fine.

Regulation 66 of the *Environment Protection Regulations 2009* (the Regulations) requires that:

66—Notifications by auditors after commencement or termination of audit (section 103Z(3))

For the purposes of section 103Z(3) of the Act-

(b) a notification by a site contamination auditor of the termination before completion of a site contamination audit for which the auditor is or was the responsible auditor must be in the form set out in Schedule 3 clause 7.

The form, *Notification by auditor after termination (before completion) of audit*, must be completed by the 'responsible auditor' under the Act and the Regulations. This is the auditor who personally carried out or directly supervised the work involved in the audit.

Please ensure that all sections of the form are completed, requested information and attachments (where necessary) are provided and labelled as indicated.

Please provide the current Certificate of Title information relevant to the audit termination as an annexure to the form.

Please do not modify the form and do not write within the areas for EPA USE ONLY.

Termination of audit forms must be sent to:

Manager, Site Contamination Branch
Environment Protection Authority
GPO Box 2607
Adelaide SA 5001

Forms can also be emailed in pdf format to the Manager and your allocated EPA coordinator.

For any enquiries or questions relating to the site contamination audit system, contact the EPA Site Contamination Branch on:

Telephone: (08) 8204 2004 Email: <*EPASiteContam@epa.sa.gov.au*>

Received:	30/4/12
No.	05/12/1613
	05/13314; 60117
	/ /
	WBoyce

E.P.A.
E71484

EPA GENI Reference

(EPA use only)

NOTIFICATION BY AUDITOR AFTER TERMINATION (BEFORE COMPLETION) OF AUDIT
(under section 103Z of the Environment Protection Act 1993)

SECTION A: AUDITOR DETAILS	
Name of auditor*:	Andrew Nunn
Auditor's accreditation number:	2009019
Name of auditor's company or business:	Soil and Groundwater Consulting
SECTION B: AUDIT SITE DETAILS	
EPA reference:	60117
Name of audit site *[if applicable]*:	Franklin Street Bus Station Stage 2
Address of audit site:	Franklin St, Adelaide
SECTION C: AUDIT TERMINATION DETAILS	
Name, postal address and position of person who terminated audit:	Alan Faunt, Consultant, Adelaide City Council, 25 Pirie Street, ADELAIDE, SA, 5000
Indicate authority of person who terminated audit:	EPA Yes ☐ No ☒ Owner Yes ☒ No ☐ Occupier Yes ☐ No ☒ Developer Yes ☐ No ☒ Auditor Yes ☐ No ☒ Other [*please specify*]
Date audit terminated:	30/04/2012
Reasons for termination**: ** *If insufficient space, details may be annexed to this form.*	Site Contamination Audit Report terminated as part of rationalization of audits by the Auditor and the surrender of his accreditation. Works have not progressed on Stage 2 and proponent will engage an auditor once the project is re-initiated.

DECLARATION

To the best of my knowledge, all information provided in this form is current and correct at the time of signing and dating.

Signed*:

Dated: 30/04/2012

* *This form must be completed and signed by the 'responsible auditor', being, under the Environment Protection Act 1993 and the Environment Protection Regulations 2009, the auditor who personally carried out or directly supervised the work involved in the audit.*

This notification must be lodged with the EPA.

Details of this notification will be recorded in the public register kept by the EPA under section 109 of the Environment Protection Act 1993.

NOTIFICATION BY AUDITOR AFTER TERMINATION (BEFORE COMPLETION) OF AUDIT

Attachment - Certificate of Title Details.

Certificate of Title	Land Title Details
5557/418	A396 FP 181238
5557/419	A 3 DP 546
5810/890	A 5 DP 546
~~5557/419~~	~~A 2 DP 546~~
~~5810/890~~	~~A 6 DR 546~~
5557/420	A 1 DP 546
5704/698	A 91 FP 199648
5692/9	A 92 FP 199649
5688/796	A 95 FP 199652
5843/256	A A RP 6347

Repeated

Repeated

Corporation of the City of Adelaide

FRANKLIN STREET BUS STATION AND CAR PARKS

SITE AUDIT REPORT

Report No. 97.0307/1 **31 July 1997**

BC TONKIN & ASSOCIATES
Consulting Engineers
55 Queen Street
ADELAIDE SA 5000

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Corporation of the City of Adelaide
Franklin Street Bus Station and Car Parks
Site Audit Report

CONTENTS

	Page
1. SUMMARY INFORMATION	1
2. INTRODUCTION	4
3. SUMMARY OF ENVIRONMENTAL SITE ASSESSMENT	6
3.1 Background Studies	6
3.1.1 Site Identification and Description	6
3.1.2 Site History	6
3.1.3 Geology and Hydrogeology	7
3.1.4 Potential Site Contamination Issues	7
3.2 Site Investigations	7
3.2.1 Soil Sampling	7
3.2.2 Soil Conditions Encountered	8
3.2.3 Laboratory Analysis Programme	8
3.2.4 Field Observations and Headspace Analysis	9
3.2.5 Assessment Criteria	9
3.2.6 Contamination Assessment Results	10
3.2.7 Quality Assurance/Quality Control (QA/QC)	10
3.2.8 Data Validation	10
3.2.9 Findings and Conclusions	11
3.2.10 Recommendations	12
4. AUDITOR REVIEW OF ENVIRONMENTAL SITE ASSESSMENT	14
4.1 General	14
4.2 Background Studies	14
4.3 Sampling Frequency	14
4.4 Laboratory Analysis Programme	15
4.5 Assessment Criteria	15
4.6 Quality Assurance/Quality Control (QA/QC)	16
4.7 Findings and Recommendations	17
5. CONCLUSIONS	18
6. REFERENCES	22

APPENDICES

A. Rust PPK Pty Ltd, 1997, *Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide,* for the Corporation of the City of Adelaide, 6 March 1997

B. Rust PPK Pty Ltd, 1997, *Environmental Site Assessment, Franklin Street Bus Station and Car Parks,* for the Corporation of the City of Adelaide, 30 June 1997

1. SUMMARY INFORMATION

This audit report has been prepared for the Franklin Street Bus Station and Car Parks, located at 85-129 Franklin Street, Adelaide (see Location Plan, Figure 1.1). The report has been prepared in accordance with guidelines provided in the South Australian Environment Protection Authority (EPA) Special Bulletin No. 1, 20 October 1995, *The Use of Environmental Auditors: Contaminated Land,* and the Victorian Environment Protection Authority (VicEPA) *Guidelines for Environmental Auditors Contaminated Land, Issue of Certificates of Environmental Audit,* WH 91/14, May 1992.

The Site Audit Report is based on site conditions at the time of issue of the report. The environmental auditor cannot be responsible for future activities on the site, or off site impacts, which may result in subsequent contamination of the site.

The purpose of the Site Audit Report is to present the auditor's opinion on the environmental condition of the site.

Summary information is set out as follows:

- **Name of auditor**

  Mr Adrian Hall of BC Tonkin & Associates

- **Date of appointment as an Accredited Environmental Auditor under the Environment Protection Authority Act, 1970, Victoria**

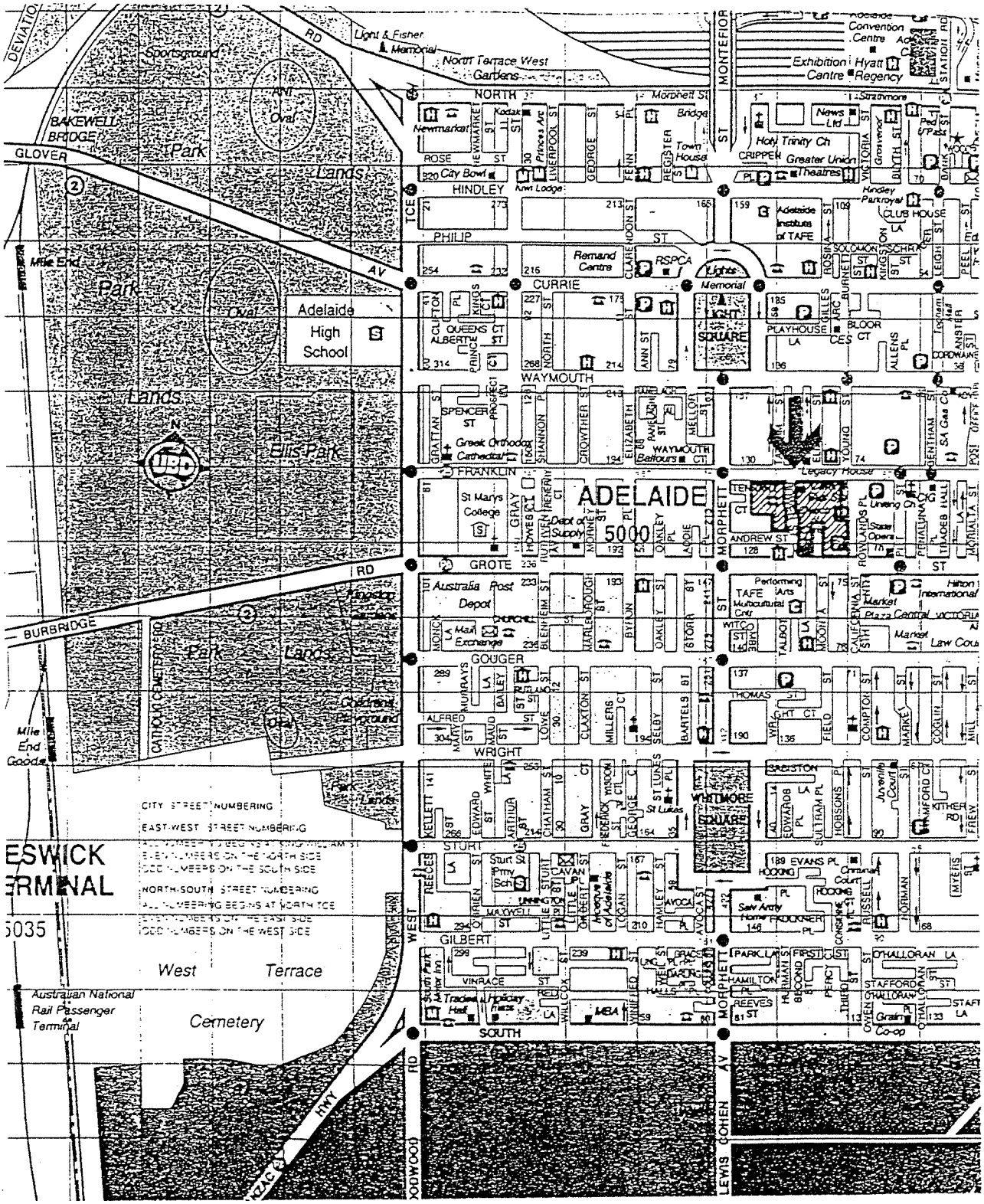
  7 January 1997

- **Name of person making a request for a Site Audit Report**

  Mr Brian Fitzpatrick, Corporation of the City of Adelaide

- **Address of the site being audited**

  85-129 Franklin Street, Adelaide



MAP COURTESY OF UNIVERSAL PRESS

Figure 1.1

CORPORATION OF THE CITY OF ADELAIDE

FRANKLIN STREET BUS STATION AND CARPARKS
SITE AUDIT REPORT
LOCATION PLAN

JOB No	97.0307
SCALE	N.T.S.
DRAWN	A.M.
CHECKED	A.M.D.H.
DATE	July 1997

B.C. TONKIN & ASSOCIATES
CONSULTING ENGINEERS
55 QUEEN STREET, ADELAIDE, 5000
TELEPHONE 223 5583, FAX 223 5237

A4

- **Lands Title Information**

Allotment details are as follows:

Eastern Side of Bowen Street

Certificate of Title	Part Town Acre/Plan No	Area (m^2)
Volume 226, Folio 124	Town Acre 263	1983.80
Volume 1639, Folio 119	Town Acre 310	2760.50
Volume 1663, Folio 99	Town Acre 309	83.60
Volume 1751, Folio 37	Town Acre 311	648.80
Volume 1922, Folio 48	Town Acre 263	986.26
Volume 5060, Folio 608	Allotment 1 in DP 32560	580.00
Volume 5317, Folio 61	Allotment 12 in DP 546	149.60
Volume 5317, Folio 62	Allotment 91 in FP 166443	348.69
Volume 5317, Folio 63	Allotment 92 in FP 166444	271.50
Volume 5317, Folio 64	Allotment 93 in FP 166445	526.90
Volume 5317, Folio 65	Allotment 91 in FP 170401	816.37
	TOTAL	**9156.02**

Western Side of Bowen Street

Certificate of Title	Part Town Acre/Plan No	Area (m^2)
Volume 2023, Folio 96	Town Acre 311	260.67
Volume 2128, Folio 45	Town Acre 311	257.80
Volume 2201, Folio 187	Town Acre 311	259.70
Volume 3479, Folio 180	Town Acres 261 & 262	1744.00
Volume 3582, Folio 78	Town Acre 261	509.70
Volume 3582, Folio 79	Town Acre 262	490.04
Volume 3582, Folio 80	Town Acres 261 & 262	1122.90
Volume 3841, Folio 122	LTRO Plan 546	340.60
	TOTAL	**4985.41**

- **Land Use Zoning**

The site is part of the F8 Franklin Street East Precinct

- **Names of current site owner and occupier**

The Corporation of the City of Adelaide

- **Documentation reviewed**

Rust PPK Pty Ltd, 1997, *Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide,* for the Corporation of the City of Adelaide, 6 March 1997

Rust PPK Pty Ltd, 1997, *Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide,* for the Corporation of the City of Adelaide, 30 June 1997

2. INTRODUCTION

Mr Adrian Hall of BC Tonkin & Associates has been appointed by the Corporation of the City of Adelaide to act as an environmental auditor for the Franklin Street Bus Station and Car Parks.

The site is described on the current Certificates of Titles as listed above. The current Certificates of Title show the site to be owned by the Corporation of the City of Adelaide.

The site contains the following features

Eastern Side of Bowen Street

- the Greyhound and McCafferty's Express bus terminals and canopy, on the north eastern side of Bowen Street (referred to collectively as 'Bus Depot 1')

- a single storey house, a private car park, a toilet block and a two storey building and adjacent car park, all utilised by the Adelaide Central Mission, on the eastern side of Bowen Street, in the south of the site (referred to collectively as '104 Grote Street')

- two bitumen sealed public car parks in the east of the site, owned and operated by the Corporation of the City of Adelaide (referred to as the Grote Street Car Park and the Franklin Street Car Park, respectively)

Western Side of Bowen Street

- the Premier Stateline bus terminal, canopy and private car park on the north west of the site (referred to collectively as 'Bus Depot 2')

- the Coachfreight parcel collection and drop off point, including storage shed, on the west of the site

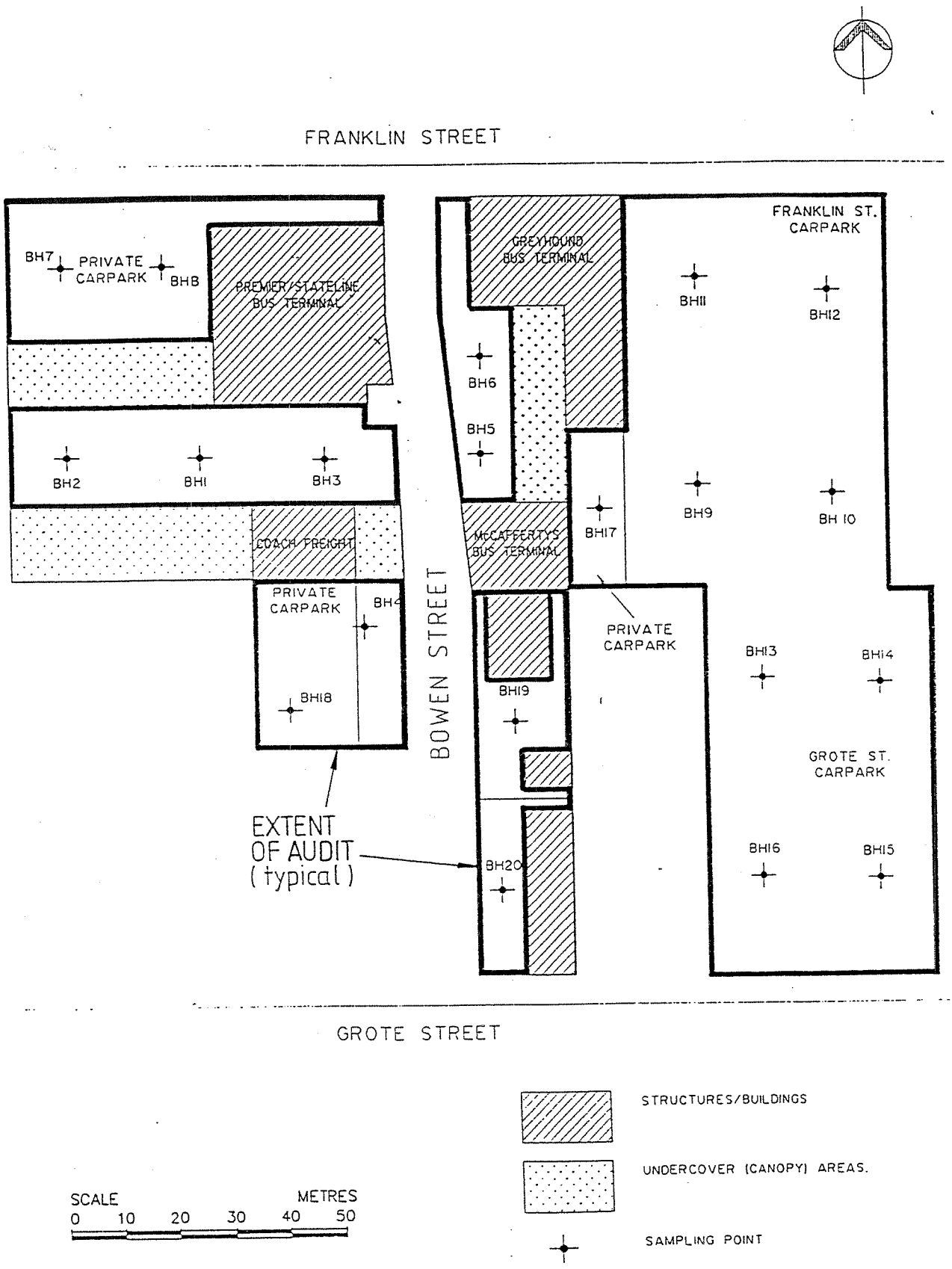
- a bitumen sealed private car park in the south west of the site

A Site Plan, including sampling locations, is given in Figure 2.1.

The extent of the audit is also shown on Figure 2.1. It should be noted that as no soil testing was undertaken under the canopies, or under the floor slabs of the buildings, the extent of this audit has necessarily been confined to the open space areas of the site, with a total areal extent of approximately 0.98 hectares.

The site is surrounded by the following properties

- Dreamland Furniture and a disused warehouse to the east
- light industrial facilities to the west
- Franklin Street to the north
- Andrews Street, the Grote Street Church of Christ and Grote Street to the south.



SOURCE: RUST PPK DRAWING No. 27J097A4

Figure 2.1

CORPORATION OF THE CITY OF ADELAIDE

FRANKLIN STREET BUS STATION AND CARPARKS
SITE AUDIT REPORT
SITE PLAN

JOB No	97.0307
SCALE	1:1000
DRAWN	A.M.
CHECKED	A.M.D.H.
DATE	July 1997 A4

B.C. TONKIN & ASSOCIATES
CONSULTING ENGINEERS
55 QUEEN STREET, ADELAIDE, 5000
TELEPHONE 223 5583, FAX 223 5237

Further background information on the Franklin Street Bus Station and Car Parks site is contained in the Site History Report prepared by Rust PPK. A copy of the document is provided in Appendix A.

Rust PPK Pty Ltd was commissioned by the Corporation of the City of Adelaide to undertake a comprehensive environmental assessment of the Franklin Street Bus Station and Car Parks site. The results of this work have been reported in the following document:

> Rust PPK Pty Ltd, 1997, *Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide,* for the Corporation of the City of Adelaide, 30 June 1997

A copy of the above document is provided in Appendix B. The assessment report should be read in conjunction with this audit.

The role of BC Tonkin & Associates in the audit of this site involved

- inspections of the site
- liaison with Rust PPK during their investigations
- assessment of the information provided in the above report.

No additional fieldwork was conducted by BC Tonkin & Associates during this audit.

3. SUMMARY OF ENVIRONMENTAL SITE ASSESSMENT

3.1 Background Studies

3.1.1 Site Identification and Description

This section of the assessment carried out by Rust PPK consisted of the following components

- site identification
- site description
- site ownership
- site topography
- local soil types
- local and regional groundwater.

Site identification and ownership have been described in Section 2.

The Rust PPK report provides comment on site topography and local soil types.

Comments on soil types and groundwater are provided in Section 3.1.3.

3.1.2 Site History

The site history section of the assessment incorporates the following elements

- historical overview
- summary of potential site contamination issues.

According to the site history prepared by Rust PPK

- from 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises, including a garage, forge, workshop, bakehouse, and a private road

- from the 1920s a number of small light industries were established on the site; these included a factory, garages, forges, stables, printing works, workshops, shops and offices

- during the 1960s a large proportion of the residential land in the western part of the site had been cleared, and was used as an open lot car park

- by 1972 the Corporation of the City of Adelaide had acquired most of the land comprising the site, except for 104 Grote Street; the land was then cleared, and by 1979 the majority of the existing bus terminals and car parks had been constructed

- the residences on the 104 Grote Street site were acquired by the Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission; the

front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking

- between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.

3.1.3 Geology and Hydrogeology

The Rust PPK report suggests that the soil profile at the site can be expected to include in the order of 1.0 m of surface fill, consisting of various reworked soils and building rubble. Underlying this the profile is likely to resemble a Brown Solonised Soil Type BS classification. Such profiles consist of brown sandy to clayey soils with abundant earthy lime and calcrete in the subsoil. Such soils vary from a thin layer to up to 3 m thick, and the layer overlies Hindmarsh Clay.

MESA records indicate regional standing groundwater levels at depths ranging from approximately 6 m to up to 40 m. No groundwater was encountered during the on-site drilling programme to a maximum depth of 2.3 m.

3.1.4 Potential Site Contamination Issues

Based on information obtained from the Site History investigation, Rust PPK considered that the following potential contamination may be present on site as a result of past on-site and adjacent activities

- Polycyclic Aromatic Hydrocarbon (PAH) contamination from the tar based subbase materials that may have been used beneath bitumen in the past, and from possible waste products associated with coal fires or furnaces

- Organochlorine Pesticide (OCP) contamination from the possible use of white ant treatments beneath former buildings

- possible petroleum contamination from the leakage of fuel or oil from vehicles

- possible heavy metal contamination from activities associated with a plumbing business, forging, oxy-welding, radio and electrical companies, wrecking and auto-mechanics or printing works, all of which existed on the site in the past.

3.2 Site Investigations

3.2.1 Soil Sampling

Rust PPK's sampling locations were based on a nominal grid across the site, and comprised 20 boreholes (refer to Figure 2.1). Sampling locations were agreed on site between Rust PPK and the auditor.

In general, 3 - 4 soil samples were collected from the top 1.0 m of the soil core, with an additional 1 - 3 samples recovered between 1.0 m and 2.0 m, and 1 sample below 2.0 m if the

borehole was drilled past 2.0 m. The specific sample depths were however dependent on the soil profile at each location.

3.2.2 Soil Conditions Encountered

Rust PPK reported that the soil conditions encountered during drilling could be summarised as follows

fill materials

- surface layer of yellow silty sand with some gravel overlying dark brown silty clays to depths ranging from 0.5 m to 1.2 m
- brick fragments and cinders in 13 out of the 20 boreholes, and fragments of vesicular slag were identified in one of the boreholes

natural sediments

- calcareous silty clays with some calcareous gravel to about 2.0 m
- at some boreholes the soil became greenish brown at around 2.0 m as it became Hindmarsh Clay.

Environmental soil monitoring borelogs are presented in Appendix D of the Rust PPK report. A site plan showing the approximate area of fill materials containing ash, cinders and/or slag is contained in Appendix E of the Rust PPK report.

3.2.3 Laboratory Analysis Programme

A total of 22 soil samples was submitted to the primary laboratory (AGAL) for analysis. 2 inter-laboratory duplicates were sent to the secondary laboratory (MGT) for analysis.

The samples were analysed for a range of chemical analytes, including

- pH
- heavy metals
- polycyclic aromatic hydrocarbons (PAHs)
- organochlorine pesticides (OCPs)
- total petroleum hydrocarbons (TPH)
- monocyclic aromatic hydrocarbons (BTEX)
- polychlorinated biphenyls (PCBs), phenols, chlorinated hydrocarbons, cyanide, fluoride.

Table 3.1 shows the full range of soil samples taken from each borehole, and the chemical analytes for each sample analysed.

In particular, 2 field duplicate samples and the 2 inter-laboratory duplicate samples were analysed for the full Victorian EPA screen.

The primary laboratory was Australian Government Analytical Laboratories (AGAL).

TABLE 3.1 SUMMARY OF SAMPLING AND ANALYSIS

Borehole	Sample	Min	Max	Soil Type	Field Class	pH	Sb	As	Ba	Cd	Cr tot	Cr VI	Co	Cu	Pb	Mn	Hg	Mo	Ni	Se	Sn	Zn	PAHs	OCPs	PCBs	BTEX	TPH	Phenols	Flouride	Cyanide	VOC	Cresols
BH1		60	300	FILL	0	x		x		x	x			x	x		x					x										
		40	500	FILL	0																											
		800	1000	Silty Clay	0																											
		1400	1550	Silty Clay	0																											
		2000	2100	Silty Clay	0																											
	D	2000	2100	Silty Clay	0																											
BH2		100	300	FILL	0																											
	D	100	300	FILL	0																											
		400	500	FILL	0																											
		800	1000	Silty Sandy Clay	0																											
		1350	1500	Silty Sandy Clay	0																											
		1800	2000	Silty Clay	0			x		x	x			x	x		x					x										
BH3		100	300	FILL	0																											
	D	100	300	FILL	0																											
		400	500	FILL	0																											
		800	1000	Silty Clay	0	x		x		x	x			x	x		x					x										
		1400	1550	Silty Clay	0																											
		2000	2100	Silty Clay	0																											
BH4		100	300	FILL	0																											
		450	600	FILL	1		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	
	D - BD2?	450	600	FILL	1																											
		800	1000	FILL	1																											
		1550	1700	Silty Clay	0																											
		2000	2100	Silty Clay	0																											
BH5		100	300	FILL	0																											
		400	500	FILL	0																				✓							
	D	400	500	FILL	0																											
		700	000	FILL	1																											
		000	1000	Silty Clay	0	x																	x									
		1350	1500	Silty Clay	0																											
		1700	1800	Silty Clay	0																											
		2000	2100	Silty Clay	0																											
BH6		100	300	FILL	0																											
		400	500	FILL	0																											
		650	750	FILL	1	x		x		x	x			x	x		x					x	x									
		1000	1200	Silty Clay	0																											
	D	1000	1200	Silty Clay	0																											
		1700	1800	Clay	0																											
BH7		100	300	FILL	0																											
		400	500	FILL	0	x		x		x	x			x	x		x					x										
		800	1000	Silty Clay	0																											
		1350	1500	Silty Clay	0																											
	D	1350	1500	Silty Clay	0																											
		1800	2000	Silty Clay	0																											
BH8		100	300	FILL	0																											
		400	500	FILL	0																											
	D	400	500	FILL	0																											
		800	1000	Silty Clay	0	x		x		x	x			x	x		x					x										
		1350	1550	Silty Clay	0																											
		1000	2000	Silty Clay	0																											
BH9		100	300	FILL	0																											
		350	500	FILL	0																											
		700	900	Silty Clay	0																											
	D	700	900	Silty Clay	0																											
		1300	1450	Silty Clay	0																											
		2000	2100	Silty Clay	0			x		x	x			x	x		x					x										
BH10		100	300	FILL	0																											
		350	500	FILL	0																											
		700	850	Silty Clay	0	x		x		x	x			x	x		x					x										
	D	700	850	Silty Clay	0																											
		1000	1200	Silty Clay	0																											
		1400	1550	Silty Clay	0																											
		1000	2000	Silty Clay	0																											

TABLE 3.1 SUMMARY OF SAMPLING AND ANALYSIS

Borehole	Sample	Min	Max	Soil Type	Field Class	pH	Sb	As	Be	Cd	Cr tot	Cr VI	Co	Cu	Pb	Mn	Hg	Mo	Ni	Se	Sn	Zn	PAHs	OCPs	PCBs	BTEX	TPH	Phenols	Flouride	Cyanide	VOC	Cresols
BH11		100	300	FILL	0																											
		350	500	FILL	0																											
	D	350	500	FILL	0																											
		800	1000	Silty Clay	0	x		x		x	x			x	x		x					x										
		1300	1450	Silty Clay	0																											
		1800	2000	Silty Clay	0																											
BH12		150	300	FILL	0																											
		550	700	FILL	1	x		x		x	x			x	x		x					x	x									
	D	550	700	FILL	1		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		850	1000	Silty Clay	0																											
		1550	1700	Silty Clay	0																											
		1850	2000	Silty Clay	0																											
BH13		50	150	FILL	0																											
		200	350	FILL	0																											
		350	500	FILL	0																											
		700	900	FILL	1		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	
	D - BD6?	700	900	FILL	1																											
		1350	1500	Silty Clay	0																											
		1600	2000	Silty Clay	0																											
BH14		50	150	FILL	0																											
		150	300	FILL	1																											
		550	700	FILL	1	x		x		x	x			x	x		x					x	x									
		700	850	FILL	0																											
		1000	1200	FILL	0																											
		1850	2000	Silty Clay	0																											
	D	1850	2000	Silty Clay	0																											
BH15		150	300	FILL	0																											
		300	500	FILL	0																											
		700	850	Silty Clay	0	x		x		x	x			x	x		x					x										
	D	700	850	Silty Clay	0		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
		1500	1600	Silty Clay	0																											
		2000	2100	Silty Clay	0																											
BH16		100	300	FILL	0																											
	D	100	300	FILL	0																											
		400	500	FILL	1	x		x		x	x			x	x		x					x	x									
		850	1000	Silty Clay	0																											
		1750	1850	Silty Clay	0																											
BH17		100	300	FILL	0																											
		350	500	FILL	0																											
	D	350	500	FILL	0																											
		800	1000	Silty Clay	0	x		x		x	x			x	x		x					x										
		1800	2000	Silty Clay	0																											
BH18		50	150	FILL	0																											
		150	300	FILL	0																											
		400	500	FILL	1	x																	x									
		800	1000	Silty Clay	0																											
		1450	1600	Silty Clay	0																											
		2150	2300	Silty Clay	0																											
BH19		100	300	FILL	0																											
		550	700	FILL	1	x		x		x	x			x	x		x					x	x			x	x					
		950	1100	Silty Clay	0																											
		1850	2000	Silty Clay	0																											
BH20		50	200	FILL	1	x		x		x	x			x	x		x					x	x			x	x					
		200	350	FILL	0																											
		450	550	FILL	1																											
	D	450	550	FILL	1																											
		850	1000	Silty Clay	0																											
		1800	1950	Silty Clay	0																											
	BD2					x		x		x	x			x	x		x					x	x									
	BD6					x		x		x	x			x	x		x					x										
	ER1							x		x	x			x	x		x					x	x			x	x					
	ER2							x		x	x			x	x		x					x	x			x	x					
				Number of Samples Analysed		18	4	24	4	24	24	4	4	24	24	4	24	4	4	4	4	24	15	4	4	8	8	4	2	2	4	2

The secondary laboratory was MGT Environmental Consulting Pty Ltd (MGT).

Both laboratories are NATA certified for all the nominated soil analyses.

3.2.4 Field Observations and Headspace Analysis

Rust PPK have advised that during the drilling and sampling programme, headspace testing was undertaken on soil from various depths at the majority of the boreholes drilled. A second set of between 2 and 5 samples was collected from each borehole, and transferred to labelled, resealable plastic bags. These samples were then left for approximately 20 minutes before the headspace analysis was undertaken, to determine the presence of volatile organic hydrocarbons, using a photoionisation detector (PID).

Due to operational difficulties with the PID during the sampling programme, PID readings were not taken at every borehole.

Rust PPK advised that the concentrations of VOCs detected by the PID were generally quite low (< 20 ppm); however, where the concentrations detected were elevated (e.g. > 50 ppm), the soil sample from around that depth was analysed for TPH/BTEX.

No visible or olfactory evidence of hydrocarbon contamination was recorded within the surface or subsurface soils at any of the boreholes.

3.2.5 Assessment Criteria

For the purpose of assessing potential long term human health risks, Rust PPK adopted the SAHC (1993) Health Investigation Levels as the initial investigation levels.

For the purpose of assessing potential environmental risks, Rust PPK adopted the ANZECC/NH&MRC (1992) Environmental Investigation Levels as the initial investigation levels.

As a preliminary aid in the evaluation of site specific health based risk analysis, the SAHC (1996) Proposed Health Based Soil Guidelines were used as reference criteria.

For the purpose of the preliminary contamination assessment, the criteria nominated within SAHC (1993) and ANZECC/NH&MRC (1992) were referenced as the primary assessment criteria.

For the purpose of the preliminary health risk assessment, the SAHC (1996) Proposed Health Based Soil Guidelines Exposure Settings D (residential with restricted soil access) and F (commercial/industrial) were used as the reference criteria.

In the case of analytes not covered by the nominated criteria, the Dutch Investigation and Intervention values were referenced. The former Dutch C levels and the NSW EPA Guidelines for Assessing Service Station Sites were used as guidelines for TPH/BTEX.

Table 3.2 Laboratory Results : Soil - pH, Heavy Metals, PAHs

Contaminants (mg/kg)	Detection Limit (mg/kg)	Assessment Criteria: ANZECC/ NHMRC[1]	ANZECC/ NHMRC[2]	SAHC HIL[3]	NEHF[4] D	NEHF[5] F	Borehole No	BH1	BH2	BH3	BH4		BH5	BH6	BH7	BH8	BH9	BH10	BH11	BH12	
							Sample No														
							Sample Depth (min)	80	1800	800	450	450	800	650	400	800	2000	700	800	550	550
							Sample Depth (max)	300	2000	1000	600	600	1000	750	500	1000	2100	850	1000	700	700
							Soil Type	FILL	FILL	FILL	FILL	FILL LR	Silty Clay	FILL	FILL	Silty Clay	Silty Clay	Silty Clay	Silty Clay	FILL	FILL ILD
							QA/QC														
pH	0.1			>5 <9				9.5[3]	-	9.5[3]	-	-	9.5[3]	9.6[3]	9.8[3]	10[3]	-	8.8	9.3[3]	9.2[3]	-
Metals																					<10
Antimony	5	-	20	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	2.8
Arsenic	5	100	20	100	400	500		nd	9.4	7.4	7.6	7.5	-	5.6	nd	10	9.3	5	8.9	nd	<2
Beryllium	1	-	-	-	80	100		-	-	-	1.2	1.2	-	-	-	-	-	-	-	-	<0.5
Cadmium	1	20	3	20	80	100		nd	nd	nd	nd	nd	-	nd	nd	nd	nd	nd	nd	nd	28
Chromium	2	-	50	-	-	-		9.2	29	31	31	29	-	22	13	17	16	46	11	29	8.5
Cobalt	1	-	-	-	-	-		-	-	-	8	7.6	-	-	-	-	-	-	-	-	14
Copper	2	-	60	100	4,000	5,000		9.5	7	7.3	32	29	-	24	4.8	9	5.5	18	5.7	10	14
Lead	5	300	300	300	1,200	1,500		nd	7.5	10	446[1,2,3]	670[1,2,3]	-	4	nd	5.3	5.3	13	nd	11	220
Manganese	10	-	500	-	6,000	7,500		-	-	-	200	nd	-	-	-	-	-	-	-	-	<0.1
Mercury	0.5	-	1	2	60	75		nd	nd	nd	nd	nd	-	nd	nd	nd	nd	nd	nd	nd	<10
Molybdenum	5	-	-	-	-	-		-	-	-	-	nd	-	-	-	-	-	-	-	-	14
Nickel	1	-	60	-	2,400	3,000		-	-	-	15	14	-	-	-	-	-	-	-	-	<0.5
Selenium	5	-	-	-	-	-		-	-	-	nd	nd	-	-	-	-	-	-	-	-	<10
Tin	2	-	50	-	-	-		-	-	-	28	26	-	-	-	-	-	-	-	-	28
Zinc	2	-	200	500	28,000	35,000		8.7	19	21	280[2]	270[2]	-	69	17	15	14	30	9.8	17	
Polycyclic Aromatic Hydrocarbons																					<0.1
Benzo(a)pyrene	0.1	1	-	1	4	5		-	-	-	0.1	-	nd	0.8	-	-	-	-	-	nd	-
Total PAHs	0.1	20	-	20	80	100		-	-	-	nd	-	nd	5.3	-	-	-	-	-	nd	

Notes:
1 - Table 1, Proposed Health Investigation Levels (ANZECC/NHMRC, 1992).
2 - Table 2, Environmental Soil Quality Guidelines - Environmental Investigation Levels (ANZECC/NHMRC, 1992).
3 - South Australian Health Commission (SAHC) Investigation Levels (SAHC 1993)
4 - NEHF Health Based Investigation Level Soil Guidelines, According to Exposure Setting D (Landuse), SAHC 1996
5 - NEHF Health Based Investigation Level Soil Guidelines, According to Exposure Setting F (Landuse), SAHC 1996
446[1,2,3] the raised numbers indicate the guideline exceeded

nd - below AGAL detection limits
- - not analysed
ILD - interlaboratory duplicate
LR - laboratory repeat

Table 3.2 Laboratory Results : Soil - pH, Heevy Matels, PAHs

Contaminants (mg/kg)	Detection Limit (mg/kg)	Assessment Criteria: ANZECC/ NHMRC[1]	ANZECC/ NHMRC[2]	SAHC HIL [3]	NEHF [4] D	NEHF [5] F	Borehole No	BH13		BH14	BH15		BH16	BH17	BH18	BH19	BH20	BD2	BD6	
							Sample No													
							Sample Depth (min)	700	700	550	700	700	400	800	400	550	50			
							Sample Depth (max)	900	900	700	850	850	500	1000	500	700	200			
							Soil Type	FILL	FILL	FILL	Silty Clay	Silty Clay	FILL	FILL	FILL	FILL	FILL			
							QA/QC		LR			ILD						BH4/D ?	BH13/D ?	LR
pH	0.1			>5 <9				-	-	11 [3]	9.3 [3]	-	9.7 [3]	9.8 [3]	9.4 [3]	9.1 [3]	9.5 [3]	9.2 [3]	8.9	-
Metals																				
Antimony	5	-	20	-	-	-		-	-	-	-	<10	-	-	-	-	-	-	-	-
Arsenic	5	100	20	100	400	500		5.1	nd	19	nd	2.8	9.5	11	-	nd	7.6	8.5	nd	5
Beryllium	1	-	-	-	80	100		1.1	1.2	-	-	<2	-	-	-	-	-	-	-	-
Cadmium	1	20	3	20	00	100		nd	nd	nd	nd	<0.5	nd	nd		nd	nd	nd	nd	nd
Chromium	2	-	50	-	-	-		29	29	18	26	28	29	13		23	33	26	33	34
Cobelt	1	-	-	-	-	-		7.7	8.1	-	-	9.4	-	-	-	-	-	-	-	-
Copper	2	-	60	100	4,000	5,000		16	16	450 [2,3]	9.9	18	10	7.3	-	8.9	31	34	17	17
Lead	5	300	300	300	1,200	1,500		43	36	1600 [1,2,3]	11	15	11	nd	-	28	140	440 [1,2,3]	39	34
Mangenese	10	-	500	-	6,000	7,500		260	270	-	-	260	-	-	-	-	-	-	-	-
Mercury	0.5	-	1	2	60	75		nd	nd	nd	nd	<0.1	nd	nd	-	nd	nd	1.6 [2]	nd	nd
Molybdenum	5	-	-	-	-	-		nd	nd	-	-	<10	-	-	-	-	-	-	-	-
Nickel	1	-	60	-	2,400	3,000		15	15	-	-	11	-	-	-	-	-	-	-	-
Selenium	5	-	-	-	-	-		nd	nd	-	-	<0.5	-	-	-	-	-	-	-	-
Tin	2	-	50	-	-	-		2.8	2.8	-	-	<10	-	-	-	-	-	-	-	-
Zinc	2	-	200	500	28,000	35,000		32	32	2000 [2,3]	14	26	21	11	-	17	410 [2]	270 [2]	32	32
Polycyclic Aromatic Hydrocarbons																				
Benzo(e)pyrene	0.1	1	-	1	4	5		nd	0.1	0.1	-	<0.1	nd	-	nd	nd	1.7 [1,3]	nd	-	-
Tolel PAHs	0.1	20	-	20	80	100		nd	1.4	nd	-	-	nd	-	nd	nd	15	nd	-	-

3.2.9 Findings and Conclusions

Based on the laboratory results, and field observations, the findings of the environmental site assessment were reported by Rust PPK to be as follows (refer to the Executive Summary of the Rust PPK report):

"The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- *the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);*
- *the north east corner of the Grote Street public car park (BH14); and*
- *the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).*

"An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.

"Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

"The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC environmental guidelines.

"The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

"As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial land uses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both land uses."

3.2.10 Recommendations

The recommendations arising from the environmental site assessment are presented by Rust PPK as follows (refer to Section 5 of the Rust PPK report):

Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

"In accordance with the continued use of these areas for commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within these areas. This recommendation is with the exception of a site specific risk assessment required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

"If these areas of the site are to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials at nine out of the eleven sampling locations in these areas. If this land is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in these areas. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

104 Grote Street

"The investigation program has identified no requirements for any subsequent site characterisation or remedial works within this area (which includes the house, private car park, storage building and adjacent car park) provided the current uses are maintained. If this portion of the site is to be developed for a more sensitive landuse (for example residential), it is recommended that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area, and so

that the soil can be further characterised in those areas not covered in this investigation. Similarly to the other areas of the site, if this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation.

Coachfreight and adjacent car park

"If the current use of the land in this area is to be maintained, there are no requirements for remedial works in this area of the site. This is contingent upon the adequate maintenance and management of the bitumen surfaces. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area. If this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation (as described previously).

Bus Depot 2 (Premier Stateline)

"No contamination was identified in this area (which includes the bus parking area and the car park adjacent the terminal building) and so no remedial works or further site characterisation works are required provided the site use remains as at present. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, in order to further characterise the soil in those areas not covered in this investigation."

4. AUDITOR REVIEW OF ENVIRONMENTAL SITE ASSESSMENT

4.1 General

In order to assess whether the environmental consultant's report is satisfactory, the auditor has to determine whether

- the site history adequately defines the potential contaminants
- the sample density and testing frequency gives a representative picture of site conditions
- the selection of analytes adequately represents the potential contamination
- the selection of acceptance criteria is appropriate.

In determining the condition of the site, the auditor has to give consideration to defining the beneficial uses of the site. This includes issues relating to

- the health and wellbeing of humans, on or off the site
- environmental impacts to flora and fauna
- impacts of soil contamination on surface water and groundwater.

The EPA has indicated that the Site Audit Report should provide a concluding statement incorporating one of the following:

- the condition of the site is such that the site is suitable for unrestricted use

- the condition of the site is such that it is suitable only for certain stated uses; any conditions pertaining to the use of the site must be specified

- the condition of the site presents an unacceptable health and/or environmental risk, and is not suitable for any use unless remediated.

4.2 Background Studies

The background studies conducted by Rust PPK as part of the environmental assessment of the site were assessed by the auditor as being adequate to determine the potential for site contamination.

4.3 Sampling Frequency

A total of 20 soil boreholes was drilled to up to 2.3 m depth. This is equivalent to an average nominal grid spacing of about 22 m across the site.

The overall sampling frequency (i.e. the borehole spacing and the selection of samples) is considered by the auditor to be acceptable.

4.4 Laboratory Analysis Programme

The analytical requirements for the assessment were determined by Rust PPK in consultation with the auditor, and were based on an understanding of previous site activities and associated potential contaminants, together with the requirements of the Victorian EPA guidelines to provide a general screen for inorganic and organic compounds for a representative number of samples.

The analytical parameters are considered by the auditor to be sufficient to adequately characterise the level of contamination on the site.

4.5 Assessment Criteria

Selection of site specific assessment criteria can include the adoption of published criteria from regulatory authorities and from overseas publications, or the conduct of human health and ecological risk assessments.

For this environmental site assessment, Rust PPK adopted the SAHC (1993) Health Investigation Levels and the ANZECC/NH&MRC (1992) Environmental Investigation Levels, for assessing potential long term human health risks, and environmental risks, respectively. For the purpose of site specific health based risk analysis, the SAHC (1996) Proposed Health Based Soil Guidelines Exposure Settings D (residential with restricted soil access) and F (commercial/industrial) were used as reference criteria. In the case of analytes not covered by the nominated criteria, the Dutch Investigation and Intervention (Swartjes FA et al, 1993) values were referenced. The former Dutch C (ANZEC/NH&MRC, 1990), levels and the NSW EPA (1994) Guidelines for Assessing Service Station Sites were used as guidelines for TPH/BTEX.

The ANZECC/NH&MRC (1992) Environmental Investigation Levels are based on threshold levels for phytotoxicity and uptake of contaminants which may result in impairment of plant growth or reproduction, or unacceptable residue levels. These levels represent conservative values that protect the most sensitive receptor in the environment (i.e. plant life).

The proposed new Dutch Investigation and Intervention Levels are based on an integration of ecotoxicological and human-toxicological intervention values. These have not yet been adopted in Australia.

The former Dutch B and C criteria were developed for the protection of groundwater, which is the main source of potable water in the Netherlands.

The SAHC (1996) Proposed Health Based Soil Guidelines Exposure Setting D apply to residential developments with minimal opportunities for soil access, e.g. high rise apartments and flats. A 70 year exposure period has been assumed, except for those contaminants for which exposures over a much shorter period during childhood are critical.

The SAHC (1996) Proposed Health Based Soil Guidelines Exposure Setting F apply to commercial/industrial developments including shops, offices, factories and industrial sites. A 30 year exposure period has been assumed.

Given the nature and the findings of the environmental site assessment, and the proposed redevelopment strategy, adoption of the above assessment criteria is considered by the auditor to be appropriate.

4.6 Quality Assurance/Quality Control (QA/QC)

The QA/QC procedures undertaken for this assessment are documented in the Rust PPK report.

The quality assurance procedures adopted by Rust PPK included

- use of appropriate field sampling protocols
- use of appropriate sample containers, and sample preservation procedures (e.g. use of chilled esky) during transportation to the laboratory
- use of chain of custody forms, signed by the receiving laboratory
- laboratory quality control tests, including a field duplicate, an inter-laboratory duplicate, surrogate recoveries and replicate analyses
- quality assurance testing of a sample of rinse water.

The auditor was satisfied that these procedures were correctly implemented.

The laboratory analysis programme included the analysis of 4 field duplicates and 8 laboratory replicates.

The RPD was greater than 30% for the inter-laboratory duplicate results for copper and zinc. The RSD was also greater than 30% for copper. The Rust PPK report comments that the extraction methods used by the primary and the secondary laboratories were identical, and the analysis methods were compatible (ICP-AES/Flame Atomic Absorption Spectrometry). Therefore it was most likely that the difference in values for the inter-laboratory duplicates would be due to the heterogeneous nature of the soil, and the consequent difficulty in obtaining a true field duplicate sample. This explanation is accepted by the auditor.

One of the RPDs was greater than 20% for the laboratory replicate results for lead. The Rust PPK report comments that this could also be due to the heterogeneous nature of the soil, and the difficulty in obtaining two replicate samples from the soil sample in the laboratory. High RPDs can also be due to the relatively low quantities of analytes detected. This explanation is accepted by the auditor. The RSDs were within the accepted criteria for all of the replicates.

4.7 Findings and Recommendations

The detailed findings and recommendations presented by Rust PPK in their Environmental Site Assessment Report are endorsed by the auditor.

There was no background sampling or testing carried out. However, given the nature and the findings of the environmental site assessment, the absence of background data was not considered to pose a problem.

Groundwater was not intersected at the site to a depth of 2.3 m. While no leachability testing was conducted as part of this assessment, the alkaline nature and generally low permeability of the soils underlying the site should preclude leaching of contaminants.

5. CONCLUSIONS

A Site Audit Report has been prepared by Mr Adrian Hall of BC Tonkin & Associates for the Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide. An Environmental Site Assessment was performed by Rust PPK Pty Ltd.

As no soil testing was undertaken under the canopies, or under the floor slabs of the buildings, the extent of this audit has necessarily been confined to the open space areas of the site, with a total areal extent of approximately 0.98 hectares, as shown in Figure 2.1.

In the opinion of the auditor, the investigations have satisfactorily defined the nature and extent of contamination at the site.

The conclusions of this Site Audit Report are set out as follows:

1. The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only)
- the north east corner of the Grote Street public car park (BH14)
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).

2. An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.

3. Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

4. The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC

environmental guidelines. The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

5. As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial land uses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both land uses.

On the basis of the above conclusions, the auditor's considerations regarding the condition of the open space areas of the site are set out separately for the following four zones:

- Zone A - Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks
- Zone B - 104 Grote Street
- Zone C - Coachfreight and Adjacent Car Park
- Zone D - Bus Depot 2 (Premier Stateline).

Zone A - Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

The auditor considers that this zone is suitable for continued existing use provided that the conditions as specified below are satisfied:

1. Generally, the findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within this zone.

2. The exception is that a site specific risk assessment is required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of this area providing the bitumen surfaces are maintained and managed appropriately.

If this zone is to be developed for a more sensitive landuse, then further site characterisation is required, the extent of which will be dependent on the future land use, due to the presence of ash and cinders within the fill materials.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.

2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone B - 104 Grote Street

The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works.

If this zone is to be developed for a more sensitive landuse (for example residential), then it is required that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials in this zone.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.

2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone C - Coachfreight and Adjacent Car Park

The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works. This is contingent upon the adequate maintenance and management of the bitumen surfaces.

If this zone is to be developed for a more sensitive landuse (for example residential), it is required that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials in this zone.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.

2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone D - Bus Depot 2 (Premier Stateline)

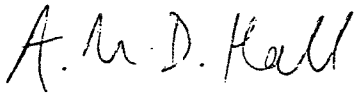
The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works.

If this zone is to be developed for a more sensitive landuse (for example residential), it is required that more extensive site characterisation is carried out prior to the redevelopment, the extent of which will be dependent on the future landuse.

It is also a requirement of this audit that the auditor be kept informed of the progress of any site redevelopment activities, and that opportunity be given to the auditor to ensure that the above conditions are adhered to.

If any part of the site is redeveloped, then a report, containing evidence by way of checks and test surveys that the above requirements have been met, is to be submitted to the auditor for approval.

Signed:



AMD Hall, MIE Aust
Chartered Professional Engineer
Associate Director
Environmental Auditor (Contaminated Land)

BC TONKIN & ASSOCIATES

Date: 1 August 1997

6. REFERENCES

ANZEC/NH&MRC (1990), *Draft Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*, Australia and New Zealand Environment Council (ANZECC), National Health and Medical Research Council (NH&MRC), June 1990.

ANZECC/NH&MRC (1992), *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*, Australian and New Zealand Environment and Conservation Council and National Health and Medical Research Council.

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APPENDIX A

Rust PPK Pty Ltd, 1997,
Site History Report for the Franklin Street Bus Station,
Located at 85-129 Franklin Street, Adelaide,
for the Corporation of the City of Adelaide, 6 March 1997

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Site History Report for the Franklin Street Bus Station,
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Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide

The Corporation of the City of Adelaide

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1 July 1997

Mr Brian Fitzpatrick
The Corporation of the City of Adelaide
GPO Box 2252
ADELAIDE SA 5001

Dear Sir

Site History Report for the Franklin Street Car Park

We are pleased to provide the Draft Site History report for the Franklin Street Bus Station. Potential contamination issues have been identified and we have made recommendations accordingly. If you have any queries regarding the content of this report, or would like to engage our services in carrying out the recommendations, please contact the undersigned.

Yours faithfully

John Iddles
Senior Environmental Consultant
Rust PPK Pty Ltd

Contents

	Page Number
Executive Summary	iii
1. Introduction	1
2. Background Information	2
2.1 Site Identification	3
2.2 Ownership	3
2.3 Party Responsible for Assessment	3
2.4 Environmental Consultant	3
2.5 Proposed Land Use	3
2.6 Operator of Site	
3. Site History	4
3.1 Site Location	4
3.2 Site History of Land East of Bowen Street	12
3.3 Site History of Land West of Bowen Street	16
3.4 Information Sources	
4. Site Inspection	17
4.1 Topography	17
4.2 Local Soil Types and Groundwater	17
4.3 General Observations - East of Bowen Street	18
4.4 General Observations - West of Bowen Street	
5. Summary of Potential Contamination Issues	20
5.1 Potential Contamination Issues Associated with Previous Uses of the Site	21
5.2 Potential Contamination Issues Associated with the Current Use of the Site	
6. Recommendations	23
7. Statement of Limitations	23

List of Tables

		Page Number
Table 2.1	Allotment Details for the Eastern Side of Bowen Street	2
Table 2.2	Allotment Details for the Western Side of Bowen Street	2
Table 3.1	History of Ownership - Part Town Acre 310, Grote Street	4
Table 3.2	History of Ownership - Part Town Acre 263, Off Rowlands Place	5
Table 3.3	History of Ownership - Part Town Acre 263, Franklin Street	5
Table 3.4	History of Ownership - Part Town Acre 263, Franklin Street	5
Table 3.5	History of Ownership - Part Town Acre 262, Allotment 4	6
Table 3.6	History of Ownership - Part Town Acre 262, Allotment 12	6
Table 3.7	History of Ownership - Part Town Acres 262 and 263	6
Table 3.8	History of Ownership - Part Town Acre 262	7
Table 3.9	History of Ownership - Part Town Acre 310, Allotment 1	7
Table 3.10	History of Ownership - Part Town Acre 311, Allotment 1	8
Table 3.11	List of Aerial Photographs Examined	10
Table 3.12	History of Ownership - Part Town Acre 311, Andrew Street	12
Table 3.13	History of Ownership - Part Town Acre 311, Andrew Street	12
Table 3.14	History of Ownership - Part Town Acre 311, Andrew Street	12
Table 3.15	History of Ownership - Part Town Acres 261 and 262, Franklin Street	13
Table 3.16	List of Aerial Photographs Examined	15

Appendices

Appendix A	Location Map
Appendix B	Site Plan
Appendix C	Current Zoning Regulations
Appendix D	Borelogs from the Surrounding Area
Appendix E	Aerial Photographs
Appendix F	Photographs

Executive Summary

Rust PPK Pty Ltd was commissioned by The Corporation of the City of Adelaide, to investigate and report on potential site contamination, environmental and other related issues arising from historical and current site activities on a 0.5 hectare section of land on the western side of Bowen Street, and a 0.9 hectare section of land on the eastern side of Bowen Street, Adelaide. The purpose of this report is to identify potential contaminants in the soil and other environmental issues.

Site Description

The site currently contains the following features:

- *the Premier Stateline bus terminal and canopy on the north-west of the site;*
- *the Coachfreight parcel collection and drop off point (including storage shed) in the west of the site;*
- *a bitumen-sealed private car park in the south-west of the site;*
- *the Greyhound and McCafferty's Express bus terminals and canopy on the north-east of Bowen Street;*
- *a single storey house, a private car park, a toilet block and a two-storey building occupied by the Adelaide Central Mission on the south-east of Bowen Street; and*
- *two bitumen sealed public car parks in the east of the site owned and operated by The Corporation of the City of Adelaide.*

Historic Overview

- *From 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises, a garage, forge, workshop, bakehouse, and a private road.*
- *From the 1920s a number of small light industries were established on the site. These included a factory, garages, forges, stables, printing works, workshops, shops and offices. Some of the occupants included the Franklin Wrecking Co, J.W. Turner, a plumber, Oxy-welders Ltd, the O'Donnell Brothers Ltd, and a number of radio and electrical companies.*
- *During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park by Dimet Corrosion Prevention Pty Ltd and I. and M. Jedynak.*
- *The Corporation of the City of Adelaide had acquired most of the land comprising the site by 1972, excepting the land contained in Certificates of Title 5060/608 and 1751/37. The land was then cleared and by 1979 the majority of the existing bus terminals and car parks had been constructed.*
- *The residences on land contained in Certificates of Title 5060/608 and 1751/37 were acquired by The Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission to store furniture. The front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking.*
- *Between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.*

Potential Contamination Associated with Previous Land Uses

- *Polycyclic aromatic hydrocarbons (PAHs) may be potential contaminants from residential land uses where coal and ashes may have been disposed of on-site.*
- *Benzoyl peroxide, polycyclic aromatic hydrocarbons (PAHs) (due to the disposal of coal and ashes on-site) and hydrocarbons (due to the storage of fuels on-site) are potential contaminants associated with bakeries, and therefore may be present in the north-eastern part of the site.*
- *J.W. Turner operated a plumbing business in the north-east of the site. A range of contaminants are associated with plumbing supplies and their usage, including acids, solvents, lead, silver, zinc and arsenic.*
- *Two forges were established on the site at various times. Potential contaminants that may have been generated by their operation include a broad range of metals and heavy metals, solvents, cyanides, phenols, phosphorous, halogenated compounds, polychlorinated biphenyls (PCBs), hydrocarbons, monocyclic aromatic hydrocarbons (MAHs) and polycyclic aromatic hydrocarbons (PAHs).*
- *An oxy-welding company was established in a warehouse in the north-east of the site, and remained in operation for at least 10 years. Similar contaminants would have been generated by the welding processes, as in the forge, however specific contaminants may include chromium, fluorides, nitrogen, thorium, titanium, vanadium, zinc and benzene.*
- *A number of radio and electrical companies occupied a warehouse in the south-eastern part of the site. Potential contaminants from these businesses may include metals, PCBs, MAHs, halogenated compounds, boron, chlorinated naphthalenes, chlorodiphenyls, phthalates and hydrocarbons.*
- *A wrecking company and two garages have also been in operation on the site. Contaminants associated with these businesses include petroleum hydrocarbons, a range of heavy metals including lead, volatile organic compounds, degreasing solvents, anti-freeze compounds, PCBs, asbestos, MAHs and other organic compounds. Underground fuel storage tanks may possibly have been used to store the fuels. It could not be ascertained whether these have ever existed on the site.*
- *Printing works may have caused contamination with heavy metals (in particular chromium, magnesium, and zinc), other metals (particularly silver), alkalis, inorganic acids, petroleum hydrocarbons, solvents, MAHs, halogenated compounds, ethyl acetate, ethanol, and isopropanol.*
- *Dimet Corrosion Pty Ltd also owned some land in the north-west of the site, however the aerial photographs did not indicate any structures on the site at that time. If corrosion inhibitors were used or manufactured on the site then the potential contaminants may include heavy metals (including Boron associated with Borax), other metals (including tin, lead, copper, and zinc), and amines, phosphates and nitrates.*

There were also various leases on some of the properties to occupants whose business could not be ascertained, therefore there may be contaminants present in addition to those already mentioned above.

Potential Contamination Associated with Current Land Uses

- *There may be polycyclic aromatic hydrocarbons (PAHs) in the soil underlying the bitumen due to tar based sub-base materials used in the past.*
- *Hydrocarbon spillages and leaks from cars and buses may have leached through the bitumen into the soil strata where there are cracks in the bitumen surface.*
- *Power switchboards in a number of the terminal buildings may contain asbestos.*
- *A rubber conveyor belt in the Coachfreight storage shed may contain asbestos.*
- *Asbestos may exist in the building materials of the old houses on the eastern side of Bowen Street that are currently used by The Adelaide Central Mission.*
- *White ant treatments may have used on the soil beneath the buildings and on surfaces prior to sealing with bitumen. Potential contaminants associated with this may include, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs) and heavy metals such as arsenic.*

1. Introduction

Rust PPK Pty Ltd was commissioned by The Corporation of the City of Adelaide, to investigate and report on potential site contamination, environmental and other related issues arising from historical and current site activities at The Franklin Street Bus Station, some residential properties and two associated public car park sites. The site is divided into two irregularly shaped parcels of land located on the eastern and western sides of Bowen Street. The section to the east of Bowen Street has an area of approximately 0.9 hectares and incorporates 85-107 Franklin Street, 2-40 Bowen Street, 84-94 Grote Street, 102-106 Grote Street, and an access road from Rowlands Place. The section to the west of Bowen Street has an area of approximately 0.5 hectares, and incorporates 111-129 Franklin Street, 4-8 Andrew Street, and 1-29 Bowen Street, Adelaide.

2. Background Information

2.1 Site Identification

The subject site comprises two irregularly shaped parcels of land to the east and west of Bowen Street. Each of these parcels comprises a number of allotments which are described under different Certificates of Title, as listed in Table 2.1 and Table 2.2 below.

The Locality Plan for the site is contained in Appendix A, and the site plans showing the current layout of the site are contained in Appendix B.

The total area of the site is approximately 1.41 hectares.

Table 2.1
Allotment Details for the Eastern Side of Bowen Street

Certificate of Title Reference	Land Description	Area (m^2)
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.60
1751/37	Town Acre 311	648.80
1922/48	Town Acre 263	986.26
5060/608	Allotment 1 in DP 32560	580.00
5317/61	Allotment 12 in DP546	149.60
5317/62	Allotment . 91 in FP166443	348.69
5317/63	Allotment 92 in FP166444	271.50
5317/64	Allotment 93 in FP166445	526.90
5317/65	Allotment 91 in FP170401	816.37
TOTAL		9156.02

Table 2.2
Allotment Details for the Western Side of Bowen Street

Certificate of Title Reference	Land Description	Area (m^2)
2023/96	Town Acre 311	260.67
2128/45	Town Acre 311	257.80
2201/187	Town Acre 311	259.70
3479/180	Town Acres 261 & 262	1744.00
3582/78	Town Acre 261	509.70
3582/79	Town Acre 262	490.04
3582/80	Town Acres 261 & 262	1122.90
3841/122	LTRO Plan 546	340.60
TOTAL		4985.41

2.2 Ownership

The current Certificates of Title show the site to be owned by The Corporation of the City of Adelaide.

2.3 Party Responsible for Assessment

The Corporation of the City of Adelaide
GPO Box 2252
ADELAIDE SA 5001.

2.4 Environmental Consultant

Rust PPK Pty Ltd
100 North Terrace
Adelaide SA 5000.

2.5 Proposed Land Use

At the time of the report, the proposed land use was unknown.

2.6 Operator of Site

There are currently a number of passenger and freight transport operators on the site. These include Premier Stateline, Coachfreight, Greyhound Pioneer Australia, McCafferty's Express Coaches, as well as The Adelaide Central Mission. The Corporation of the City of Adelaide also operates two public car parks on the site.

3. Site History

3.1 Site Location

The site is divided into two irregularly shaped parcels of land located on the eastern and western sides of Bowen Street. The street addresses for the section to the east of Bowen Street includes 85-107 Franklin Street, 2-40 Bowen Street, 84-94 Grote Street, 102-106 Grote Street, and an access road from Rowlands Place. The section to the west of Bowen Street has an area of approximately 0.5 hectares, and incorporates 111-129 Franklin Street, 4-8 Andrew Street, and 1-29 Bowen Street, Adelaide.

To the east, the site is bordered by the Dreamland Furniture store on Grote Street, and a disused warehouse on Franklin Street. Some light industrial facilities exist to the west of the site, such as the Jaguar Daimler Service Centre on Andrew Street. The Grote Street Church of Christ, and the accompanying church hall divide the south-eastern part of the site into two portions. These latter two buildings are included on the Register of the City of Adelaide Heritage Items.

The Corporation of the City of Adelaide have advised that the site is part of the F8 Franklin Street East Precinct. Any proposed development must comply with the zoning regulations specified by the Council which apply to this area. These regulations, which are contained within Appendix C, specify the desired and non-complying land uses. Desired uses include general offices, consulting rooms, cafes, shops, ancillary retail services, licensed premises, leisure studios, showrooms, passenger terminals and minor transport depots.

3.2 Site History of Land East of Bowen Street

3.2.1 History of Ownership

The following tables summarise the land ownership on the eastern side of Bowen Street from the early 1900's to the present, as documented in Certificates of Title which are held at the Land Titles Office.

Table 3.1
History of Ownership - Part Town Acre 310, Grote Street

Date	Ownership	CT Reference
15/3/1935	Goode Durrant and Company Limited, of Grenfell Street, Adelaide.	1639/119 (Current)
22/2/1935	Company name change to Goode Durrant and Murray Limited.	
27/7/1938	Portion leased to A.Z. Radio Pty Ltd, for 5 years. Lease number 1269127.	
28/11/1947	Leased to National Radio Corporation Ltd for 3 years. Lease number 1521372.	
7/2/1955	Portion leased to Servex Electrical Company Pty Ltd for 5 years. Lease number 1874445.	1639/119

Date	Ownership	CT Reference
23/12/1957	Name change to Goode Durrant and Murray (Consolidated) Ltd of 45 Grenfell Street, Adelaide.	1639/119 (Contd)
12/5/1964	Goode Durrant and Murray (Australia) Limited of Durrant house, Cheswell Street, London.	
29/10/1968	The Corporation of the City of Adelaide.	

Table 3.2
History of Ownership - Part Town Acre 263, Off Rowlands Place

Date	Ownership	CT Reference
	This title is for a right of way from Rowlands Place to the land contained in Certificate of Title 1639/119. Leases and transfers as for 1639/119, above.	1663/99 (Current)
29/10/1968	The Corporation of the City of Adelaide.	

Table 3.3
History of Ownership - Part Town Acre 263, Franklin Street

Date	Ownership	CT Reference
3/1/1947	John William Turner, Plumber, of 85 Franklin Street, Adelaide.	1922/48 (Current)
21/11/1946	Abraham Silk and Hyman Silk, Merchants, of Queen Victoria Markets, Melbourne.	
24/6/1947	Portion of land leased to J.W. Turner.	
1/10/1962	Death of Hyman Silk.	
16/2/1970	The Corporation of the City of Adelaide.	

Table 3.4
History of Ownership - Part Town Acre 263, Franklin Street

Date	Ownership	CT Reference
18/5/1876	Albert Ogilvie Laffer and Henry Laffer, Drapers, of Adelaide. Various leases (no occupations given) until 10/9/1938.	226/124 (Current)
10/9/1938	Lease to O'Donnell Brothers Ltd.	
14/8/1948	Death of last owner.	
6/4/1970	Caveat lodged over the land by O'Donnell Brothers Pty Ltd (No 3091291).	
23/5/1972	Transfer of land, subject to the above caveat, to The Corporation of the City of Adelaide.	

Table 3.5
History of Ownership - Part Town Acre 262, Allotment 4
(corner of Franklin Street and Bowen Street)

Date	Ownership	CT Reference
19/7/1944	Trustees: -E.H. Bakewell, pastoralist; -A.F. Gray, out of business; and -Sir W. Goodman, General Manager of Tramways Trust	1833/140
29/6/1944	Vested in Gray, Goodman and L.Walter (co-director)	
5/9/1958	As trustees of an Estate: -L.W. Walter, co-director; -H.Pickering, chartered accountant; and -Executor Trustee and Agency Co of SA Ltd.	2608/122
15/2/1968	The Corporation of the City of Adelaide.	
15/2/1968	The Corporation of the City of Adelaide	5317/65 (current)

Table 3.6
History of Ownership - Part Town Acre 262, Allotment 12
(Private Road)

Date	Ownership	CT Reference
7/11/1871	James Smith, Daniel Kekwick and George Shaw, Gentlemen of Adelaide. Various transfers of potions of land. In DP546, this road was redesignated as allotment 12.	160/22
20/1/1972	Private road closed (announced in the Gazette of this date).	
18/10/1989	Private Road acquired by the Corporation of the City of Adelaide.	
12/2/1990	The Corporation of the City of Adelaide The Corporation of the City of Adelaide	4353/276 5317/61 (current)

Table 3.7
History of Ownership - Part Town Acres 262 and 263

Date	Ownership	CT Reference
23/9/1880	Alfred Simpson and Alfred Muller Simpson, Manufacturers.	343/35
11/5/1892	Alfred Muller Simpson and Violet Laura Simpson, his wife.	
16/7/1913	Alfred Muller Simpson, manufacturer (as above).	
19/3/1936	Alfred Allen Simpson, Frederick Neighbour Simpson, Alfred Moxon Simpson (manufacturer).	
5/2/1957	Alfred Moxon Simpson, Thomas Bridge Simpson, David Owen Crompton.	
12/1/1960	Portion of lot sold to Auriga Limited (Certificate of Title 2762/199, which is now Certificate of Title 5317/64, refer below). Remaining portion changed to Certificate of Title 2762/200, now Certificate of Title 5317/62.	
6/6/1960	Auriga Limited of 47 Waymouth Street, Adelaide.	2762/199
16/1/1968	The Corporation of the City of Adelaide.	

Date	Ownership	CT Reference
	The Corporation of the City of Adelaide.	5317/64 (Current)
6/6/1960	-A.M. Simpson, manufacturer, of Pirie Street, Adelaide	2762/200
	-T.B. Simpson, merchant, of Pirie Street, Adelaide	(from 343/35)
	-D.O. Crompton of 149 Barton Terrace, North Adelaide, Medical Practitioner.	
23/5/1966	The Corporation of the City of Adelaide	
	The Corporation of the City of Adelaide.	5317/62 (Current)

Table 3.8
History of Ownership - Part Town Acre 262

Date	Ownership	CT Reference
8/1/1872	William Bloor of Adelaide, Cooper	161/121
28/9/1896	After W. Bloor's death, transfer to M.Bloor (widow), C. Bloor (spinster), and E. Hague (storekeeper of Truro).	
22/1/1903	C.Bloor, M. A. Bloor, and S. Bloor, all spinsters of Park Street, Unley.	
12/12/1907	The Church of Christ, Grote Street, Adelaide Incorporated.	
21/4/1970	The Corporation of the City of Adelaide.	
	The Corporation of the City of Adelaide	5317/63

Table 3.9
History of Ownership - Part Town Acre 310, Allotment 1

Date	Ownership	CT Reference
11/12/1888	William Bloor of Adelaide, Cooper	94/119
28/9/1896	After W. Bloor's death, transfer to M.Bloor (widow), C. Bloor (spinster), and E. Hague (storekeeper).	
22/1/1903	C.Bloor, M. Bloor, and S. Bloor, all spinsters of Park Street, Unley.	
12/12/1907	The Church of Christ, Grote Street, Adelaide Incorporated.	
	This is a small 8 foot wide strip of land at the southern end of the main block (Certificate of Title 94/119).	1751/38
6/6/1940	The Church of Christ, Grote Street, Adelaide Incorporated .	
	This Certificate of Title includes previous Certificate of Titles 1751/38 and 94/119.	4391/861
20/11/1991	The Church of Christ, Grote Street, Adelaide Incorporated.	
	The Corporation of the City of Adelaide	5060/608 (current)

Table 3.10
History of Ownership - Part Town Acre 311, Allotment 1

Date	Ownership	CT Reference
6/6/1940	May E.A. Leditschke of 9 South Terrace, Adelaide, married woman.	1751/37 (Current Title, from original title 134/49)
19/3/1970	The Churches of Christ Evangelistic Union Incorporated, of 189 Gawler Place, Adelaide.	
30/9/1988	The Corporation of the City of Adelaide	
30/9/1988	Leased to The Churches of Christ Evangelistic Union Incorporated for 2 years from 30/9/1988. Lease Number 6611267.	

3.2.2 Adelaide City Council Archives

The Assessment Books at the Adelaide City Council Archives were reviewed on the basis of the relevant Town Acre reference, to provide an indication of the occupation, ownership and use of the properties on the eastern side of Bowen Street in 1850, 1900, 1922, 1934, 1939 and 1949. This information correlates well with that provided by the review of the Certificate of Titles as summarised in Section 3.2 above.

- In 1850, the site was being established as a residential area, with some existing houses, a few houses in the construction phase, and some vacant land.
- In 1900 the eastern side of Bowen Street contained a number of houses, some vacant land, a few shops, a bakehouse (off Franklin Street) and the United Disciples Church. These premises were all owned by various Adelaide residents.
- The land use had not changed significantly by 1922, however a number of families owned significant portions of the land, for example the Simpson family owned two houses, two shops and some vacant land. The family retained ownership of the houses, shops and vacant land on Bowen Street at least until 1949. The shop on Bowen Street was occupied by the Franklin Wrecking Co. in 1949, and a marine store and shed had been built on the vacant land (also on Bowen Street) by that year.
- In 1922 Albert and Henry Laffer owned the following which were leased out to various tenants; workshop, stables, forge, showroom, shop, offices, a house and some vacant land. There was no longer evidence of the forge and stables in 1934, however the Laffer's retained ownership of the offices, workshops, showroom, house and yard until 1949.
- In 1922, the Church of Christ, Grote Street, Adelaide Incorporated owned a church, a school, a house at 22 Bowen Street, a trap (a term used in the assessment books), a shed and some vacant land on Bowen Street. By 1934, the Church had built some additional buildings on the land that they owned. At this point in time in addition to the structures listed above, the Union owned two houses at 24 and 26 Bowen Street, printing offices and works, a yard and some sheds, and offices and rooms which were leased out to various occupants at least up until 1949.

- By 1934, Goode, Durrant and Co Ltd owned a warehouse on Grote Street. The warehouse was unoccupied in 1934, and was leased out to the National Radio Corporation Ltd in 1939. The Education Department were also using some of the offices in the building in 1949.
- The Grays Estate (Bakewell, Gray and Goodman) owned a garage, workshop and offices at 101-111 Franklin Street at least from 1934 to 1949.
- J.W. Turner had acquired a house, workshop and offices by 1934. Oxy-welders Ltd occupied part of the workshop at least from 1934 until 1949. Turner himself occupied the remainder of the workshop for at least the same period. Ownership of this property had been transferred to A. and H. Silks by 1949, however the occupants remained unchanged.

3.2.3 Aerial Photographs

Aerial photographs of the site were examined from 1949 and thereafter at ten year intervals. The most recent photograph available was also examined. The features noted in each photograph for the section of the site to the east of Bowen Street are detailed below.

1949
This photograph was difficult to discern, however the layout of the buildings seemed to adhere approximately to the boundaries set by the current Certificates of Title. In some cases fences were visible along the allotment boundaries.

There was clearly a large warehouse type building in the south-east corner of the site. In the south west corner there were a number of smaller buildings, and possibly some small private parking lots, and vacant land.

There were a number of buildings ranging in size from small buildings (possibly houses) to warehouses, across the northern part of the site. Especially distinct was a large warehouse in the north-west corner. There was also some vacant space around the northern part of the site which appeared to be used as a car park.

1959
The layout of the site in this photograph was very similar to the photograph taken in 1949, however the images were much more distinct.

1968
There were only a few changes to the layout of the site from the earlier photographs. There was a small change in some of the fencelines in the south-western part of the site, and a car park in the central part of the site (accessed from Bowen Street) appeared to have been bitumenised.

1979
The entire site has been completely restructured. The current bus terminals and car parks were clearly visible.

1989
As above.

1995
A new terminal building had been constructed just off Bowen Street, on the current Certificate of Title 5317/63. This area was previously used as either car or bus parking space.

Aerial photographs examined are listed in Table 3.11 below:

Table 3.11
List of the aerial photographs examined

Photo No	Survey No	Scale	Month	Year
661	5001	1:20000	26/9/95	1995
190	4091	1:20000	6/9/89	1989
19	2408	1:16000	19/3/79	1979
0151	1126	1:15800	15/11/68	1968
9396	326	1:16000	3/1/59	1959
106	7	1:15840	18/1/49	1949

3.2.4 Historical Overview

The following information summarises the knowledge gleaned from the Certificate of Titles, the Assessment Books at the Adelaide City Council Archives, and the aerial photographs, for the section of the site located to the east of Bowen Street.

- From 1850 up until the early 1900s, the land was used generally for residential purposes, with a few shops, and a bakehouse, and a private road.
- In 1900 the eastern side of Bowen Street was generally used as private premises, containing a number of houses, some vacant land, a few shops, a bakehouse (off Franklin Street) and the United Disciples Church. These premises were all owned by various Adelaide residents.
- The land use had not changed significantly by 1922, however a number of families had begun to own significant portions of the land, these are discussed further below.
- The property in the north-western corner of the site, which appeared to be a large warehouse in the early photographs, included a garage, workshop and offices. This property was transferred between a number trustees from 1934 to 1968, when it was transferred to The Corporation of the City of Adelaide.
- From 1880, the Simpson family owned property in the northern part of the site, including two houses, two shops and some land. The shop on Bowen Street was occupied by the Franklin Wrecking Co. in 1949, and a marine store and shed had been built on the vacant land (also on Bowen Street) by that year. The family retained ownership of most of the land on Franklin Street until 1966, when it was transferred to The Corporation of the City of Adelaide, however the land on Bowen

Street was sold to Auriga Ltd in 1960, and then transferred to The Corporation of the City of Adelaide in 1968.

- In 1876 Albert and Henry Laffer, drapers, owned some land in the north-central part of the site. By 1922 this land included the following which were leased out to various tenants; workshop, stables, forge, showroom, shop, offices, a house and some vacant land. There was no longer evidence of the forge and stables in 1934, however the Laffers retained ownership of the offices, workshops, showroom, house and yard until 1949. The O'Donnell Brothers Ltd were leased the property, from 1938 until the death of the last owner in 1948. They lodged a caveat over the land in 1970, and in 1972, ownership was transferred to The Corporation of the City of Adelaide.
- J.W. Turner, a plumber, had acquired a house, workshop and offices in the north-east corner of the site by 1934. Oxy-welders Ltd occupied part of the workshop at least from 1934 until 1949. Turner himself occupied the remainder of the workshop for at least the same period. Ownership of this property was transferred to A. and H. Silks in 1946, however the occupants remained unchanged. This land was then handed over to The Corporation of the City of Adelaide in 1970.
- The Bloor family owned a house and some vacant land on Bowen Street from 1872 until 1907 when it was transferred to the Church of Christ, Grote Street, Adelaide Incorporated. By 1934 the church owned three houses (at 22, 24 and 26 Bowen Street), printing works, a yard and sheds, and various offices and rooms which were leased out to various occupants at least up until 1949. In 1940 Mrs M.A. Leditschke owned a house on the corner of Bowen and Grote Streets which was also transferred to The Churches of Christ Evangelistic Union Incorporated in 1970. By 1991, Certificates of Title 5060/608, 5317/63 and 1751/37 had been transferred to The Corporation of the City of Adelaide. These allotments are currently occupied by The Adelaide Central Mission and used to store furniture. The building at 104 Grote Street has recently been condemned by the Council due to cracking and rust problems, and is therefore disused.
- By 1934, Goode, Durrant and Co Ltd owned a factory in the south-east of the site on Grote Street which was later expanded to include some offices and a warehouse. The factory was unoccupied in 1934, however from 1938 to approximately 1960, a number of radio and electrical companies occupied the warehouse. The Education Department were also using some of the offices in the building in 1949. This land was then handed over to The Corporation of the City of Adelaide in 1968.
- The Corporation of the City of Adelaide had acquired most of the land on the eastern side of Bowen Street by 1972, excepting Certificates of Title 5060/608 and 1751/37. The land was then cleared and by 1979 the existing bus terminal (which is currently occupied by Greyhound Pioneer Australia) and car parks had been constructed.
- Between 1989 and 1995, a new terminal building was constructed on Bowen Street, on what was previously either car or bus parking space. This building is currently occupied by McCafferty's Express Coaches.

Table 3.15
History of Ownership - Part Town Acre 261 and 262, Franklin Street

Date	Ownership	CT Reference
	This Certificate of Title refers to Lots 1,2,3,5 and 6 of Town Acres 261 and 262.	249/169
10/5/1877	Andrew Tennant, Gentleman of Adelaide.	
19/7/1913	Death of A. Tennant.	
10/8/1919	-John Tennant, Sheep Farmer -Frederick Augustus Tennant, of Adelaide, Solicitor -John Tennant Love, of Adelaide, Stock Salesman	
21/11/1937	F.A. Tennant died.	
13/7/1938	J.Tennant, J.Tennant Love, Andrew Tennant	
3/5/1940	-Richard George Hawker of Bungaree, Clare -Andrew Tennant of Stony Gap, Pastoralist.	249/169 (Old)
24/2/1967	Izydor Jedynak and Maria Jedynak purchased lots 5 and 6, which then became Certificate of Title 3479/180.	
7/3/1967	Tennant Industries Pty Ltd retain ownership of Lots 1,2 and 3, which then became Certificate of Title 3479/181.	
3/4/1967	Tennant Industries Pty Ltd own Lots 1, 2 and 3 of Town Acres 261 and 262	3479/181
16/8/1968	Dimet Corrosion Prevention Pty Ltd purchased Lot 1, which then became Certificate of Title 3582/78 (refer below).	
16/8/1968	Ownership of Lots 2 and 3 is divided amongst several stakeholders: -Dimet Corrosion Prevention Pty Ltd (3/9) -Oak Pty Ltd (3/9) -Clive Langdon Bonython (1/9) -Richard Martin Bonython (1/9) -James Langdon Bonython (1/9) This then became Certificate of Title 3582/79 and 3582/80, refer below.	
1/3/1971	Dimet Corrosion Pty Ltd of Cawley Rd, Brooklyn, Victoria.	3582/78 (Current)
1/3/1971	The Corporation of the City of Adelaide.	
1/3/1971	Transfer from the Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L, R.M. and J.L. Bonython to the Corporation of the City of Adelaide.	3582/79 (Current)
1/3/1971	Transfer from the Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L, R.M. and J.L. Bonython to the Corporation of the City of Adelaide.	3582/80

3.3.2 Adelaide City Council Archives

The Assessment Books at the Adelaide City Council Archives were reviewed on the basis of the relevant Town Acre reference, to provide an indication of the occupation, ownership and use of the properties in 1850, 1900, 1922, 1934, 1939 and 1949. This data correlates well with that provided by the review of the Certificate of Titles as summarised in Section 3.6 above.

- In 1850, the site was being established as a residential area, with some existing houses, a few houses in the construction phase, and some vacant land.
- In 1900, the western side of Bowen Street was basically used as a residential area.
- The land use had not changed significantly by 1922, however a number of families had begun to own significant portions of the land. The Tennant Estate owned several houses on Bowen Street, Franklin Street and Little Bowen Street (a private road

1979
The entire site has been completely restructured. The current bus terminals and car parks were clearly visible.

1989
The layout of the site has not changed since the previous photograph.

1995
The layout of the site has not changed since the photograph taken 1979.

Aerial photographs examined are listed in Table 3.16 below:

Table 3.16
List of the Aerial Photographs Examined

Photo No	Survey No	Scale	Month	Year
661	5001	1:20000	26/9/95	1995
190	4091	1:20000	6/9/89	1989
19	2408	1:16000	19/3/79	1979
0151	1126	1:15800	15/11/68	1968
9396	326	1:16000	3/1/59	1959
106	7	1:15840	18/1/49	1949

3.3.4 Historical Overview

The following information summarises the knowledge gleaned from the Certificate of Titles, the Assessment Books at the Adelaide City Council Archives, and the aerial photographs, for the section of the site located to the west of Bowen Street.

- From 1850 up until the late 1960s, the land was used for residential purposes, with the exception of a garage owned by J.E. Bateup, and a forge and workshop operated by R.H. Halliday, both on Andrew Street.
- During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park, as is evident in the aerial photograph taken in 1968. This change probably corresponded with the transfer of land from the Tennant Estate to J. and M. Jedynak in 1967, and to Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L., R.M., and J.L. Bonython in 1968.
- By 1971, The Corporation of the City of Adelaide had acquired the entire site to the west of Bowen Street. The site was then cleared to allow for the construction of the current bus terminals, which were identifiable on the aerial photograph taken in 1979.
- There have been no significant changes of the layout of the allotment since the construction of the bus terminals was completed.

3.4 Information Sources

(a) Mapland - Department of Environment and Natural Resources, Land and Geographic Information Group, 282 Richmond Road, Netley. Aerial photographs were viewed.

(b) Lands Titles Office, 25 Pirie Street. History of Ownership was researched.

(c) Adelaide City Council Archives, Topham Mall off 55 Currie and 56 Waymouth Streets, Adelaide. Assessment Books were viewed to provide an indication of the occupation, ownership and use of properties.

(d) The Corporation of the City of Adelaide, Planning Department. Information with respect to site zoning provided by Greg Vincent.

(e) The Corporation of the City of Adelaide, Environmental Health Department. Information with respect to environmental health issues provided by Murray Phillips.

(f) Sue Park. The Adelaide Central Mission Inc.

(g) South Australian Health Commission:

- Publication "Identification and Assessment of Contaminated Land - Improving Site History Appraisal" by JW Edwards, M Van Alphen and A Langley, Contaminated Sites Monograph Series, No 3, 1994.

(h) The RPS Group plc (1994). The RPS Manual. Published by the RPS Group (UK).

(i) Shineblecker C.L. (1992) "Handbook of Environmental Contaminants: A Guide for Site Assessment". Lewis Publications, Michigan, America.

4. Site Inspection

4.1 Topography

The site was flat.

4.2 Local Soil Types and Groundwater

Published information and previous experience in the area suggests that the soil profile at the site can be expected to include in the order of 1.0m of surface fill, consisting of various reworked soils and building rubble. Underneath this, the natural soil profile is likely to resemble a Brown Solonised Soil type BS classification.

The natural profile can be expected to include a thin calcareous silt containing silts, sands and gravels overlying stiff plastic clay (Keswick Clay). Slickensided fissures are likely to be encountered within the Keswick Clay.

Borelogs for the surrounding area have been obtained from the Department of Mines and Energy and have been included in Appendix D.

References:

- Department of Mines, (1974) Soil Association Map of the Adelaide Region. Bulletin 46.
- Sheard M.J., and Bowman G.M. (1996) Soils, stratigraphy and engineering geology of near surface materials of the Adelaide Plains. Report Book 94/9.

4.3 General Observations - East of Bowen Street

The site, which was inspected on the 25th of February 1997, consisted of the McCafferty's Express Coaches and Greyhound Pioneer Australia bus terminals, 2 public car parks, a house, a private car park, a toilet block, and a two-storey building.

There were two public car parks operated by The Corporation of the City of Adelaide, on the eastern part of the site. The northern car park was accessed from Franklin Street, whilst the southern car park was accessed from Grote Street. Both car parks had a bitumen seal that was in a reasonable condition, with the exception of a few potholes, and heave around the trees which were dispersed throughout the site. The trees themselves, however, looked quite healthy. There appeared to be a number of underground services, including power in the vicinity of the car park. An old paint drum had been left in the northern car park next to a ticket vending machine.

The Greyhound Pioneer Australia bus terminal was located in the north western corner of this section of the site, and consisted of a two-storey building, and an attached canopy structure for the parking of passenger buses. The building housed a sales counter, booking office, waiting room and toilets on the ground floor, and a number of offices on the first floor. It was also noted that all cleaning and fuelling of coaches occurred off-site at Mile End. The attached canopy ran north-south, connecting the McCafferty's and Greyhound terminal buildings.

The McCafferty's terminal building contained similar features to the Greyhound Building, however it was only single storey.

The canopy was directly accessible from Bowen Street along it's entire length, and was sealed with a bitumen surface. The bitumen appeared to be in good condition, however there were a few small patches which had been replaced. All of the stormwater runoff from this area ran directly into the drains on Bowen Street.

There are two buildings on the south-western part of the site that are currently only used for storage purposes by the Adelaide Central Mission Incorporated. The building on the corner of Grote and Bowen Streets was a two-storey building with a single storey extension to the north. There was also a garage north of the building, and a small private car park west of the building. The car park was accessible from both streets, was lined with trees and bitumen sealed. There had been some illegal dumping of rubbish at the corner of the building.

Just north of the two-storey building was a fenced area containing public toilets and a private car park. There was a large pothole in the bitumen surface of the car park. An old brick wall along the rear of the lot provided evidence of a building which had previously existed on the site.

At 22 Bowen Street, between the private car park and McCafferty's bus terminal, was a small single storey dwelling which was boarded up and could not be accessed. This building is also occupied by the Adelaide Central Mission Incorporated, and is understood to only be used for storage purposes.

4.4 General Observations - West of Bowen Street

The site, which was inspected on the 25th of February 1997, consisted of a private car park, and the Coachfreight and Premier Stateline bus terminals.

The private car park was on the corners of Andrew and Bowen Streets. It was an open lot car park with a bitumen surface that was cracked in places but was otherwise in reasonable condition. The site was basically flat and any stormwater drainage would run into drainage pits in the kerb at the roadside. There was also an access road which ran parallel to Bowen Street from Andrew Street, to the Coachfreight parcel pick up point.

Coachfreight operated from a single storey office and storage shed off Bowen Street, on current Certificate of Title 3479/80. The floor in the shed was completely sealed with bitumen which was in good condition. No chemicals or fuels were stored on the site at the time of inspection, excepting some disinfectants and cleaning agents that were used by the cleaner. These chemicals were kept in a locked cage on a sealed bitumen floor. A conveyor belt ran along the length of the shed and into the office to convey heavy parcels from the storage point to the collection point. The motor and gear box which operated the belt was located at it's western end. The equipment was very greasy, and there were a few stains on the bitumen beneath it. It was also noted that a section of the bitumen floor had been replaced here.

To the north of the site was the Premier Stateline Bus Terminal. This comprised a two storey building at the eastern end of the site, an attached canopy structure which provided some shelter for the parking of passenger buses, and an open lot car park to the north of the canopy. The building housed the sales counter, a waiting room, cafe and public toilets on the first floor, and offices on the second floor. There was also a power unit on the ground floor. A cement swale guided any stormwater runoff from the site (which could possibly be contaminated with oil or fuels) into a stormwater drain at the western end of the canopy. The car park was also sealed with bitumen which seemed to be of a reasonable quality.

The central portion of this site was used as a roadway to allow access to the buses from Bowen Street. This area was completely covered with a bitumen seal. There were two large Collex waste disposal bins, two 44 gallon drums and one 45 Litre drum located at the western end of the site, next to a stormwater drain. The drums contained unknown substances.

5. Summary of Potential Contamination Issues

5.1 Potential Contamination Issues Associated with Previous Uses of the Site

Over the past 70 years a number of industries existed on the site which may have the potential to cause significant site contamination. The potential risk of contamination caused by the various land uses have been outlined below:

- Polycyclic aromatic hydrocarbons (PAHs) may be potential contaminants from residential land uses where coal and ashes may have been disposed of on-site.
- Benzoyl peroxide, polycyclic aromatic hydrocarbons (PAHs) (due to the disposal of coal and ashes on-site) and hydrocarbons (due to the storage of fuels on-site) are potential contaminants associated with bakeries, and therefore may be present in the north-eastern part of the site.
- J.W. Turner operated a plumbing business in the north-east of the site. A range of contaminants are associated with plumbing supplies and their usage, including acids, solvents, lead, silver, zinc and arsenic.
- Two forges were established on the site at various times. Potential contaminants that may have been generated by their operation include a broad range of metals and heavy metals, solvents, cyanides, phenols, phosphorous, halogenated compounds, polychlorinated biphenyls (PCBs), hydrocarbons, monocyclic aromatic hydrocarbons (MAHs) and polycyclic aromatic hydrocarbons (PAHs).
- An oxy-welding company was established in a warehouse in the north-east of the site, and remained in operation for at least 10 years. Similar contaminants would have been generated by the welding processes, as in the forge, however specific contaminants may include chromium, fluorides, nitrogen, thorium, titanium, vanadium, zinc and benzene.
- A number of radio and electrical companies occupied a warehouse in the south-eastern part of the site. Potential contaminants from these businesses may include metals, PCBs, MAHs, halogenated compounds, boron, chlorinated naphthalenes, chlorodiphenyls, phthalates and hydrocarbons.
- A wrecking company and two garages have also been in operation on the site. Contaminants associated with these businesses include petroleum hydrocarbons, a range of heavy metals including lead, volatile organic compounds, degreasing solvents, anti-freeze compounds, PCBs, asbestos, MAHs and other organic compounds. Underground fuel storage tanks may possibly have been used to store the fuels. It could not be ascertained whether these have ever existed on the site.
- Printing works may have caused contamination with heavy metals (in particular chromium, magnesium, and zinc), other metals (particularly silver), alkalis, inorganic acids, petroleum hydrocarbons, solvents, MAHs, halogenated compounds, ethyl acetate, ethanol, and isopropanol.
- Dimet Corrosion Pty Ltd also owned some land in the north-west of the site, however the aerial photographs did not indicate any structures on the site at that time. If corrosion inhibitors were used or manufactured on the site then the potential contaminants may include heavy metals (including Boron associated with Borax),

other metals (including tin, lead, copper, and zinc), and amines, phosphates and nitrates.

There were also various leases on some of the properties to occupants whose business could not be ascertained, therefore there may be contaminants present in addition to those already mentioned above.

5.2 Potential Contamination Issues Associated with the Current Use of the Site

The site currently contains a number of car parks, houses and bus terminals.

- If the bitumen was laid in the car park more than 15 years ago, the soil underlying the bitumen may contain some residues of polycyclic aromatic hydrocarbons (PAHs) due to tar based sub-base materials used in the past.
- The parking of the cars and buses has lead to some hydrocarbon staining of the bitumen surfaces. If the bitumen was cracked there is potential for these contaminants to be washed in the soil strata below. In addition, the contaminants may have been washed directly into the stormwater system.
- At the western end of Bowen Street there were a number of waste bins and large drums containing hydrocarbons located on a sealed surface next to a stormwater drain. Any leakage from either the drums or the waste bins would be washed directly into the stormwater system whenever it rains.
- Power switchboards were noted in a number of the terminal buildings. The switchboards may contain asbestos.
- There was a conveyor belt which ran the length of the Coachfreight storage shed. The rubber belt used to operate this system may potentially contain asbestos.
- Cleaning disinfectants were stored in a locked cage on a sealed floor in the Coachfreight storage shed. If a spillage did occur, there is potential for seepage directly into the stormwater drainage system.
- Asbestos may have been used in the building materials of the old houses on the eastern side of Bowen Street that are currently used by The Adelaide Central Mission.
- White Ant Treatments may have been used on the soil beneath the buildings and on the surfaces prior to sealing. Potential contaminants associated with this may include arsenic, organochlorine pesticides (OCPs), or organophosphate pesticides (OPPs).

6. Recommendations

The site history investigation has highlighted a number of past activities that have been undertaken at the site. It is likely that contaminants are present on site however given the current site use those do not present an immediate concern.

If future plans for the site include redevelopment to a more sensitive land use (ie residential housing), it is recommended that further soul samples are taken from within those areas identified as potentially being contaminated and analysed to determine if these areas of the site contain significant levels of contamination.

7. Statement of Limitations

This report has been prepared by the Consultant with all reasonable skill, care and diligence in accordance with the terms of agreement with the Client, and taking account of the human and other resources utilised by agreement with the Client.

The data in the report was derived by applying the methodology described in subsequent sections of this report. To the best of the Consultant's knowledge, the information contained in the report is accurate at the date of issue. However there should be a recognition of the limitations of the site environmental assessment process. These are referred to, for example in Section 4 of ASTM Practice E 1527-94. Clause 4.5 states the following:

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognised environmental conditions in connection with a property. This site assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for recognised environmental conditions in connection with a property, and both practices recognise limits of time and cost.

It should also be recognised that site conditions, including contaminant extent and concentrations, can change with time. This may be particularly relevant if the report is used after a protracted delay, such that further investigation of the site may be necessary.

In preparing this report, the Consultant has relied on and presumed accurate certain information provided by the Client or third parties. Unless otherwise stated in the report, the Consultant has not attempted to verify the accuracy or completeness of any such information.

The consultant has prepared this report for the Client in accordance with generally accepted consulting practice and the Consultant's Terms of Business. No other warranty, express or implied, is made as to the professional advice included in this report. The Consultant disclaims any responsibility in respect of any matters outside the scope of the terms of agreement with the Client.

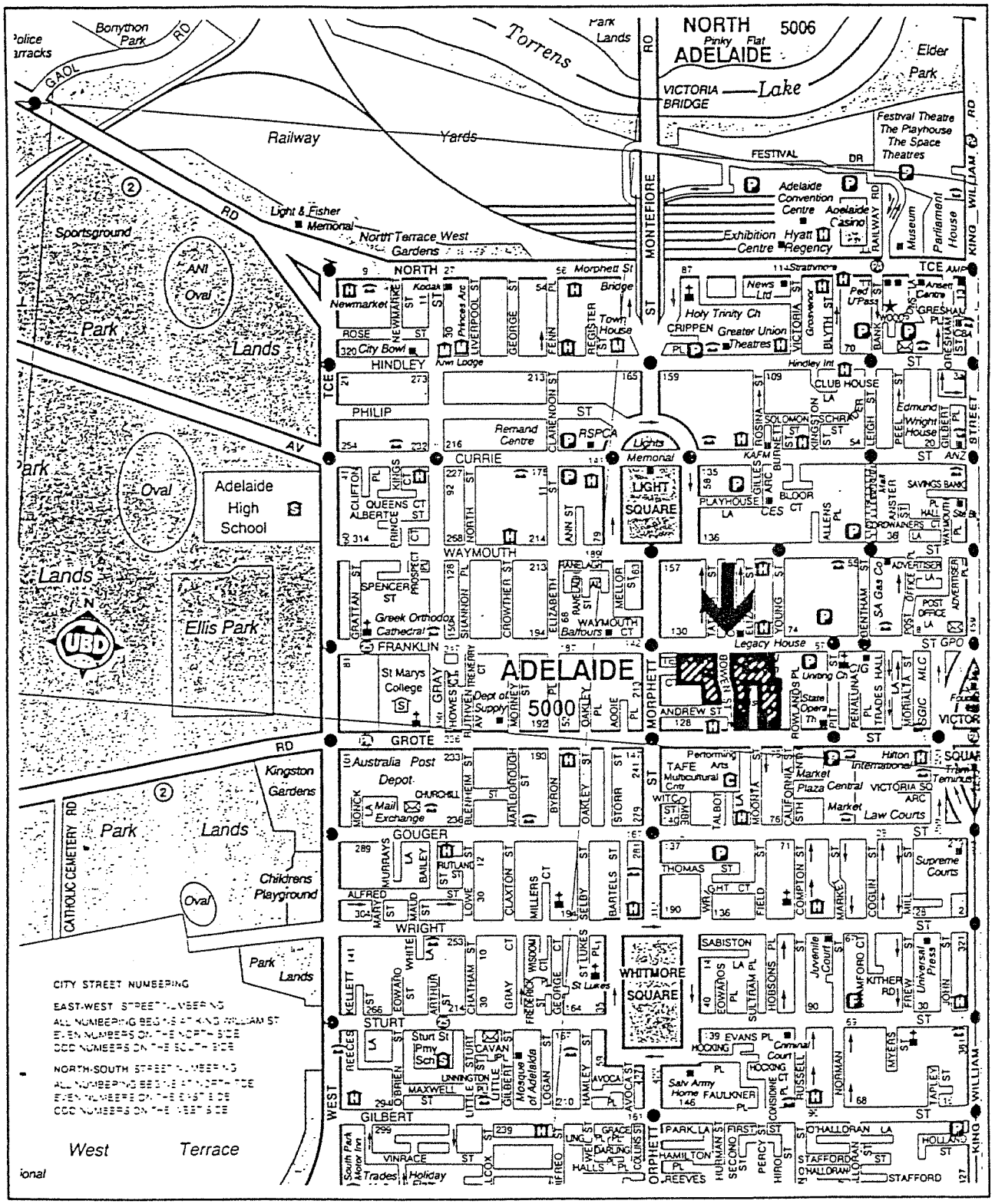
This report has not been prepared for use by parties other than the Client. It may or may not contain sufficient information for purposes of other parties or for other uses. The Consultant accepts no responsibility to third parties to whom this report, or any part thereof, is made known.

A third party relies upon the report at its own risk.

In accordance with standard practice, the assessment carried out is site specific. Consequently, the assessment does not address environmental liabilities which may or may not pertain to other properties either currently or previously owned or operated by the Client or other off-site environmental liabilities.

Appendix A

Location Map



Map courtesy of Universal Press

Location Map

Appendix B

Site Plan

FRANKLIN STREET

STREET

PITT STREET

GROTE STREET

MORPHETT

N

261

A

TA 262

3479/180

3479/180

312

ANDREW STREET

311

B

TA 263

226/124

5317/65

5317/64

5317/63

5317/62

5317/61

6
415/33

264

5
5229/375

41
4391/862

310

5039/178

36
415/32

309

5175/108

5252/887

5229/374

5229/373

5229/372

5229/371

617/45

ROWLANDS PL

84
4174/872

82
4174/873

85
4174/871

78
2538/558

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5229/9

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5229/5

5229/4

5229/3

5229/2

5229/1

WITCOMBE ST

329

330

97
5123/524

96
5099/85

331

91
4224/864

93
4224/865

18
4278/62

CALIFORNIA ST

92
4216/204

91
4216/203

332

33

90
5099/86

ROMILLA STREET

APPENDIX B

Rust PPK Pty Ltd, 1997,
Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide,
for the Corporation of the City of Adelaide, 30 June 1997

Photo 9: The carpark at the eastern edge of the site (looking east from the Greyhound terminal).

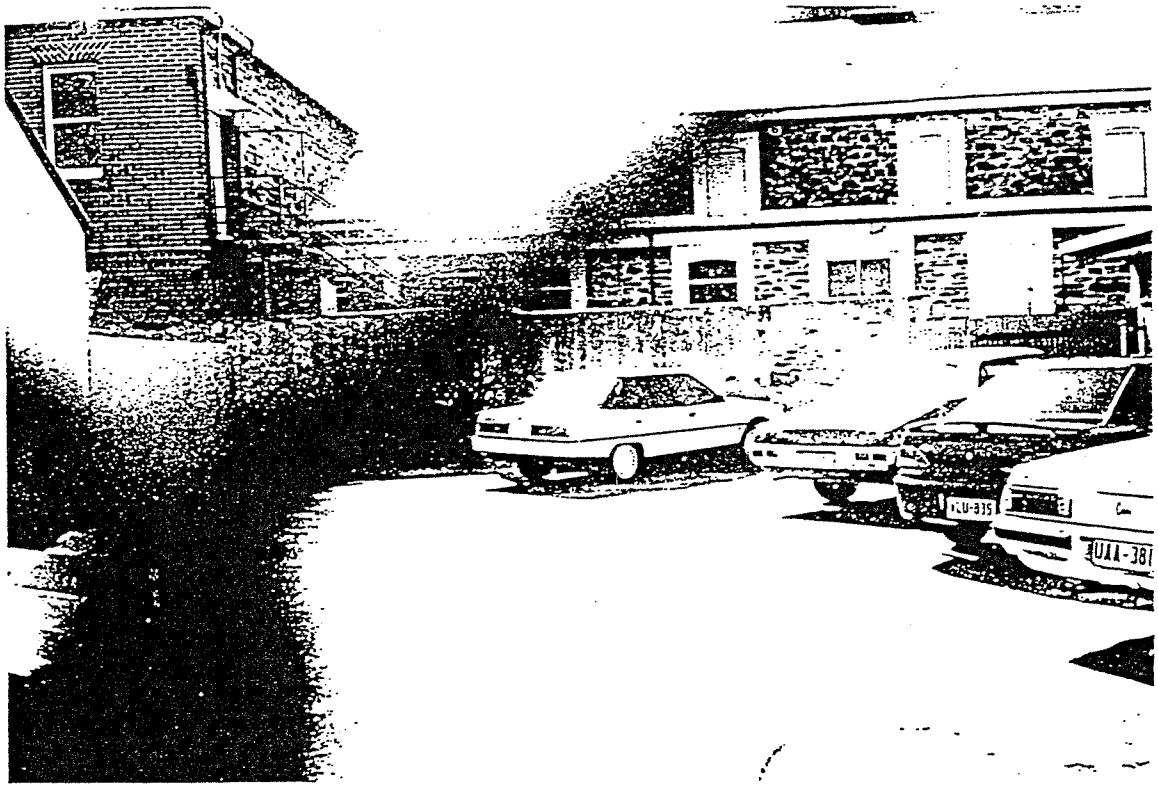


Photo 10: The private car park on Bowen Street with the remains of an old wall along the rear of the site (looking east from Bowen Street).

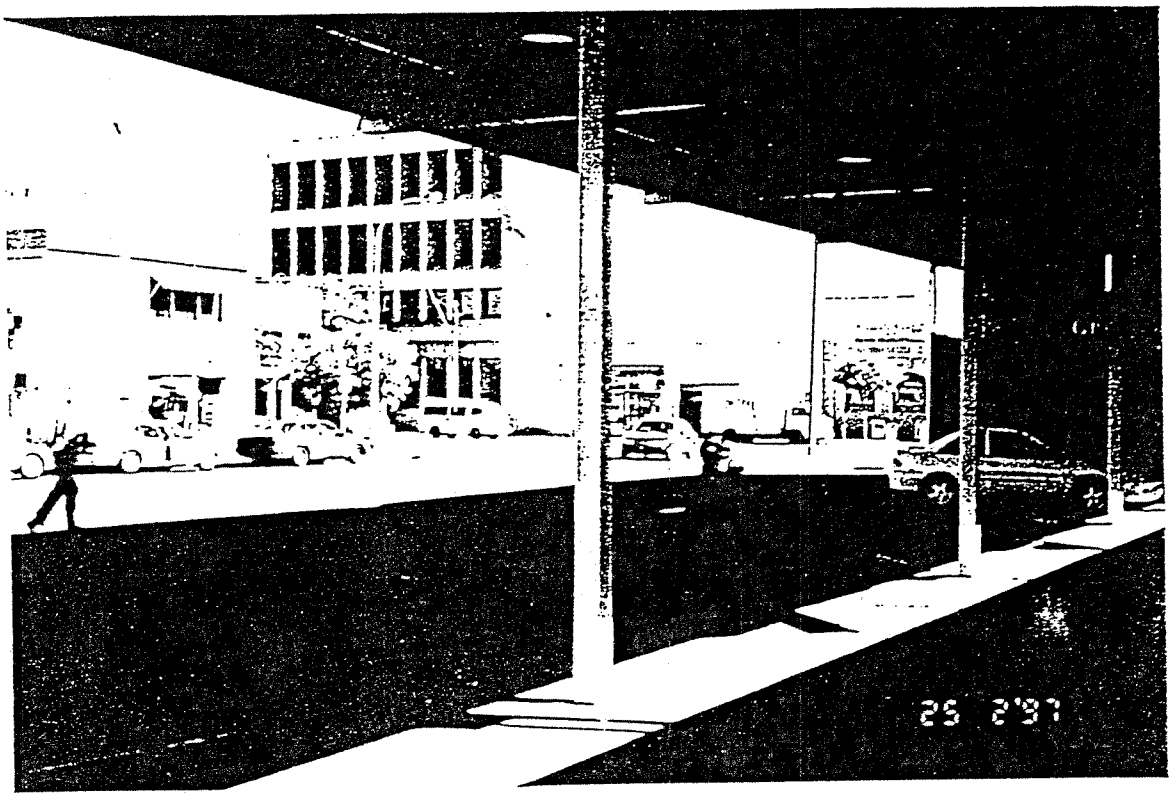


Photo 7: The Greyhound terminal and attached canopy for bus parking (looking north-west).

Photo 8: The carpark at the eastern edge of the site (looking east from the Greyhound terminal)

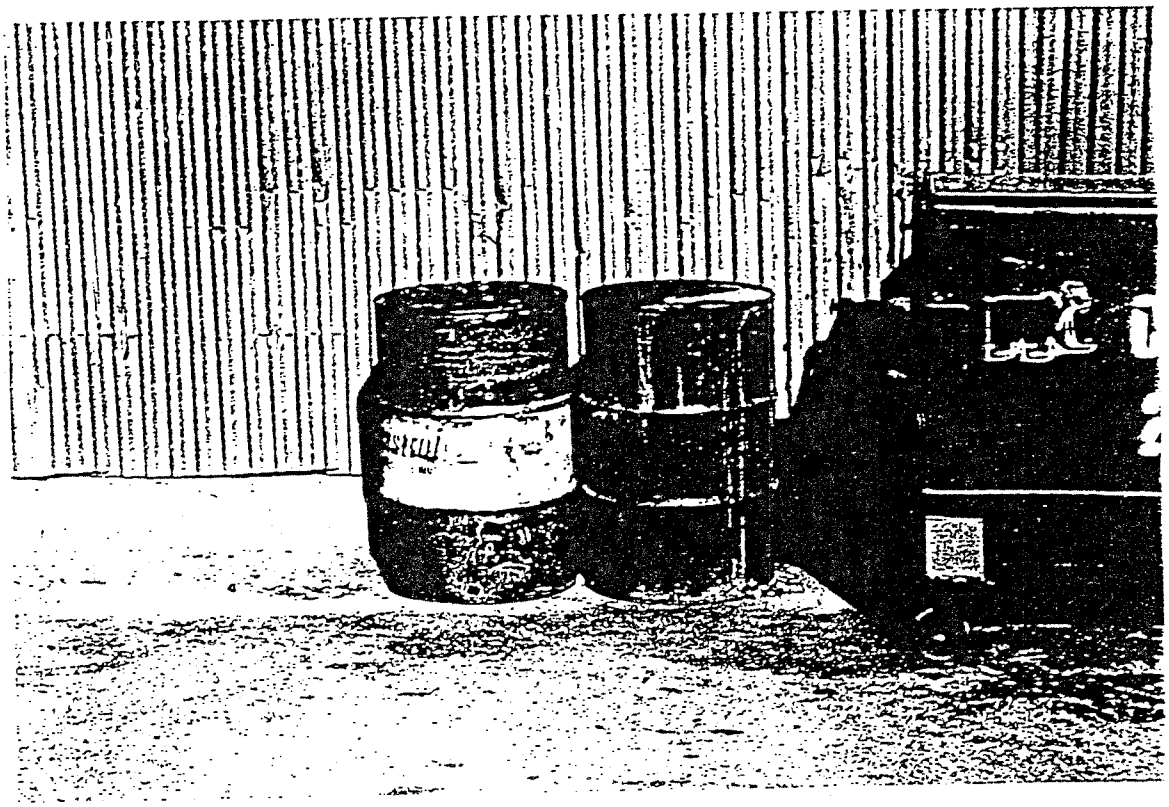


Photo 5: The large drums containing waste oils near the stormwater drainage pit at the western edge of the site.

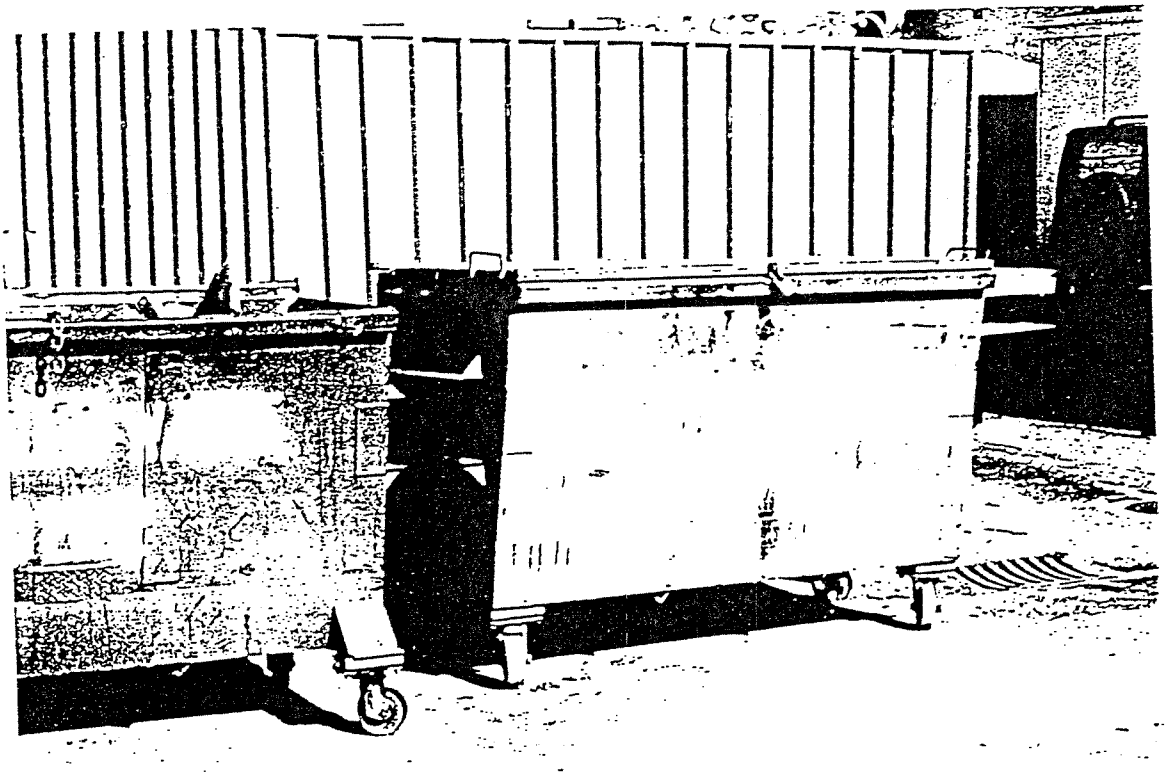


Photo 6: The Collex waste collection bins next to the stormwater drainage pit at the western edge of the site.

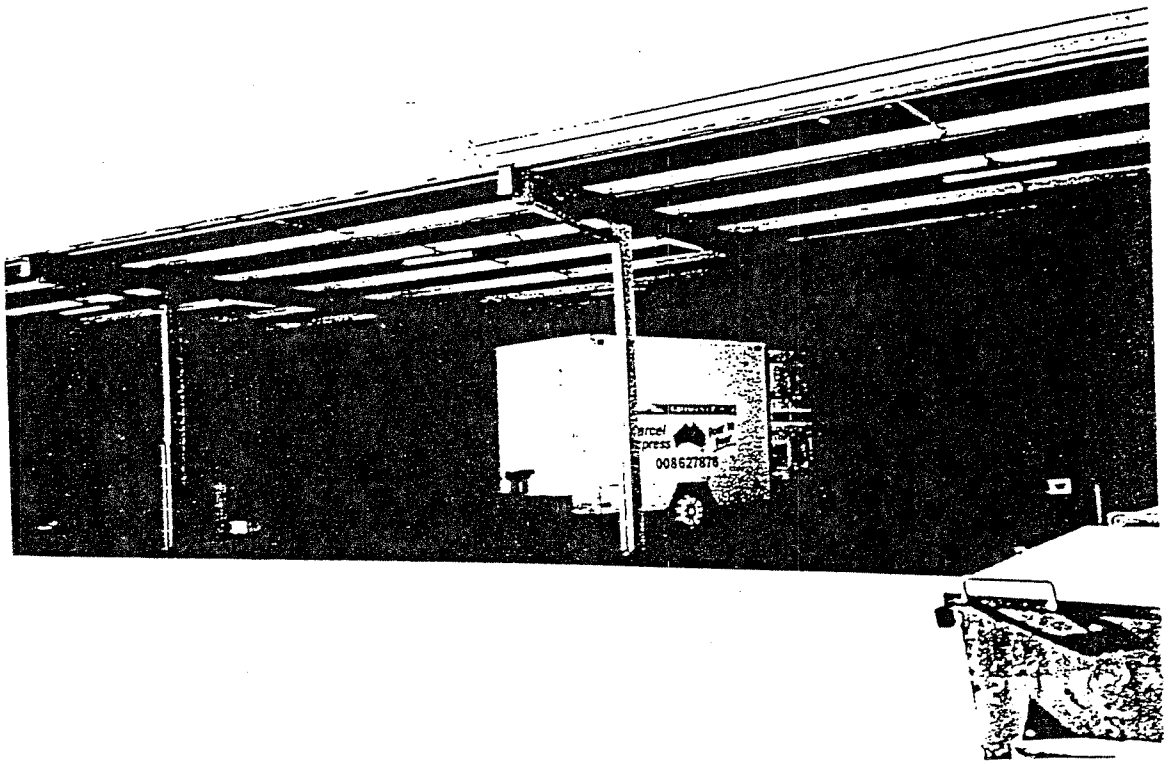


Photo 3: The Coachfreight storage shed, with the conveyor belt along the rear wall (looking south).

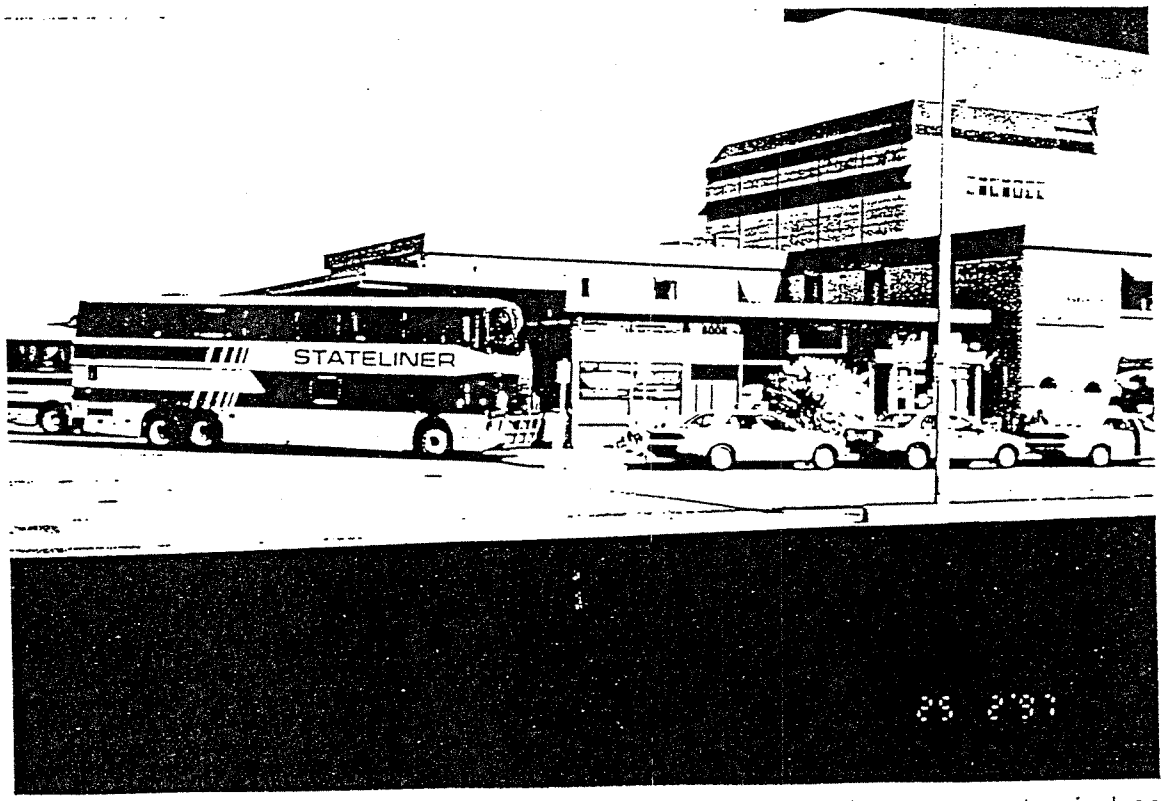


Photo 4: The Premier Stateline passenger terminal, and attached canopy for bus parking (looking west across Bowen Street).

Appendix C

Current Zoning Regulations

F8 FRANKLIN STREET EAST PRECINCT

The Franklin Street East Precinct should develop as a high quality low to medium intensity office area with a range of retail, ancillary retail and support activities at ground floor level. High-density residential and visitor accommodation is also appropriate. The substantial redevelopment opportunities which exist within the Precinct should be used to establish a new commercial character in the area, complemented by the upgrading of the public environment.

The Precinct should remain highly accessible for both local and through traffic. Pedestrian links to the Central Market Precinct and the Western Core Precinct should be maintained and improved to provide for increasing numbers of pedestrians.

USE OF LAND

The primary activity in the Precinct should be general offices supported by ground floor retailing. The redevelopment of a comprehensive bus terminal and supporting facilities is appropriate in the Precinct. The Morphett Street frontage should accommodate offices and showroom activities. Showrooms will be considered elsewhere in the Precinct on their merits. Residential and visitor accommodation may also be appropriate at higher densities.

Public parking stations are ***non-complying*** on Franklin and Morphett Street frontages, but elsewhere will be considered on merit.

Desired Uses

general offices, consulting rooms
cafes
shops
licensed premises
ancillary retail services
leisure studios
showrooms (on Morphett Street frontages)
passenger terminals, minor transport depots

Non-complying and Other Uses - indicated in Use Chart F.

BUILT-FORM

Density

Basic plot ratio: 2.4

Maximum plot ratio: 3.0

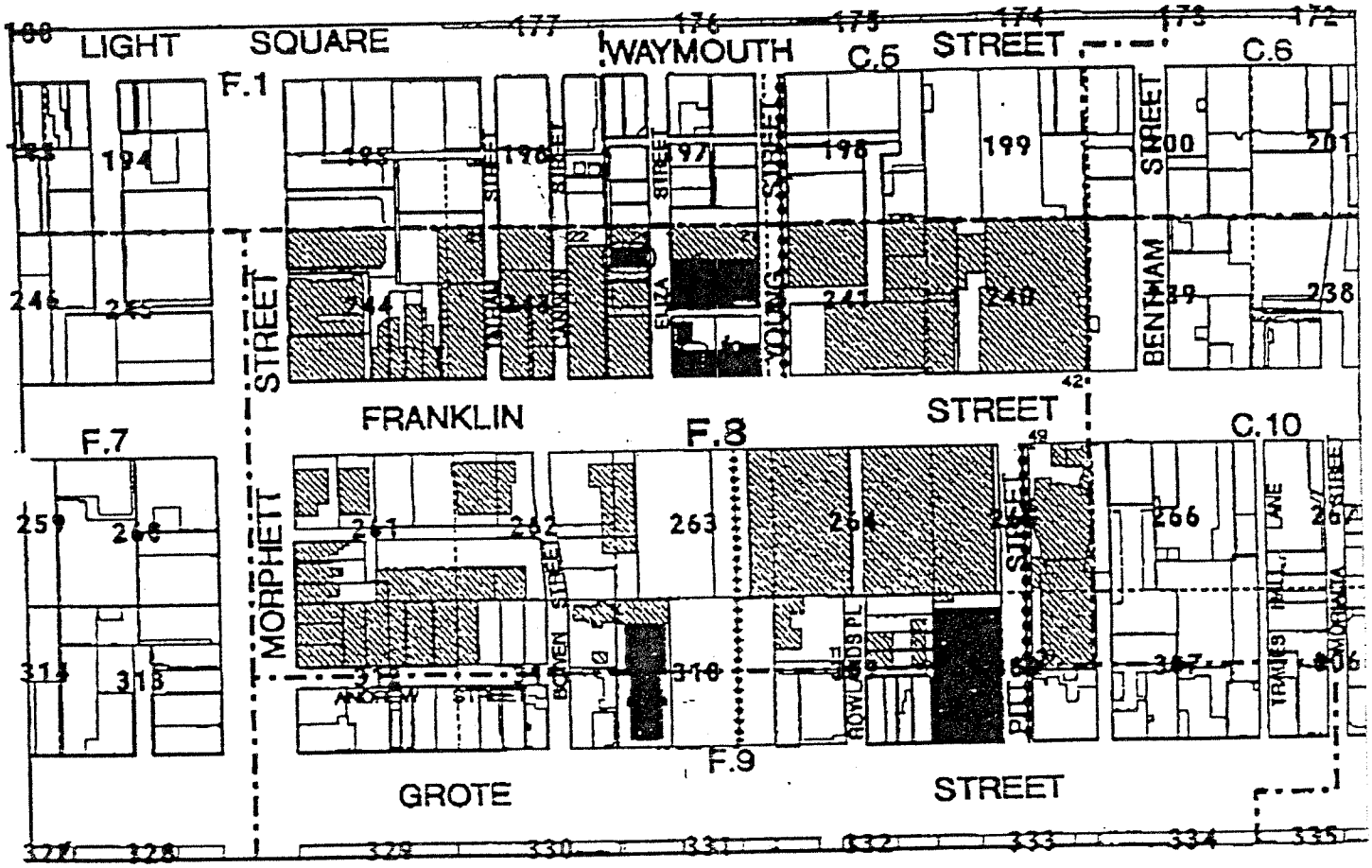
Bonus plot ratio of up to 0.6 can be achieved by the following means:

(a) by purchase of transferable floor area from a Local Heritage Item or an Item of City Heritage;

(b) for the provision of dwellings, multiple dwellings, institutional care, residential care accommodation, visitor accommodation or any combination of the above where the bonus floor area is equal to the floor area used exclusively for these purposes;

(c) for the provision of a child care centre and associated open space where the bonus floor area is equal to the area used exclusively for this purpose; and

(d) for the provision of a required pedestrian link on Town Acres 209 and 210 as indicated on Precinct Map F8. (The amount of floor area which may be achieved from the awarding of this bonus is equivalent to the site area devoted to the pedestrian link and multiplied by a factor of 2.0).



LEGEND

PRECINCT BOUNDARY	
TOWN ACRE BOUNDARY	
TOWN ACRE NUMBER	528
CT BOUNDARY	
REQUIRED PEDESTRIAN LINK (Existing)	
REQUIRED PEDESTRIAN LINK (Proposed)	
BUILDING (within Precinct)	
BUILDING (outside Precinct)	
HERITAGE ITEM	
LOCAL HERITAGE ITEM	

PRECINCT MAP

F.8 FRANKLIN STREET EAST

Height, Scale and Siting

The built-form in the Precinct should effect a transition from the higher intensity and scale of the Western Core to the lower scale of the Central Market Precinct.

Accordingly, the maximum building height in the Precinct is 21 metres or six storeys. Buildings on Franklin Street should achieve a minimum of two storeys. Front and side boundary set-backs should be minimal to Franklin and Morphett Streets, and be in accordance with the prevailing siting pattern in order to produce a largely continuous built-form wall along these major street frontages. On minor streets front and side set-backs may be varied to provide landscaped frontages to buildings.

Townscape Context

Development should relate well to neighbouring buildings and contribute to the development of a cohesive townscape. New buildings should respect the traditional scale, massing and architectural detail of the Franklin Hotel and adjacent buildings.

Heritage

Within the Franklin Street East Precinct the following items are included on the Register of City of Adelaide Heritage Items contained in Schedule 4 to these Principles:

Item 0961	Workshop, 25 Eliza Street;
Item 97	Young Street Chambers (former Printing House), 25 to 29 Young Street and 26-30 Eliza Street;
Item 98	Offices (former Houses), 82 to 86 Franklin Street;
Item 99	Church of Christ and Church Hall, rear of 96 to 100 Grote Street (part in F9 Precinct);
Item 100	Hotel Franklin, 88 to 92 Franklin Street;
Item 101	Her Majesty's Theatre, 54 to 58 Grote Street (part in F9 Precinct).

The location of the above buildings contained within the Items is indicated on Precinct Map F8.

ENVIRONMENT AND AMENITY

Public Environment and Pedestrian Shelter

A high level of pedestrian amenity should be achieved in the public environment of the Precinct with large growing street-trees on the major streets and attractive paving where appropriate. Where footpath widths and existing or proposed street tree-planting allow, development may provide verandahs, awnings or balconies for pedestrian shelter.

Design of the public environment should contribute to the safety and security of pedestrians.

On-site Landscaped Open Space

On-site landscaped open space is not required, but the provision of landscaped pedestrian spaces such as arcades, malls and small pocket parks on pedestrian links is desirable.

Signs

The provision of signs should be in accordance with Principle 37 and Sign Chart F.

A variety of well-designed signs may be permitted in the Precinct. Illumination of signs and buildings is appropriate, providing there is no adverse impact on residential premises.

Within the indicated sign levels the following signs are appropriate:

(a) above canopy level - flat wall signs (at parapet height), vertical projecting signs;

(b) canopy level - fascia signs, flat wall signs, horizontal projecting signs;

(c) below canopy level - business plates, flat wall signs, horizontal projecting signs, under canopy signs; and

(d) ground level - low free-standing signs.

Within the indicated sign levels the following signs are ***non-complying***.

(a) roof level - all signs; and

(b) ground level - pylon signs.

All other signs and the animation of signs will be considered on their individual merits, but third party advertising is ***non-complying***.

MOVEMENT

Pedestrians

Existing through-site and on-street pedestrian links should be maintained and developed on Town Acres 241, 242, 263, 265, 308 and 310.

A new pedestrian link is required between Grote and Franklin Streets to run from Young Street to Moonta or California Streets through Town Acre 263 and 310 as shown on Precinct Map F8.

The pedestrian route along Bentham Street and Pitt Street should be developed as a key route linking the railway station with the Central Market. Pedestrian safety and security should also be improved along Young Street.

Vehicle Access and Servicing

Provision for vehicle access and servicing should be in accordance with Principles 44, 46 and 50.

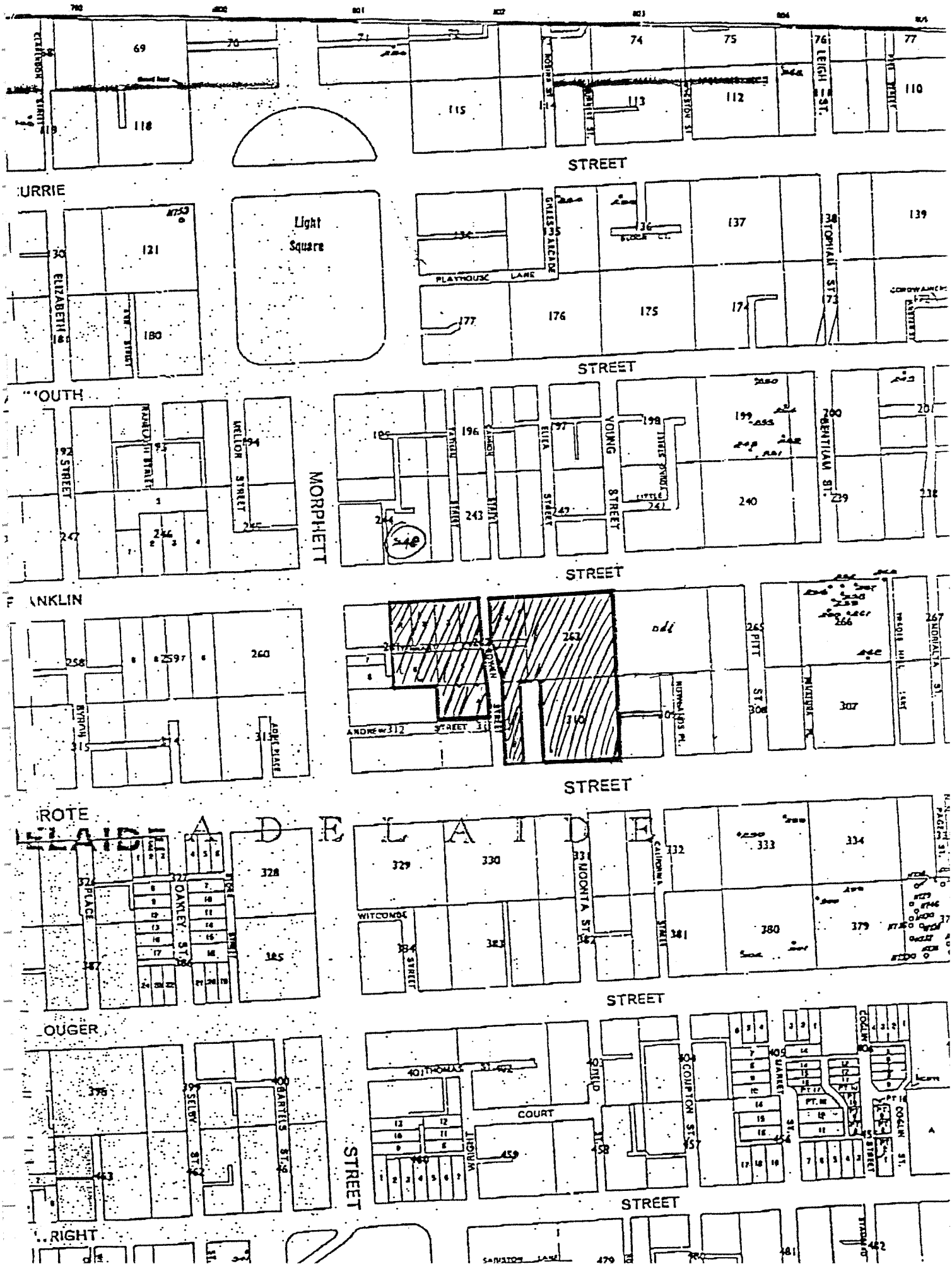
Parking

Provision for car parking should be in accordance with Principles 48, 50, 52 and 53.

Appendix D

Borelogs from the Surrounding Area

6628-41m


STREET
Light Square
PLAYHOUSE LANE
STREET
MORPHETT
STREET
STREET
ADELAIDE
STREET
STREET
STREET
69
70
71
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South Australian Department of Mines and Energy

Regions 400 metre

te:26/02/97
me:10:03

Program No:dhr021
Page: 1 of 3
Version:1.00

Summary of Latest Water Information for Drillholes

it No	Cl	Max Drill Depth (m)	Orig Drill Date	Curr Drill Depth (m)	Curr Drill Date	Hundred	Section	SWL (m)	SWL Date	Well Yield (Gal/hr)	Well Yield Date	TDS (mg/l)	Sampl Date	pH	Permit	Cased To (m)	Full Chem Anal	Drll Log	Geol Log	Gphys Log	Rhan Rckf Coll Plug
628 41 m 230	NW	83.82	01/05	83.82	11/14	ADELAIDE	S 71	17.98	11/14	2502.37	01/14	1799	10/14				Y	Y	U	U	
628 41 m 234	EW	12.95	11/61	12.95	11/61	ADELAIDE	S 135										U	U	Y	U	
628 41 m 235	NW	27.43	06/14	27.43	06/14	ADELAIDE	S 136	21.34	06/14	1203.67	01/14	1428	06/14				Y	Y	U	U	
628 41 m 243	EW	13.72	04/62	13.72	04/62	ADELAIDE	S 201	10.97	04/62								U	U	Y	U	
628 41 m 248	NW	21.95	03/60	21.95	03/60	ADELAIDE	S 244										U	Y	U	U	
628 41 m 249	EW	45.72	08/65	45.72	06/65	ADELAIDE	S 199	21.34	08/65								U	U	Y	U	
628 41 m 250	EW	23.01	08/65	23.01	09/65	ADELAIDE	S 199									15.24	U	U	Y	U	
628 41 m 251	EW	24.38	03/68	24.38	04/68	ADELAIDE	S 199										U	U	Y	U	
628 41 m 252	EW	26.21	03/68	26.21	04/68	ADELAIDE	S 199										U	U	Y	U	
628 41 m 253	EW	25.50	03/68	25.50	03/68	ADELAIDE	S 199										U	U	Y	U	
628 41 m 254	EW	27.20	03/67	27.20	03/68	ADELAIDE	S 199										U	U	Y	U	
628 41 m 255	EW	12.80	01/57	12.80	01/57	ADELAIDE	S 266										U	U	Y	U	
628 41 m 256	EW	25.91	02/57	25.91	02/57	ADELAIDE	S 266										U	U	U	U	
628 41 m 257	EW	12.80	01/57	12.80	01/57	ADELAIDE	S 266										U	U	Y	U	
628 41 m 258	EW	12.80	01/57	12.80	01/57	ADELAIDE	S 266										U	U	Y	U	
628 41 m 259	EW	4.88	01/57	4.88	01/57	ADELAIDE	S 266										U	U	Y	U	
628 41 m 260	EW	12.80	01/57	12.80	01/57	ADELAIDE	S 266										U	U	Y	U	
628 41 m 261	EW	12.80	01/57	12.80	01/57	ADELAIDE	S 266										U	U	Y	U	

The Department will not assume responsibility for any errors or omissions in the data provided

Summary of Latest Water Information for Drillholes

It No	Cl	Max Drill Depth (m)	Orig Drill Date	Curr Drill Depth (m)	Curr Drill Date	Hundred	Section	SWL (m)	SWL Date	Well Yield (Gal/hr)	Well Yield Date	TDS (mg/l)	Sampl Date	pH	Permit	Cased To (m)	Full Chem Anal	Dril Log	Geol Log	Gphys Log	Aban Bokf Coll Plug
28 41 m 262	EW	15.47	01/71	15.47	01/71	ADELAIDE	S 266										U	U	Y	U	
28 41 m 263	EW	7.62	01/71	7.62	01/71	ADELAIDE	S 266										U	U	Y	U	
628 41 m 289	EW	13.29	04/64	13.29	04/64	ADELAIDE	S 333										U	U	Y	U	
628 41 m 290	EW	27.43	04/64	27.43	04/64	ADELAIDE	S 333										U	U	Y	U	
628 41 m 300	WW	23.09	10/34	23.09	10/34	ADELAIDE	S 379			401.86	01/34						U	Y	U	U	
628 41 m 301	EW	27.48	04/64	27.48	04/64	ADELAIDE	S 380										U	U	Y	U	
628 41 m 302	EW	19.20	04/64	19.20	04/64	ADELAIDE	S 380	14.63	04/64								U	U	Y	U	
628 41 m 358	EW					ADELAIDE	S 111										U	U	U	U	
628 41 m 361	WW	113.00	09/76	113.00	09/76	ADELAIDE	S 61	40.00	09/76			1529	09/76	7.80	186		X	Y	U	U	BKF
628 41 m 6881	WW	100.00	03/78	100.00	07/78	ADELAIDE	P 19	18.00	03/78	300.92	01/78	2403	03/78	7.80	2798	63.68	U	Y	U	U	BKF
628 41 m 11726	WW	17.50	05/81	17.50	05/81	ADELAIDE	S 378	15.00	05/81			1804	05/81	7.60	8778	17.50	U	Y	U	U	OPR
628 41 m 11727	WW	17.00	05/81	17.00	05/81	ADELAIDE	S 378	14.50	05/81			1810	05/81	7.50	8779	17.00	U	Y	U	U	OPR
628 41 m 11728	WW	16.00	05/81	16.00	05/81	ADELAIDE	S 378	13.50	05/81			1832	05/81	7.70	8780	16.00	U	Y	U	U	OPR
628 41 m 11729	WW	16.50	05/81	16.50	05/81	ADELAIDE	S 378	14.00	05/81			1832	05/81	7.60	8781	16.50	U	Y	U	U	OPR
628 41 m 11730	WW	16.00	05/81	16.00	05/81	ADELAIDE	S 378	13.50	05/81			1832	05/81	7.60	8782	16.00	U	Y	U	U	OPR
628 41 m 11732	WW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	8.10	8784	19.00	U	Y	U	U	OPR
628 41 m 11733	WW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	7.70	8785	19.00	U	Y	U	U	OPR
628 41 m 11734	WW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	7.70	8786	19.00	U	Y	U	U	OPR

Summary of Latest Water Information for Drillholes

it No	Cl	Max Drill Depth (m)	Orig Drill Date	Curr Drill Depth (m)	Curr Drill Date	Hundred	Section	SWL (m)	SWL Date	Well Yield (Gal/hr)	Well Yield Data	TDS (mg/l)	Sampl Date	pH	Permit	Cased To (m)	Full Chem Anal	Drll Log	Geol Log	Gphys Log	Aban Bckf Coll Plug
28 41 m 11739	WW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	17.50	05/81			1776	05/81	8.10	8791	19.00	U	Y	U	U	DPR
28 41 m 11742	WW	15.00	05/81	15.00	05/81	ADELAIDE	S 378	12.50	05/81			1787	05/81	7.70	8794	15.00	U	Y	U	U	OPR
28 41 m 11743	WW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1776	05/81	7.50	8795	19.00	U	Y	U	U	OPR
28 41 m 11746	WW	15.10	05/81	15.10	05/81	ADELAIDE	S 378	12.50	05/81			1776	05/81	8.00	8798	15.00	U	Y	U	U	OPR
28 41 m 11753	WW	12.55		12.55	09/81	ADDISON	S 131	6.35	09/81			882	09/81	8.50			D	Y	U	U	ABD
28 41 m 13444	WW	160.00	11/84	160.00	11/84	ADELAIDE	S 191	20.00	11/85	1543.78					14718	29.00	U	Y	U	Y	

6628-248

HD. ADELAIDE PT. TOWN ACRE 244 BORE NO. 1 A

LOG OF BORE

Depth From	Depth To	Nature of Strata
0'	64'	Clay
64	72	Sand.
		END BORE 72ft.
		DRILLER F.S.MUNRO'S LOG.

Micro Film No.

6628- 255

HD. ADELAIDE, T.A. BLOCK 266, AUGER HOLE NO. A. 5A

LOG OF BORE

Depth From	Depth To	Nature of Strata
0'	1'	Fill. Sandy loam and rubble.
1	2	Fill. Fairly soft brownish limey clay with some greenish-grey clay with red and yellow mottling.
2	4	Dark brown limey clay loam with some rubble, (true topsoil) grading to light brown limey and sandy clay with abundant grit and travertine fragments. Slightly mottled.
4	6	Light brown limey clay and slight greenish-grey mottling and numerous travertine particles, becoming greenish-grey clay with brown and yellow-brown mottling. Quite firm and puggy.
6	8	Mainly greenish-grey slightly silty clay with slight yellow-brown (ochreous) and brown mottling. Some small patches of red iron staining. Some gritty fragments. Stiff and puggy.
8	18	Greenish-grey slightly silty clay with abundant patches of reddish material and lesses yellow-brown ochreous mottling. Some brown mottling. Numerous small grit and travertine fragments. Some blobs of black organic matter. Stiff and puggy.
18	20	Greenish-grey silty clay, but mottling mainly yellow and yellow-brown. Only insignificant reddish patches. Less gritty, no travertine fragments. Some moderately large patches. Less gritty, no travertine fragments. Some moderately large patches of brownish-black organic material. Stiff and puggy.
20	26	Greenish-grey slightly silty clay with reddish-brown mottling and some brown and yellow-brown patches. Stiff to very stiff.
26	32	Greenish-grey slightly silty clay with yellow-brown and brown mottling, reddish mottling only very slight.
32	39	Red-brown very sandy clay with small blobs of greenish-grey yellow-brown and brown clay. Patches of red-brownsand and grit. Very stiff.

Micro Film No.

6628-257

HD. ADELAIDE, T.A. BLOCK 266, AUGER HOLE NO. 4 C

LOG OF BORE

Depth From	Depth To	Nature of Strata
0'	2'	Brown sandy fill. Numerous rock fragments.
2	4	Dark brown limey clay (True topsoil). Mottled light brown. Somewhat silty but with numerous gritty fragments of quartz, travertine etc. - becoming more light brown with depth. Fairly soft and pliable.
4	6	Light brown limey clay with abundant gritty travertine fragments etc.
6	8	Light brown limey clay with some green-grey and slight red-brown mottling. Contains the usual gritty travertine, qtz. some black organic matter and whitish limey patches. Moderately stiff
8	10	Mainly green-grey silty clay, with brown, yellow-brown and slight red mottling. Thence as above.
10	14	Ditto but limey patches absent whilst reddish-brown iron staining more common. Very firm.
14	20	Mainly green-grey very stiff puggy silty clay. Slight brownish mottling. Some red and yellow iron oxide patches in varying amount. Some gritty fragments.
20	22	Ditto i.e. green-grey, but with excessive reddish patches and lesser yellow-brown patches. Again very stiff and puggy.
22	24	Ditto but more uellow-brown mottling.
24	26	Ditto - reddish-clay more abundant - appears to form harder kernels in otherwise very stiff and puggy clay.
26	33	Ditto i.e. green-grey silty clay, mottled mainly light red-brown, some yello w-brown and slight reddish. Very stiff and puggy with kernels of even harder clay. Some gritty particles etc. Abundant dark organic material at about 32ft.
33	34	Greengrey silty clay. Very stiff. Small patches of well churned light red-brown clayey sand. Numerous gritty particles.

Micro Film No.

BORING 1

ELEVATION 101 ± FEET

	STRENGTH DATA					MOISTURE-DENSITY DATA		FIELD DATA
ATTERBERG LIMITS (PI)	LIQUID LIMIT	PASSING #200	TYPE OF STRENGTH TEST	TEST CHAMBER PRESSURE, LBS/SQ FT	TEST MOISTURE CONTENT, %	SHEAR STRENGTH, LBS/SQ FT	NATURAL MOISTURE CONTENT, %	DRY DENSITY, LBS/CU FT	PENETRATION RESISTANCE, BLOWS/FT
							25.6		
			DS	700	24.9	1200	24.9	96	5/10/6"
							23.6		
			DS	1030	23.3	1440	23.3	101	S = 11
							22.9		
			DS	1310	28.2	1500	28.2	94	5-18/9"
			DS	1600	25.1	1600			
	70						30.4		
LINEAR SHRINKAGE = 17%									
			DS	1850	33.4	2450	33.4	89	5-11/9"
							24.1		
			DS	2530	32.5	2900	32.5	88	S = 23
							33.3		
			DS	3130	31.6	3220	37.4	85	5-18/9"
							33.8		
SF							35.3		H = 42
			DS	3890	19.0	4400	19.0	110	5-24/6"
							19.2		
			DS	4500	24.1	4500	24.1	101	5-33/9"
							26.8		
			DS	5220	30.1	4800	30.1	92	5-29/5"

0 — ASPHALT PAVEMENT
Dark brown SANDY CLAY (CL)
(firm, bricks, pockets of sand)
(slight seepage)
FILL 4.5'

5 — Red-brown SILTY CLAY (CH) (firm)
(stiff, gray)

10 — (green-gray, mottled with yellow)

(moist zone)

15 — (very stiff)

20 — (cave-in from fill, petrol seepage)

33.7'
Light green-gray and red SANDY CLAY (CL)
(very stiff, near SC)

38.2'
Light green-gray SILTY CLAY (CH)
(very stiff, mottled with yellow)

45 — (grading less yellow)

50 — BORING DEPTH 51 FEET
CASING DEPTH 39 FEET
GROUND WATER NOT OBSERVED

6628-289

6628 41 MEW 69 Hot Adel

024599 LOG OF PERCUSSION DRILL HOLE

HOLE NO. 1

SHEET 1 OF 1

LOCATION CNR. GROTE ST. & EASTERN ROADWAY, ADELAIDE ADELAIDE

FEATURE: FOUNDATION CONDITIONS Depth 60 FT R.L. 249' Coords

SOIL TYPE GEOLOGICAL DESCRIPTION	CASING R.L. (FEET)	DEPTH (FEET)	GRAPHIC LOG	GROUP SYMBOL	SOIL DESCRIPTION GROUP NAME	CONSISTENCY REL. DENSITY	MOISTURE CONTENT	WATER LEVELS	PENETRATION DATA HAND PENETROMETER Tons per sq. inch 1 2 3 4 5
Abundant earthy lime pockets and nodules up to 2 inches size. Scattered lime pockets and charcoal fragments				CL	CLAY SOIL, low plasticity, silty and sandy, dark brown to dark grey brown	VERY FIRM	VERY MOIST	NO WATER CUT	Not recorded
Few small reddish iron-stone nodules		10		CH	CLAY SOIL, high plasticity, slightly silty, brown, dark grey brown, grey mottled				
					CLAY SOIL, high plasticity, fine sand and silt inclusions, light green-grey with prominent brown, yellow-brown and dark red ferruginous mottling	STIFF			
		20				VERY STIFF			
Quartz grains subangular to rounded and burning due to fires				SC	CLAY SOIL, low plasticity, finely sandy, grey-brown, brick red, yellow brown				
		30		SP-SC	SAND, fine to medium grain, slightly gravel, dark coal, clay and silt lenses 50 cm thickness up to 0.5 m thick grey with brick red and yellow mottling	DENSE	MOIST		4.5+
Few small reddish iron-stone nodules				CH	CLAY SOIL, high plasticity, few lime sand particles light grey with yellow and yellow-brown mottling, reddish mottling in 45 cent	VERY STIFF	VERY MOIST		
OLD EROSION SURFACE		40							
Abundant pockets of whitish earthy and chalky lime and hard rock to up to 2 inches.				CH-ML	CLAY SOIL, high plasticity, abundant limey silt pockets, few sand particles light green-grey yellow-brown mottling				
Few lime pockets and nodules		50		ML	SILT SOIL, low plasticity, fine sandy, light brown, yellow-brown mottling	FIRM			
Calcareous fossiliferous sandstone, fine grained, hard.				GM	GRAVEL, irregular lumps of hard sandy limestone in calcareous matrix	HARD			4.5+
					LIMESTONE, sandy, chalky, off white, recovered as slush				SLUDGE SAMPLES
		60			END OF HOLE 60 FEET				

PLEISTOCENE TO RECENT MOTTLED CLAYS

PLIOCENE SANDSTONE

UPPER MILLER LIMESTONE

TYPE OF SAMPLE	HYDROLOGY	CONSISTENCY	REL. DENSITY	MOISTURE
Open Tube	Water cut	VS-Very Soft	VL-Very Loose	H-Humid
Sealed Tube	Static level	S-Soft	L-Loose	D-Damp
Auger barrel	Supply	F-Firm	C-Compact	M-Moist
Slush pump	Analysis (ppm)	St-Stiff	D-Dense	W-Wet
Casing	Water level (Date)	VSt-Very Stiff	VD-Very Dense	S-Saturated
		H-Hard		

Rig No. 23 — R.D. Steel

Type D.H. 500 — Date 27 May '84

Driller D. Phillips — R.D.S.

Started 6 April '84 — Traced J.M.H.

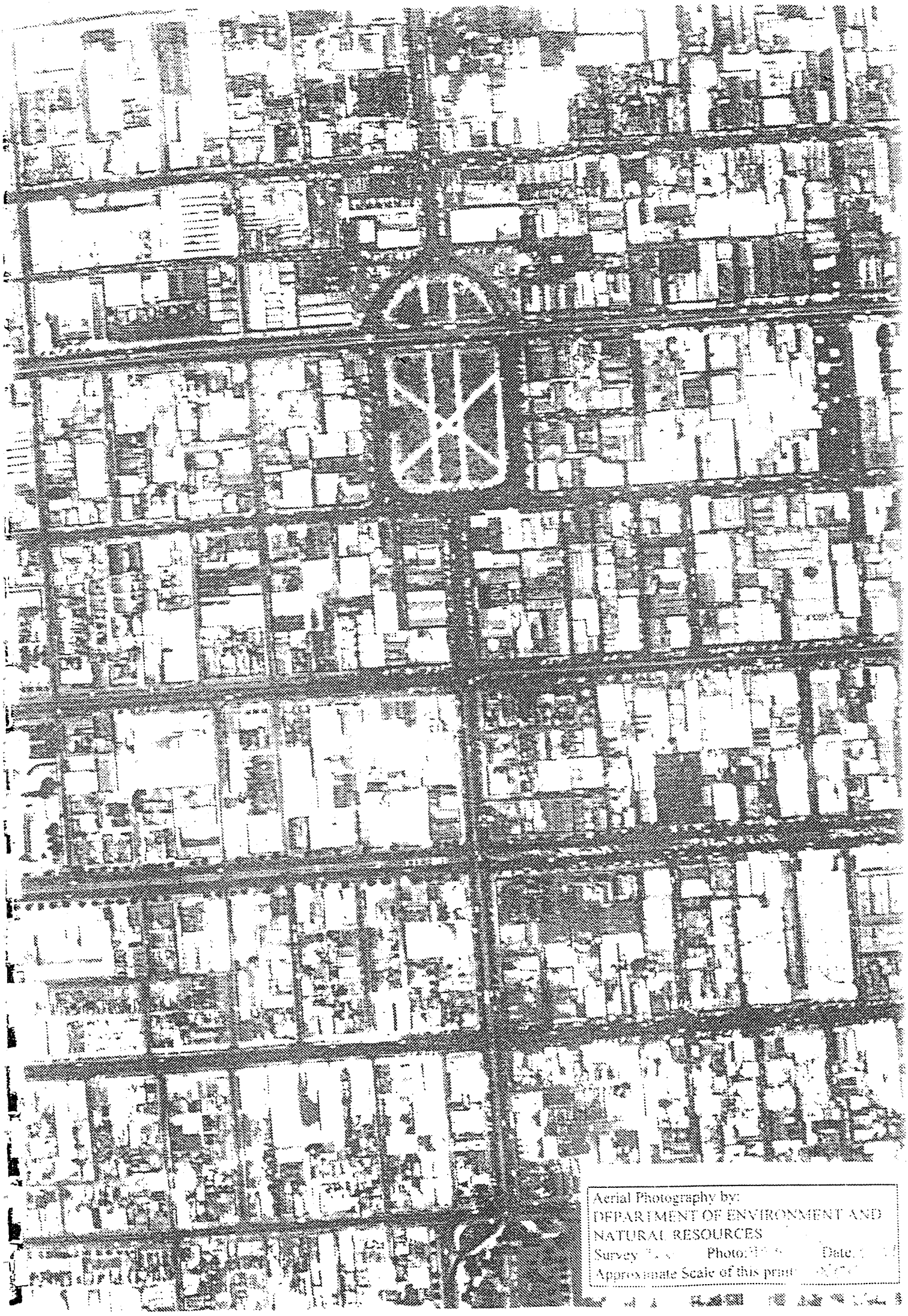
Finished 9 April '84 — Checked R.D.S.

PLAN No. S 3720 Ha 6

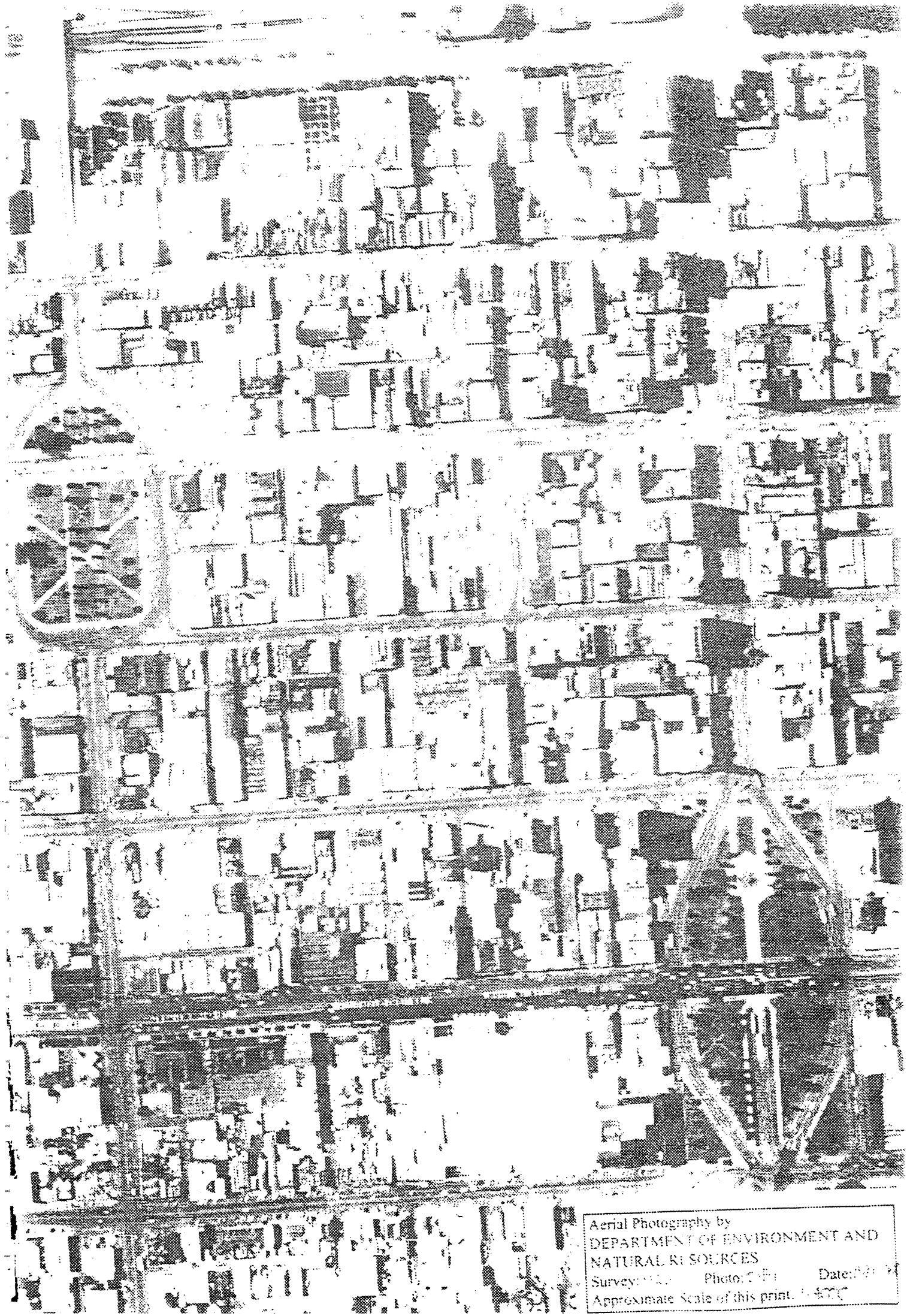
Vertical Scale 10 feet to 1 inch

Appendix E

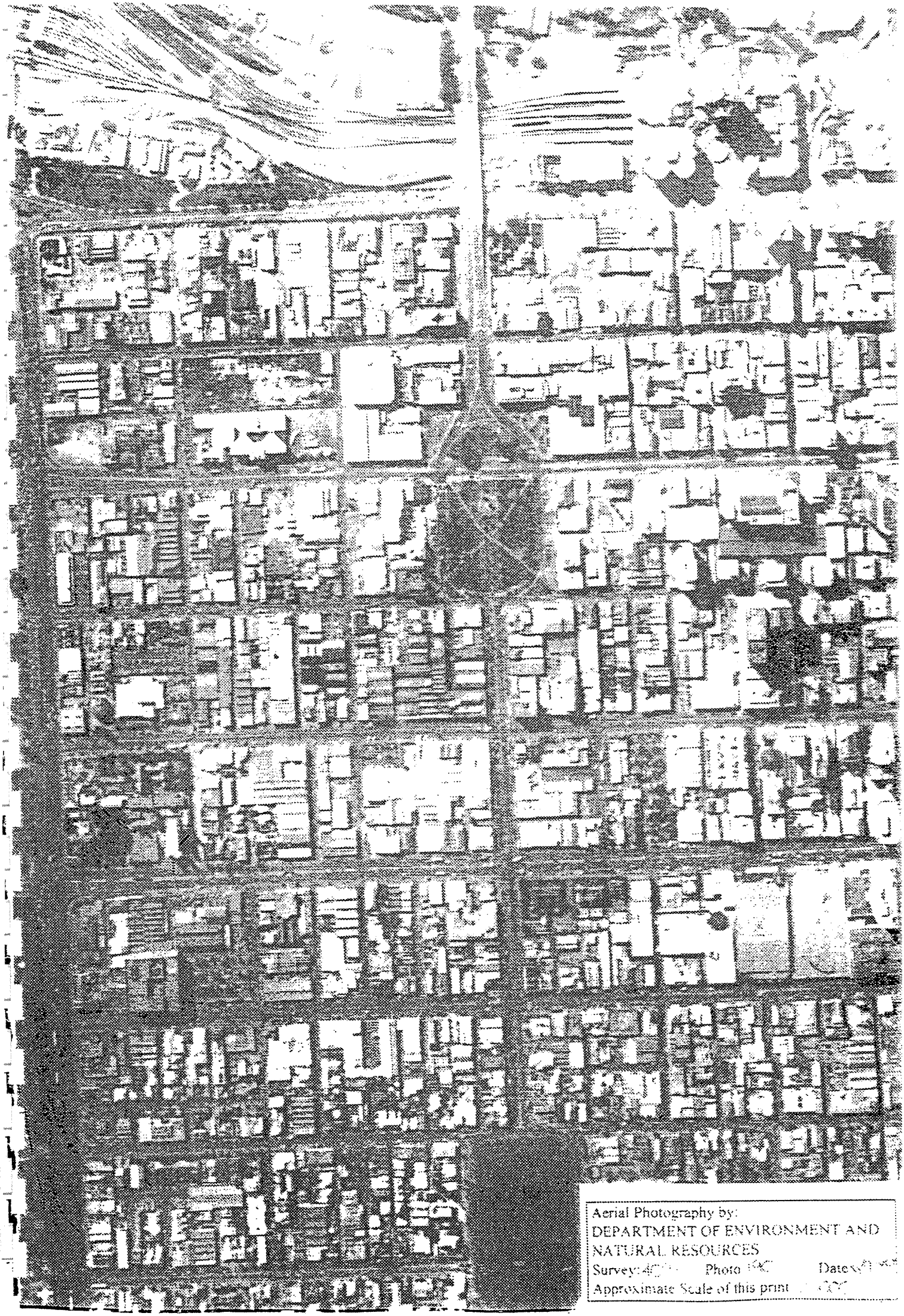
Aerial Photographs



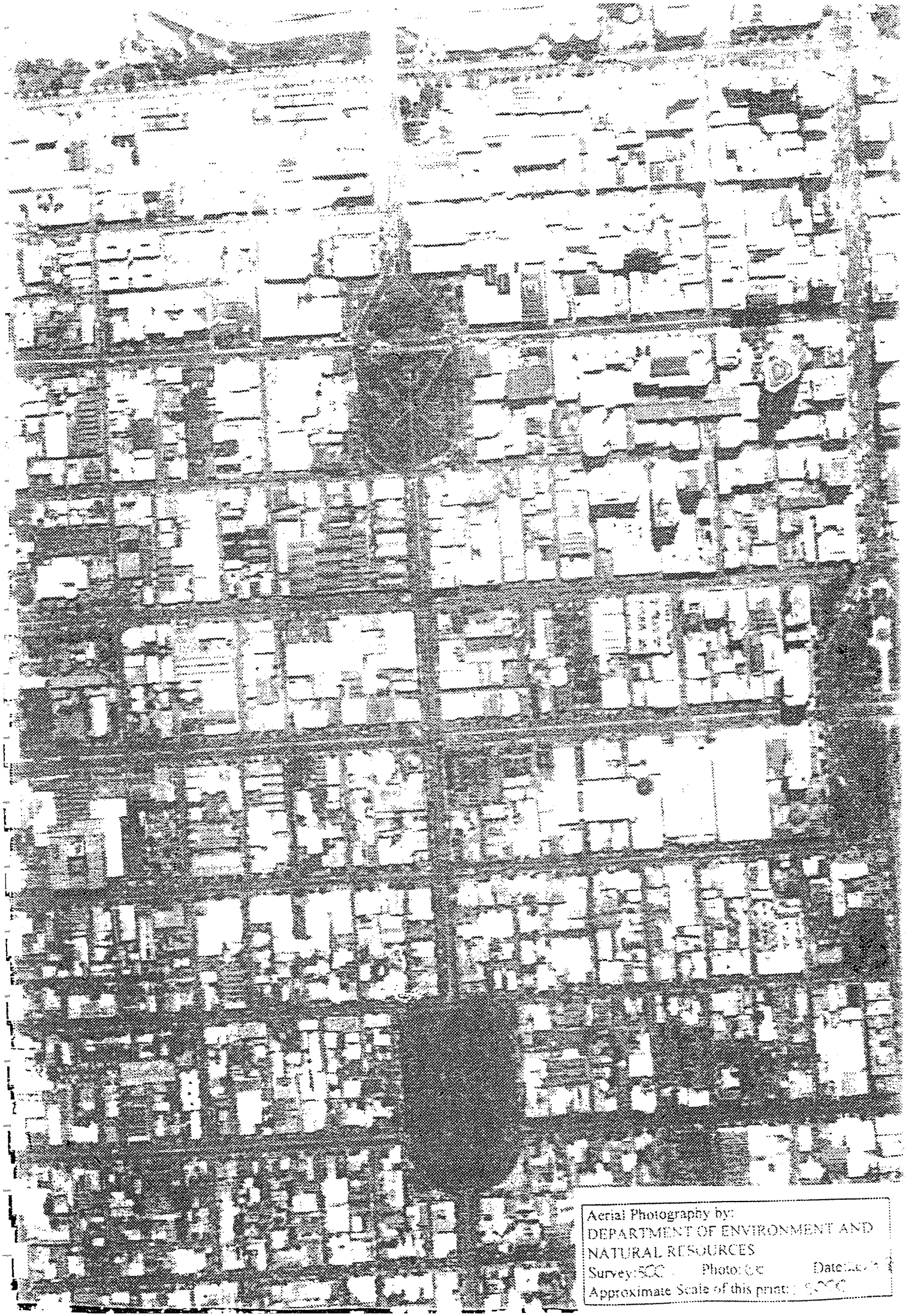
Aerial Photography by:
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
Survey [illegible] Photo [illegible] Date [illegible]
Approximate Scale of this print [illegible]



Aerial Photography by
DEPARTMENT OF ENVIRONMENT AND
NATURAL RESOURCES
Survey: Photo: Date:
Approximate Scale of this print:



Aerial Photography by:
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
Survey: Photo Date:
Approximate Scale of this print



Aerial Photography by:
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
Survey: SOC Photo: C-E Date:
Approximate Scale of this print:

Appendix F

Photographs

Photo 1: The Private Carpark on Andrew Street and the entrance driveway into Coachfreight (looking north).

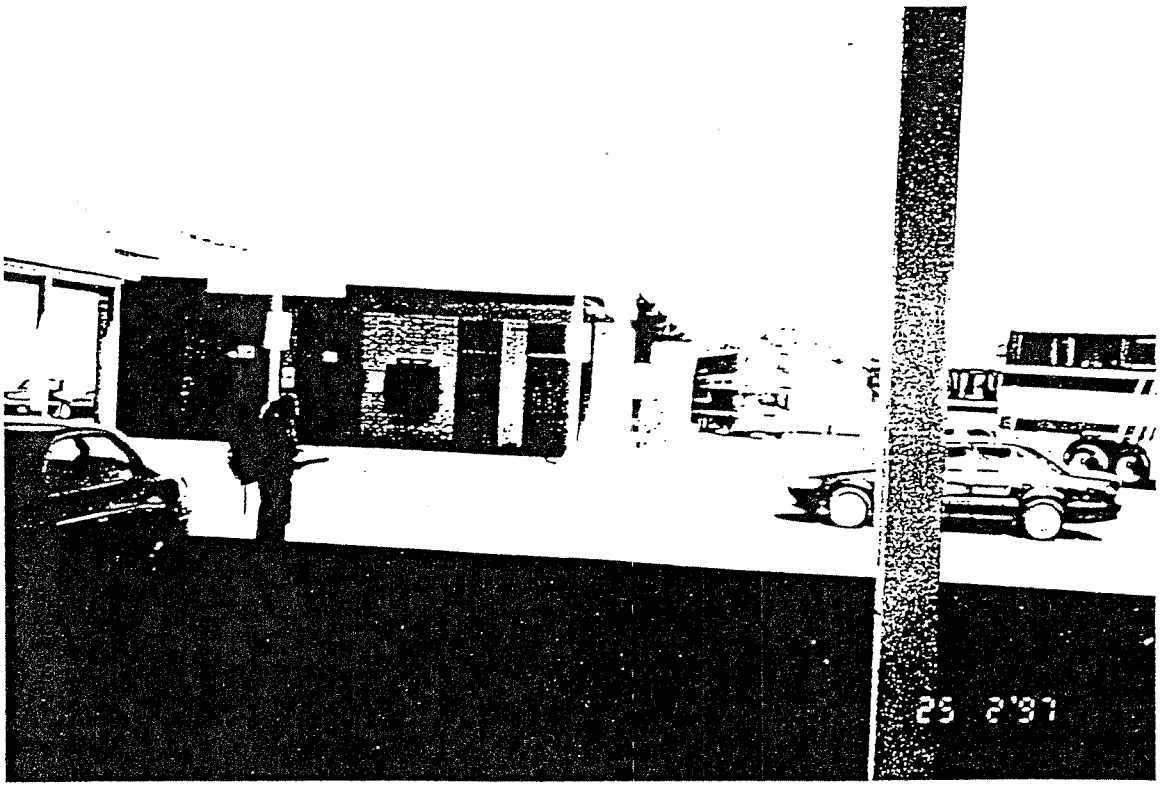


Photo 2: The Coachfreight storage shed (and bus shelter), looking west, across Bowen Street.

APPENDIX B

Rust PPK Pty Ltd, 1997,
Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide,
for the Corporation of the City of Adelaide, 30 June 1997

Environmental Site Assessment Franklin Street Bus Station and Car Parks

The Corporation of
The City of Adelaide

Rust PPK Pty Ltd
Environment & Infrastructure

101 Pirie Street
Adelaide SA 5000
PO Box 398
Adelaide SA 5001
Australia
Telephone: (61 8) 8405 4300
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30 June 1997
27J097A 97-459.DOC

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RUST PPK
Environment & Infrastructure

Our Reference 2706/2916/27J097A

30 June 1997

The Corporation of The City of Adelaide
Town Hall Adelaide
GPO Box 2252
South Australia 5001

Attention: Mr Brian Fitzpatrick

Dear **Brian**

Environmental Site Assessment Franklin Street Bus Station and Car Parks

Rust PPK is pleased to submit two (2) copies of the above assessment report for your consideration.

The findings of the assessment program have identified no requirements for remedial works at the site in accordance with the continued long term use of the site for commercial purposes. Recommendations have been made with regard to the potential redevelopment of various parts of the site for either similar commercial landuses or for restricted residential purposes (with no access to underlying soil), and also for more sensitive landuses (such as unrestricted residential) where there maybe potential access to underlying soil. It is understood that the recommendations are subject to approval by the appointed environmental auditor, Adrian Hall.

I trust that I have interpreted your requirements correctly. If you have any queries or questions relating to the above report or the assessment program, please do not hesitate to call me on (08) 8405 4300 or 0414 245353.

Yours faithfully

Stuart P Taylor
Team Leader, Environmental Assessment and Remediation
Rust PPK Pty Ltd

Contents

		Page Number
Executive Summary		iii
1.	Introduction	1
2.	Site Identification and Description	
2.1	Site Identification	2
2.2	Site Description	3
2.3	Site Ownership	3
2.4	Site Topography	3
2.5	Local Soil Types	3
2.6	Local and Regional Groundwater	4
3.	Site History	
3.1	Historical Overview	5
3.2	Summary of Potential Site Contamination Issues	5
4.	Soil Assessment program	
4.1	Assessment Rationale	7
4.2	Ground Conditions Encountered	8
4.3	Sampling Depths and Analytes	9
4.4	Laboratory Analysis Program	11
4.5	Soil Assessment Criteria	11
4.6	Soil Contamination Assessment	12
4.7	Data Validation Report	15
5.	Conclusions	16
6.	Recommendations	18
7.	Statement of Limitations	20

Appendices

Appendix A	Site Location Plan
Appendix B	Department of Mines and Energy Groundwater Data
Appendix C	Location of Soil Sampling Points
Appendix D	Soil Borelogs
Appendix E	Interpolated Area of Potentially Impacted Soils
Appendix F	Chain of Custody Forms
Appendix G	Assessment Criteria for Analytical Results
Appendix H	Tabulated Soil Analysis Results
Appendix I	Certified Laboratory Results
Appendix J	Tabulated Results of Replicate and Duplicate Analysis
Appendix K	Data Validation

Executive Summary

Rust PPK Pty Ltd (Rust PPK) was commissioned by The Corporation of the City of Adelaide (The Corporation) to undertake a preliminary environmental assessment of the Franklin Street Bus Station and several surrounding car park sites. The entire subject site which includes the bus station and car parks is located at 85-129 Franklin Street however the site is divided into two sections on the eastern and western sides of Bowen Street.

The environmental assessment program follows a site history investigation undertaken by Rust PPK in March 1997 (Rust PPK doc no 97/143).

The objectives of the environmental assessment program were to investigate and report on any potential soil and groundwater contamination resulting from past site activities, prior to the possible future redevelopment of various parts of the site.

In order to achieve these objectives Rust PPK undertook a comprehensive desktop study and on-site investigation comprising targeted soil investigations and detailed laboratory analysis.

The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- *the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);*
- *the north east corner of the Grote Street public car park (BH14); and*
- *the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).*

An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.

Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC environmental guidelines.

The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial landuses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both landuses.

In accordance with the continued use of all site areas for current commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works at the site. The only possible exception is the need for a site specific risk assessment to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the elevated lead level identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

If any part of the site is to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse. This is necessary in order to further characterise the soil in those areas of the site which were not investigated, particularly due to the presence of ash and cinders within the fill materials at thirteen out of the twenty sampling locations on-site. If any part of the site, with the exception of the Premier Stateline Terminal, is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that charcterisation of any excavated soil be carried out in order to determine off-site disposal options. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in many areas of the site. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

1. Introduction

Rust PPK Pty Ltd (Rust PPK) was commissioned by The Corporation of the City of Adelaide (The Corporation) to undertake a preliminary environmental assessment of the Franklin Street Bus Station and several surrounding car park sites. The entire subject site which includes the bus station and car parks is located at 85-129 Franklin Street however the site is divided into two sections on the eastern and western sides of Bowen Street.

The environmental assessment program follows a site history investigation undertaken by Rust PPK in March 1997 (Rust PPK doc no 97/143)

The objectives of the environmental assessment program were to investigate and report on any potential soil and groundwater contamination resulting from past site activities, prior to the possible future redevelopment of various parts of the site.

In order to achieve these objectives Rust PPK undertook a detailed desktop study and on-site investigation comprising:

- review of historical site usage;
- review of local soil and groundwater;
- drilling and sampling of twenty (20) soil bores;
- laboratory analysis of selected soil samples for a full range of chemical parameters characteristic of suspected potential contaminants resulting from previous on-site and adjacent site activities; and
- review and assessment of soil contaminant levels in accordance with the proposed future landuse.

The scope of works undertaken was in general accordance with the proposed work plan provided to The Corporation in April 1997 (Rust PPK document no. 97-219) and was subject to discussion and approval by The Corporation appointed Environmental Auditor, Mr Adrian Hall (BC Tonkin & Associates).

This report details the results and findings of the assessment program including a summary of available site history, assessment methodology and recommendations for limited site remediation and future site management.

2. Site Identification and Description

2.1 Site Identification

The subject site comprises two irregularly shaped parcels of land to the east and west of Bowen Street. Each of these parcels comprises a number of allotments which are described under different Certificates of Title, as listed in Table 2.1 and Table 2.2 below.

The total area of the site is approximately 1.41 hectares.

The site is located at 85-129 Franklin Street, Adelaide, and has an approximate total area of 1.41 hectares. The Corporation have advised that the site is part of the F8 Franklin Street East Precinct. Any proposed development must comply with the zoning regulations specified by the council which apply to this area. These regulations specify the desired and non-complying land uses and specify that any development should be used to establish a new commercial character in the area, complemented by the upgrading of the public environment.

Table 2.1
Allotment Details for the Eastern Side of Bowen Street

Certificate of Title Reference	Land Description	Area (m^2)
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.60
1751/37	Town Acre 311	648.80
1922/48	Town Acre 263	986.26
5060/608	Allotment 1 in DP 32560	580.00
5317/61	Allotment 12 in DP546	149.60
5317/62	Allotment 91 in FP166443	348.69
5317/63	Allotment 92 in FP166444	271.50
5317/64	Allotment 93 in FP166445	526.90
5317/65	Allotment 91 in FP170401	816.37
TOTAL		9156.02

Table 2.2
Allotment Details for the Western Side of Bowen Street*

Certificate of Title Reference	Land Description	Area (m^2)
2023/96	Town Acre 311	260.67
2128/45	Town Acre 311	257.80
2201/187	Town Acre 311	259.70
3479/180	Town Acres 261 & 262	1744.00
3582/78	Town Acre 261	509.70
3582/79	Town Acre 262	490.04
3582/80	Town Acres 261 & 262	1122.90
3841/122	LTRO Plan 546	340.60
TOTAL		4985.41

The site is surrounded by the following properties:

- Dreamland Furniture and a disused warehouse to the east;
- light industrial facilities to the west;
- Franklin Street to the north; and
- Andrews Street, the Grote Street Church of Christ and Grote Street to the south.

A location map for the site is presented in Appendix A.

2.2 Site Description

The site currently contains the following features:

- the Premier Stateline bus terminal, canopy and private car park on the north-west of the site (collectively referred to as Bus Depot 2);
- the Coachfreight parcel collection and drop off point (including storage shed) in the west of the site;
- a bitumen-sealed private car park in the south-west of the site;
- the Greyhound and McCafferty's Express bus terminals and canopy on the north-eastern side of Bowen Street (collectively referred to as Bus Depot 1);
- a single storey house, a private car park, a toilet block and a two-storey building and adjacent car park all utilised by the Adelaide Central Mission on the eastern side of Bowen Street, in the south of the site (collectively referred to as 104 Grote Street); and
- two bitumen sealed public car parks in the east of the site owned and operated by The Corporation of the City of Adelaide (referred to as the Grote Street Car Park and the Franklin Street Car Park).

2.3 Site Ownership

The current Certificates of Title show the site to be owned by The Corporation of the City of Adelaide.

2.4 Site Topography

The site is situated on a flat parcel of land and is surrounded by similarly flat parcels of land.

2.5 Local Soil Types

Published information and previous experience in the area suggests that the natural soil profile at this site can be expected to include in the order of 1.0m of surface fill, consisting of various reworked soils and building rubble. Underlying this the profile is likely to resemble a Brown Solonized Soil type BS classification. Type BS soil profiles consist of brown sandy to clayey

soils with abundant earthy lime and calcrete in the subsoil. Type BS soils are alkaline and often contain significant amounts of soluble salts. Over most of the city area, Type BS soils vary from a thin layer up to three metres thick and the layer overlies Hindmarsh Clay. Surface absorption in Type BS soils is rapid due to the highly permeable profile and as such external drainage is slight.

2.6 Local and Regional Groundwater

Department of Mines and Energy (MESA) records indicate regional standing groundwater levels at depths ranging from approximately 6 to 40 metres (refer Appendix B).

No groundwater was intersected during the on-site drilling program to a maximum depth of 2.3 m.

3. Site History

3.1 Historical Overview

The following information summarises the information obtained from Certificates of Title, Assessment Books in the Adelaide City Council Archives, the Sands and McDougall Directories of South Australia and historical aerial photographs of the site, all of which was documented in more detail in the Site History Report prepared by Rust PPK in March 1997:

- From 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises including a garage, forge, workshop, bakehouse, and a private road.
- From the 1920s a number of small light industries were established on the site. These included a factory, garages, forges, stables, printing works, workshops, shops and offices. Some of the occupants included the Franklin Wrecking Co, J.W. Turner, a plumber, Oxy-welders Ltd, the O'Donnell Brothers Ltd, and a number of radio and electrical companies.
- During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park by Dimet Corrosion Prevention Pty Ltd and I. and M. Jedynak.
- The Corporation of the City of Adelaide had acquired most of the land comprising the site by 1972, excepting the land contained in Certificates of Title 5060/608 and 1751/37 (the land referred to as 104 Grote Street). The land was then cleared and by 1979 the majority of the existing bus terminals and car parks had been constructed.
- The residences on land contained in Certificates of Title 5060/608 and 1751/37 were acquired by The Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission. The front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking.
- Between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.

3.2 Summary of Potential Site Contamination Issues

Based on the historical information obtained from the Site History Investigation, it is considered that the following potential contamination may be present on site as a result of past on-site and adjacent site activities:

- Polycyclic Aromatic Hydrocarbon (PAH) contamination from the tar-based sub-base materials that have been used beneath bitumen in the past;
- PAH contamination from possible waste products associated with coal fires or furnaces which may have been used on the site in the past;
- Organochlorine Pesticide (OCP) contamination from the possible use of white ant treatments beneath buildings that have existed on-site;

- possible petroleum hydrocarbon (TPH) contamination from leakage of fuel or oil from vehicles; and
- possible heavy metal contamination from activities associated with a plumbing business, forging, oxy-welding, radio and electrical companies, wrecking and auto-mechanics or printing works, all of which existed on the site in the past.

4. Soil Assessment program

4.1 Assessment Rationale

The assessment program was undertaken in general accordance with the proposed scope of works provided to The Corporation in April 1997 (Rust PPK document no. 97-219).

In designing the soil assessment program, reference was drawn from the following sources:

- the Australian and New Zealand Guidelines for the Assessment and management of Contaminated Sites" (ANZECC 1994);
- the guidelines prepared by the South Australian Health Commission in the publication "A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in South Australia" (1993); and
- site history information.

The soil sampling program targeted only the open space areas of the site. The approximate open space area of the site is 0.98 hectares therefore in accordance with the Draft Australian Standard for the Sampling of Soils, the minimum number of sampling points recommended for a site with an area of 0.9 hectares is 20 points. The soil assessment program therefore incorporated twenty (20) soil monitoring bores targeted within the open and accessible areas of the site.

The location of all soil sampling boreholes were discussed with and approved by the appointed auditor, Adrian Hall and the approximate location of the soil monitoring bores are presented in Appendix C.

Drilling and sampling of the soil boreholes was undertaken between 20 - 22 of May 1997. Soil boring was undertaken using stainless steel push tubes, driven by a pneumatic hammer, to a maximum depth of 2.3 m. Soil cores were extracted from the push tubes directly onto clean plastic core trays for logging and collection of soil samples by the Rust PPK field investigator. Soil samples were recovered directly from core trays and transferred to pre-chilled 250 ml glass jars and sealed with teflon lined metal lids. Collected samples were immediately labelled and transferred to a chilled esky for storage.

On completion of field activities all samples were checked for labelling consistency against the field sampling record. Samples were then packed into eskies with fresh ice bricks and sealed for transport to the nominated laboratory for storage and analysis. Chain of Custody forms were completed and accompanied the samples to the laboratory.

To reduce any cross-contamination of soil samples all push tubes were decontaminated and cleaned using a pressurised spray gun prior to the drilling of all soil bores. An equipment rinsate (ER) was taken on one push tube in every ten (10) boreholes, a procedure which involves rinsing the tube with de-ionised water into a sample bottle which can then be sent to the laboratory for analysis to ensure that the tubes were washed correctly.

A field duplicate sample was recovered from a particular depth at each borehole in addition to the primary sample for that depth. Selected field duplicates were analysed along with the primary sample in order to monitor the precision and accuracy of the laboratory analysis and the distribution of contaminants within the soil profile.

4.2 Ground Conditions Encountered

The generalised soil types encountered during drilling are summarised as follows:

- Fill Materials: generally consisted of a surface layer of yellow silty sand with some gravel overlying dark brown silty clays to depths ranging from 0.5 m to 1.2 m. Brick fragments and cinders were identified in 13 out of the 20 boreholes and fragments of vesicular slag were identified in one of the boreholes.

- Natural Sediments: calcareous silty clays with some calcareous gravel ranging from creamy brown mottled brown to orange brown mottled creamy brown to a depth of approximately 2.0 m. At some boreholes the soil became greenish brown at around 2.0 m as it became Hindmarsh clay.

The fill materials which showed visual evidence of contamination are detailed as follows:

BH4: Some ash and cinders and very occasional vesicular slag fragments from 0.7 - 1.0m.
BH5: Occasional ash and cinders from 0.7-0.8 m.
BH6 : Occasional ash and cinders from 0.65-0.75 m.
BH10: Occasional ash and cinders from 0.65-0.7 m.
BH12: Very occasional ash and cinders from 0.55-0.7 m.
BH13: Occasional surface bitumen fragments from 0.035-0.15 m, some ash and cinders from 0.6-0.9 m,
BH14: Occasional ash and cinders from 0.15-0.7 m.
BH15: Occasional ash and cinders from 0.55-0.7 m.
BH16: Occasional ash and cinders from 0.3-0.6 m.
BH17: Occasional ash and cinders from 0.65-0.7 m.
BH18: Occasional ash and cinders from 0.4-0.5 m.
BH19: Occasional ash and cinders from 0.6-0.7 m.
BH20: Very occasional ash and cinders from 0.015-0.2 m, occasional ash and cinders from 0.35-0.55 m

Environmental soil monitoring borelogs are presented in Appendix D and a site plan showing the approximate area of fill materials containing ash, cinders and/or slag is contained in Appendix E.

4.3 Sampling Depths and Analytes

In general 3 to 4 soil samples were collected from the first metre of the soil core, with an additional 1 to 3 samples recovered between 1.0 m and 2.0 m, and then one sample was taken below 2.0 m, if the borehole was drilled past 2.0 m. The sampling generally included between 2 and 5 soil samples from the fill materials depending on the depth of fill. The specific sample depths were dependent on the soil profile at each location.

Selected soil samples were analysed for a range of chemical analytes including:

- Organochlorine Pesticides (OCPs);
- Heavy Metals - arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), and zinc (Zn);
- Total Petroleum Hydrocarbons (TPHs);
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs); and
- pH.

Four soil samples were also analysed for the full Victorian EPA Chemical Suite which generally consists of a selection (or all) of the following analytes:

- Heavy Metals - As, Be, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Zn;
- Organochlorine Pesticides (OCPs);
- Total Petroleum Hydrocarbons (TPHs);
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX);
- Poly Aromatic Hydrocarbons (PAHs);
- Poly Chlorinated Biphenyls (PCBs);
- Chlorinated Hydrocarbons;
- Cyanide;
- Fluoride; and
- Phenols.

The four samples which were analysed for the full Victorian EPA screen were all field duplicates. Two of the duplicates were labelled as blind duplicates (the borehole number and depth was not indicated) and analysed by the primary laboratory along with the original samples in order to provide an intra-laboratory comparison between the results. The other field duplicates were analysed by the secondary laboratory while the original samples were analysed by the primary laboratory in order to provide an inter-laboratory comparison. These analyses were undertaken as a quality control measure.

Two Equipment Rinsates (ER1 and ER2) was also analysed for PAHs, heavy metals and OCPs.

Chain of Custody documentation showing all of the samples recovered and the analysis selected for particular samples is presented in Appendix F.

4.3.1 Rationale for Analyte Selection

Metals (As, Be, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Zn)

Analysis for the nominated range of heavy metals was undertaken to target metallic species which may have been present within any fill materials on-site. Heavy metals could be present on-site from activities associated with many of the businesses which existed on-site in the past. The metals selected are in accordance with the suite of metals recommended within the Victorian EPA Screen and have the potential for posing health and/or environmental concerns if significant elevated levels are identified.

pH

Analysis for pH was undertaken on the majority of the samples as it is a measure of the relative acidity or alkalinity of the soil. The soil pH provides valuable information relating to the potential for leachate generation and solubility of certain metallic and non metallic analytes.

TPH/BTEX

TPH and BTEX analyses were undertaken as a measure of potential petroleum hydrocarbon residues within the soil profile. The potential for on-site petroleum hydrocarbon impacted soils was identified from the possibility of leakage of fuel and oil from cars in those areas that are used as an open bitumen car park.

PAHs

Analysis for PAHs was undertaken due to the possibility that tar-based materials were used beneath the bitumen car park and also due to the possibility that wastes associated with coal, coke or fuel oil fires or furnaces may be present on-site. PAHs typically result from the incomplete combustion and partial pyrolysis of petroleum hydrocarbon products (ie. fuel oils, coke and coal). Some PAH compounds, particularly Benzo(a)pyrene are known human carcinogens, whilst other PAHs including Benzo(a)anthracene and Dibenz(a,h)anthracene are suspected human carcinogens.

OCPs

Analysis for OCPs was carried out due to the possibility of residual contamination from the use of white ant treatments beneath or around any of the residences or other buildings that existed on the site in the past. OCPs have the potential to pose significant health risks for future occupiers of the site as the more residual OCPs such as Dieldrin, Heptachlor and DDT have a predicted environmental persistence time of 5-15 years.

Victorian EPA Screen

Analysis of selected soil samples for the Victorian EPA screen was undertaken in accordance with the requirements of the independently appointed Environmental Auditor. The range of analytes contained within the Vic EPA screen provide a broad chemical characterisation of the site targeted towards a wide range of common industrial and commercial pollutants.

4.4 Laboratory Analysis Program

The primary laboratory soil analyses were conducted by:

Australian Government Analytical Laboratories (AGAL)
51-65 Clarke Street
South Melbourne, Victoria.

AGAL laboratories are NATA certified for all of the nominated soil analyses.

Two duplicate samples were sent to a secondary laboratory as a Quality Control (QC) measure. The inter-laboratory QC duplicate analysis was conducted by:

MGT Environmental Consulting Pty Ltd
3 Kingston Town Close
Oakleigh, Victoria.

MGT are also NATA certified for all of the nominated soil analyses.

4.5 Soil Assessment Criteria

In order to assess the level and significance of any potential contaminants detected through analytical laboratory testing it is usual to reference established environmental investigation levels and/or human health threshold exposure levels.

For the purpose of assessing potential long term human health risks, the South Australian Health Commission (SAHC) Investigation Levels as specified within the publication "A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in SA" (SAHC January 1993), are referenced as the adopted initial investigation levels.

For the purpose of assessing potential environmental risks, the Environmental Investigation Levels specified in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC/NH&MRC 1992) are referenced as the adopted initial investigation levels. The ANZECC Environmental investigation guidelines are primarily based on threshold levels for phytotoxicity and surface water receptors and are derived to protect the most sensitive receptor likely to be placed at risk and to reflect a level at which there is no observed effect on that receptor.

The SAHC (health) and the ANZECC (environmental) Investigation Levels do not necessarily represent an immediate action level if exceeded during the course of the initial investigation, however, they indicate contaminant levels which need to be assessed further through risk analysis to determine the relative level and significance of the contaminant concentrations on a site specific basis.

As a preliminary aid in the evaluation of site specific health based risk analysis, the Proposed Health Based Soil Guidelines (Langley et al 1996) as presented in the Health Risk Assessment and Management of Contaminated Sites - Contaminated Sites Monograph Series No. 5, 1996 are used as reference criteria. The Langley Criteria incorporate health based soil guidelines for a range of potential exposure settings including:

Exposure setting **A** - 'standard' residential:
Exposure setting **B** - 'restricted' residential with substantial vegetable garden (limits on poultry meat intake);
Exposure setting **C** - 'restricted' residential with substantial vegetable garden (exclusions on poultry meat intake);
Exposure setting **D** - residential with restricted soil access (includes medium to high density residential);
Exposure setting **E** - parks, recreational open space and playing fields: includes secondary schools;
Exposure setting **F** - commercial/industrial sites.

For the purpose of the preliminary contamination assessment the assessment criteria nominated within the SAHC Health Based Guidelines and the ANZECC Environmental Investigation levels will be referenced as the primary assessment criteria. For the purpose of the preliminary health risk assessment reference will be drawn from the Langley Criteria for restricted residential landuse with limited soil access and commercial/industrial landuse (Langley et al 1996 - Exposure Settings D and F) in order to provide information regarding the health risks associated with the site depending on the potential future landuse.

In the case of analytes not covered by the nominated guidelines the Dutch Investigation and Intervention values will be referenced and the former Dutch C levels and the NSW EPA Guidelines for Assessing Service Station Sites will be used as the guidelines for TPH/BTEX.

4.6 Soil Contamination Assessment

Assessment Criteria for comparison with soil analytical results is contained in Appendix G and laboratory results from the nominated soil analyses are presented in tabulated form in Appendix H. Full certified laboratory results are presented in Appendix I. Refer to Appendix C for the sampling location plan.

Heavy Metals

Elevated levels of **zinc** (280 mg/kg, 2000 mg/kg and 410 mg/kg) in excess of the ANZECC Environmental Investigation level (200 mg/kg), were reported within the fill materials (0-0.7 m) at boreholes BH4, BH14 and BH20. At borehole BH14, located in the north eastern corner of the Grote Street Car Park, the zinc concentration was also above the SAHC Health Based Investigation level of 500 mg/kg. From a preliminary human health risk assessment perspective the zinc concentrations identified at these locations were well below the proposed health based soil guidelines for both restricted residential landuse (limited soil access) and commercial/industrial landuse (Langley et al 1996, Exposure settings D and F) of 28000 mg/kg and 35000 mg/kg.

Elevated **lead** concentrations (670 mg/kg and 1600 mg/kg) in excess of the ANZECC Environmental Investigation level and the SAHC Health Based Investigation level, both of which have a level of 300 mg/kg, were reported within the fill materials (0-0.7 m) recovered from boreholes BH4 and BH14. The lead concentration from BH14 was also in excess of the proposed health based soil guidelines for both restricted residential landuse and commercial/industrial landuse (Langley et al 1996, Exposure Settings D and F) of 1200 mg/kg and 1500 mg/kg respectively.

An elevated **copper** concentration of 450 mg/kg which is in excess of the ANZECC Environmental Investigation level (60 mg/kg) and the SAHC Health Based Investigation level (100 mg/kg) was reported within the fill materials (0.55-0.7 m) recovered from borehole BH14 located in the north eastern corner of the Grote Street Car Park. The concentration reported was however well below the proposed health based soil guidelines for both restricted residential landuse (limited soil access) and commercial/industrial landuse (Langley et al 1996, Exposure settings D and F) of 4000 mg/kg and 5000 mg/kg.

Analysis for heavy metals was undertaken on eight natural soil samples across the site and the concentrations were all well below the relevant assessment criteria.

The concentrations of heavy metals were below the referenced acceptance criteria for the remainder of the boreholes however fragments of ash and cinders were identified in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11, and in boreholes BH4 and BH18 located on the western side of Bowen Street therefore there is the potential for localised or 'hotspot' heavy metal contamination at all of these locations.

Polycyclic Aromatic Hydrocarbons (PAHs)

An elevated Benzo(a)pyrene level of 1.7 mg/kg which is in excess of the SAHC Health Based Investigation level of 1 mg/kg, was reported within the surficial fill materials (0.05-0.2 m) recovered from borehole BH20 located in the Adelaide Central Mission Car Park on the corner of Bowen Street and Grote Street. Ash and cinders were identified in the fill materials, which extended to 0.55 m, at this location. The Total PAH concentration at this location was 15 mg/kg which is not above the SAHC Health Based Investigation level

20 mg/kg, however the presence of the ash and cinder fragments indicates the potential for localised or 'hotspot' PAH contamination at this location.

Although the concentrations of Total PAH and benzo(a)pyrene were below the acceptance criteria for the remainder of the boreholes, fragments of ash and cinders were identified in boreholes BH4 and BH18 located on the western side of Bowen Street and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. There is therefore the potential for localised or 'hotspot' PAH contamination at these locations.

pH

Laboratory analysis reported soil pH levels ranging from 8.8 to 11.0 which is indicative of moderately alkaline soils. The analysis reported that all of the eighteen samples analysed for pH were found to exceed the ANZECC Environmental Investigation criteria which recommends an upper pH of 8, with sixteen out of the eighteen samples also exceeding the SAHC health based investigation criteria which recommends an upper pH of 9. The range of pH values reported in the fill materials were found to be very similar to those reported in the underlying natural soils.

Organochlorine Pesticides (OCPs) and Organophospate Pesticides (OPPs)

All soil samples analysed for OCPs reported concentrations below the respective laboratory detection limits and consequently well below the nominated intervention criteria.

Total Petroleum Hydrocarbons (TPHs) and Mono Aromatic Hydrocarbons (BTEX)

All soil samples analysed for TPH and BTEX compounds reported concentrations below the respective laboratory detection limits and consequently well below the nominated intervention criteria.

Victorian EPA Screen

The four samples that was analysed for a Victorian EPA Screen (BH4, BH13, BH12/D and BH15/D) reported concentrations of Polychlorinated Biphenyls (PCBs), phenol and chlorinated hydrocarbons below the laboratory detection limits. The samples from boreholes BH12 and BH15 were also analysed for cyanide and cresols and the concentrations reported were below the laboratory detection limits.

Elevated levels of fluoride of 260 mg/kg and 190 mg/kg were reported in the fill materials (0.55-0.85 m) recovered from boreholes BH12 and BH15, located in the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park, respectively. The levels were below the Dutch intervention level of 2000 mg/kg. It is likely that the fluoride is associated with the ash and cinders, which were identified at both locations.

Equipment Rinsate

The equipment rinsate which was from the push tube used in BH8, was analysed for PAHs, metals and OCPs. The laboratory results reported all PAHs, OCPs and metals below the respective laboratory detection limits and hence below the specific environmental and health based guidelines for these analytes.

4.7 Data Validation Report

All analytical data for soil was assessed to ensure validation. Results of internal laboratory Quality Control (QC) for soils are included within the laboratory reports in Appendix I. This includes results of surrogate recoveries and replicate analysis carried out as part of the laboratory QC program. Tabulated results of all of laboratory replicate analysis and field duplicate analysis is contained in Appendix J.

The precision of the results for each analyte for both the laboratory replicate and field duplicate samples was determined by calculating the Relative Percentage Difference (RPD) between a replicates and duplicates. This was calculated a follows:

$$RPD = \frac{(\text{Concentration 1} - \text{Concentration 2}) \times 100}{(\text{Concentration 1} + \text{Concentration 2}) \div 2}$$

The acceptance criteria for laboratory replicates is generally set at an RPD of 20%, with an RPD of 30% used for field duplicates. This criteria is based on Rust PPK quality assurance (QA) protocols, which were developed with regard to the US EPA regulations. The %RPD values for the laboratory replicate and field duplicates are contained in Appendix K.

In order to obtain a measure of overall precision, a relative standard deviation (%RSD) was determined for each analyte. This involved normalising each sample result and the corresponding replicate/duplicate results and then calculating the standard deviation of the complete set of normalised values for that analyte. This relative standard deviation is calculated as a percentage and is included in Appendix K. For soil sampling programs an RSD below 30% is considered satisfactory.

The laboratory analysis program included the analysis of four field duplicates and eight laboratory replicates. The RPD was greater than 30% for the inter-laboratory duplicate results for copper and zinc. The extraction methods used by the primary and the secondary laboratory are identical and the analytical methods are compatible (ICP-AES/Flame Atomic Absorption Spectrometry) and therefore the difference between the inter-laboratory duplicate results would most likely be due to the heterogeneous nature of soil and the consequent difficulty in obtaining a 'true' duplicate sample in the field.

One of the RPDs was greater than 20% for the laboratory replicate results for lead and this could also be due to the hetergeneous nature of soil and the difficulty in obtaining two replicate samples from the soil sample in the laboratory. The RSDs were within the accepted criteria for all of the replicates as shown in Appendix K.

5. Conclusions

The investigation program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);
- the north east corner of the Grote Street public car park (BH14); and
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).

The concentrations of heavy metals were reported to depths ranging from 0.2 m to 0.7 m.

An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street to a maximum depth of 0.85 m. Elevated Total fluoride concentrations were also identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park.

These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations. The presence of these ash, cinders and/or slag is indicative of former waste products such as coke, coal and potential fuel oil wastes which may result from the incomplete combustion of petroleum hydrocarbon products (which may occur in domestic fires or furnaces for example). The ash, cinders and/or slag may also be waste products resulting from former forging operations which occurred at the site from around the 1920s to the 1970s.

Fragments of ash, cinders and/or slag were identified in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. Due to the fragmented nature and uneven distribution of the ash, cinders and/or slag within the fill materials, the concentrations of contaminants that have been reported may not necessarily be indicative of the level of potential contamination in the soil. In addition to this, the relatively low proportion of the ash, cinders and/or slag within the overall soil matrix may be resulting in a dilution effect on the contaminant levels within the overall matrix. There is therefore the potential for high concentrations of localised (hotspot) PAH, heavy metal and/or fluoride contaminants within the fill materials at all of the locations where the ash, cinders and/or slag were observed. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

Heavy metal concentrations from eight of the soil samples recovered from the natural underlying soils reported concentration levels below both the ANZECC and SAHC

investigation levels. From an environmental perspective it is considered that the presence of moderately alkaline surface and subsurface soils will act to minimise the potential for heavy metal leachate generation and infiltration by acting to favour the complexing of the ions within the clay matrix.

As a preliminary health risk assessment, the concentrations of all analytes were also compared to the proposed health based soil guidelines (Langley et al 1996) for restricted residential landuse and commercial/industrial landuse (Exposure Settings D and F). The preliminary risk assessment identifies the lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park (BH14) in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for restricted residential and commercial/industrial landuses.

The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

6. Recommendations

Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

In accordance with the continued use of these areas for commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within these areas. This recommendation is with the exception of a site specific risk assessment required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

If these areas of the site are to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials at nine out of the eleven sampling locations in these areas. If this land is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in these areas. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

104 Grote Street

The investigation program has identified no requirements for any subsequent site characterisation or remedial works within this area (which includes the house, private car park, storage building and adjacent car park) provided the current uses are maintained. If this portion of the site is to be developed for a more sensitive landuse (for example residential), it is recommended that more extensive site characteristion is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area, and so that the soil can be further characterised in those areas not covered in this investigation. Similarly to the other areas of the site, if this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation.

Coachfreight and adjacent car park

If the current use of the land in this area is to be maintained, there are no requirements for remedial works in this area of the site. This is contingent upon the adequate maintenance and management of the bitumen surfaces. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is

recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area. If this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation (as described previously).

Bus Depot 2 (Premier Stateline)

No contamination was identified in this area (which includes the bus parking area and the car park adjacent the terminal building) and so no remedial works or further site characterisation works are required provided the site use remains as at present. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, in order to further characterise the soil in those areas not covered in this investigation.

7. Statement of Limitations

This report has been prepared by the consultant with all reasonable skill, care and diligence in accordance with the terms of agreement with the client, and taking into account the human and other resources utilised by agreement with the client.

The data in this report was derived by applying the methodology described in previous sections of this report. To the best of the consultant's knowledge, the information contained in the report is accurate at the date of issue. However, there should be a recognition of the limitations of the environmental site assessment process. These are referred to, for example, in Section 4 of ASTM Practice E 1527-94. Clause 4.5 states the following:

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognised environmental conditions in connection with a property. This site assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for recognised environmental conditions in connection with a property, and both parties recognise limits of time and cost.

It should also be recognised that site conditions, including the extent of contamination and contaminant concentrations, can change with time. This may be particularly relevant if the report is used after a protracted delay, such that further investigation of the site may be necessary.

In preparing this report, the consultant has relied upon, and presumed accurate, certain information provided by the client or third parties. Unless otherwise stated in the report, the consultant has not attempted to verify the accuracy or completeness of any such information.

The consultant has prepared this report for the client in accordance with generally accepted consulting practice and the consultant's terms of business. No other warranty, express or implied, is made as to the professional advice included in this report. The consultant disclaims any responsibility in respect of any matters outside the scope of the terms of agreement with the client.

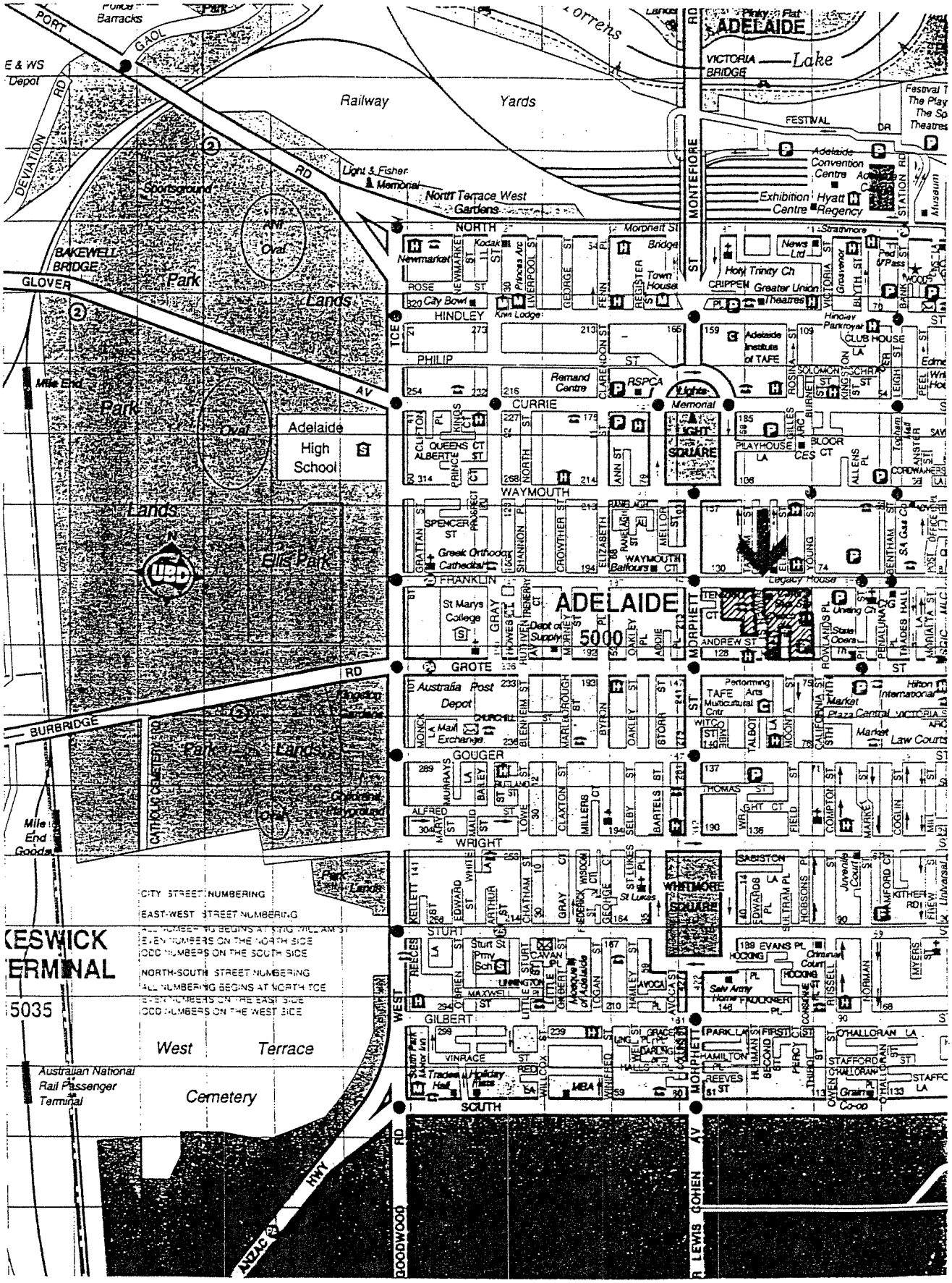
This report has not been prepared for use by parties other than the client. It may or may not contain sufficient information for the purposes of other parties or for other uses. The consultant accepts no responsibility to third parties to whom this report, or any part thereof, is made known.

A third party relies upon the report at its own risk.

In accordance with standard practice, the assessment carried out is site specific. Consequently, the assessment does not address environmental liabilities which may or may not pertain to other properties either currently or previously owned or operated by the client, or to other off-site environmental liabilities.

Appendix A

Site Location Plan



SITE LOCATION PLAN

MAP COURTESY OF UNIVERSAL PRESS

CHECKED	JRH
DRAWN	JRH
DATE	27.6.97
DRAWING No	27J097A

CODE	REVISIONS	DATE

RUST PPK
Environment & Infrastructure
100 NORTH TERRACE ADELAIDE
SOUTH AUSTRALIA, 5000
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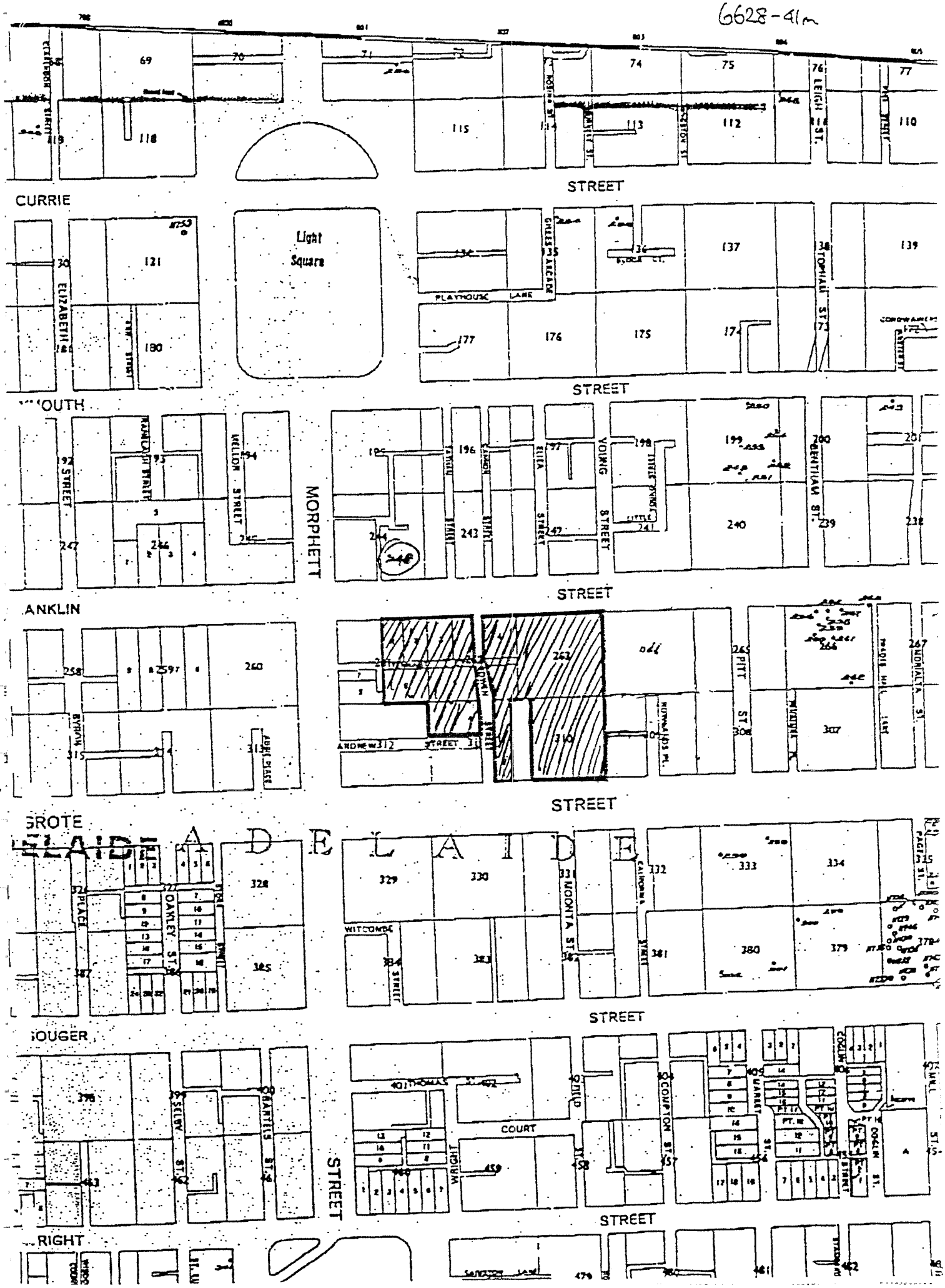
FAX (08) 2124686

Appendix B

Department of Mines and Energy
Groundwater Data

6628-41m

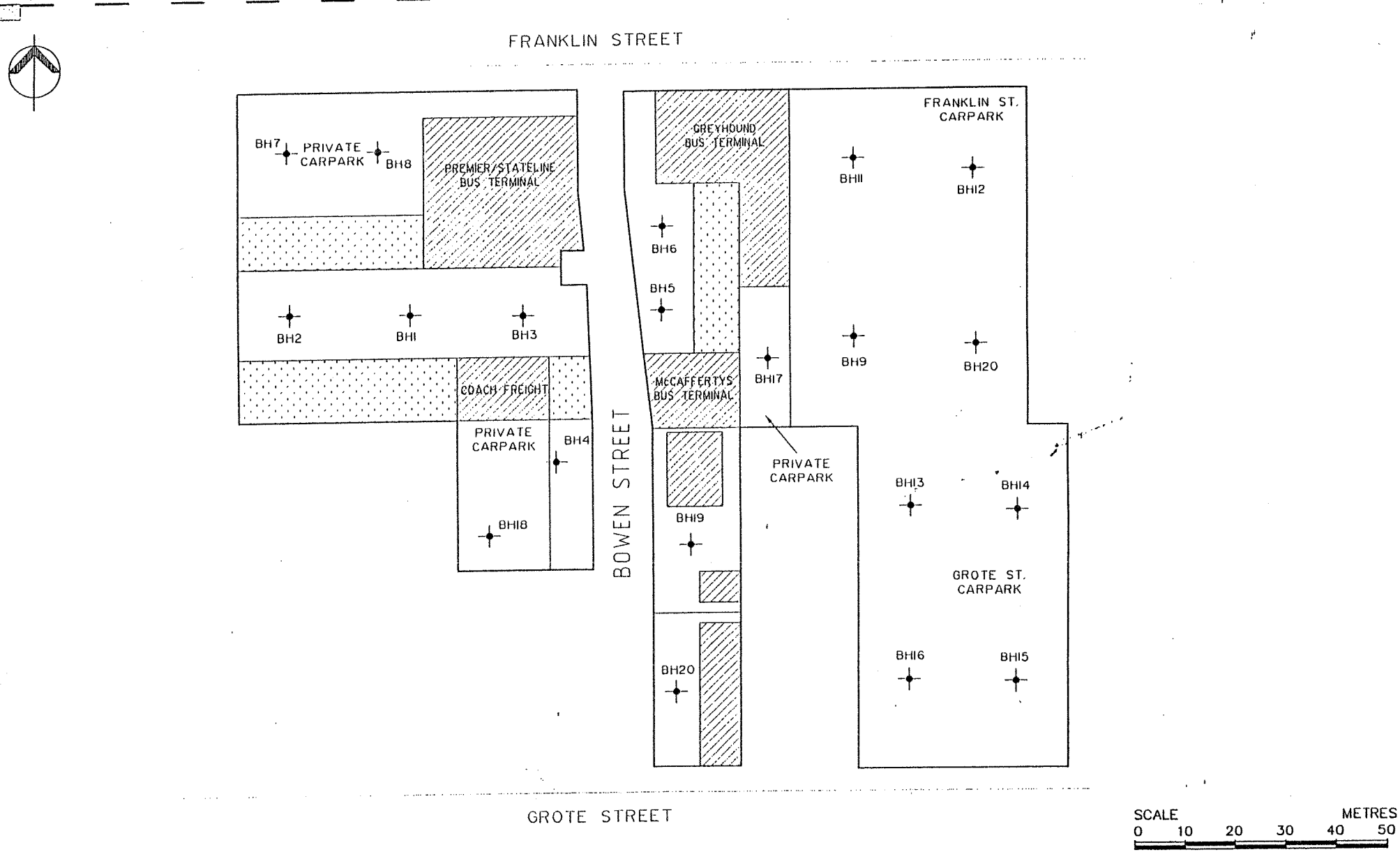

CURRIE
STREET
Light Square
ELIZABETH
PLAYHOUSE LANE
STREET
SOUTH
MORPHETT
STREET
ANKLIN
STREET
GROTE
ADELAIDE
OAKLEY ST.
MOONTA ST.
STREET
GOUGER
STREET
COURT
COMPTON ST.
RIGHT

Summary of Latest Water Information for Drillholes

Unit No	Cl	Max Drill Depth (m)	Orig Drill Date	Curr Drill Depth (m)	Curr Drill Date	Hundred	Section	SWL (m)	SWL Date	Well Yield (Gal/hr)	Well Yield Date	TDS (mg/l)	Sampl Date	pH	Permit	Cased To (m)	Full Chem Anal	Dril Log	Geol Log	Ophys Log	Aban Bokf Coll Plug
628 41 m 262 ✓	EW	15.47	01/71	15.47	01/71	ADELAIDE	S 266										U	U	Y	U	
628 41 m 263	EW	7.62	01/71	7.62	01/71	ADELAIDE	S 266										U	U	Y	U	
628 41 m 289	EW ✓	18.29	04/64	18.29	04/64	ADELAIDE	S 333										U	U	Y	U	
628 41 m 290	EW	27.43	04/68	27.43	04/64	ADELAIDE	S 333										U	U	Y	U	
628 41 m 300	MW	23.09	10/34	23.09	10/34	ADELAIDE	S 379			403.86	01/34						U	Y	U	U	
628 41 m 301	EW	27.48	04/64	27.48	04/64	ADELAIDE	S 380										U	U	Y	U	
628 41 m 302	EW	19.20	04/64	19.20	04/64	ADELAIDE	S 380	14.63	04/64								U	U	Y	U	
628 41 m 358	EW					ADELAIDE	S 111										U	U	U	U	
628 41 m 368	MW	113.00	09/76	113.00	09/76	ADELAIDE	S 61	40.00	09/76			1529	09/76	7.80	186		Y	Y	U	U	BKF
628 41 m 6881	MW	100.00	03/78	100.00	07/78	ADELAIDE	E 19	18.00	03/78	300.92	01/78	2403	03/78	7.80	2798	63.68	U	Y	U	U	BKF
628 41 m 11726	MW	17.50	05/81	17.50	05/81	ADELAIDE	S 378	15.00	05/81			1804	05/81	7.60	8778	17.50	U	Y	U	U	OPR
628 41 m 11727	MW	17.00	05/81	17.00	05/81	ADELAIDE	S 378	14.50	05/81			1810	05/81	7.50	8779	17.00	U	Y	U	U	OPR
628 41 m 11728	MW	16.00	05/81	16.00	05/81	ADELAIDE	S 378	13.50	05/81			3832	05/81	7.70	8780	16.00	U	Y	U	U	OPR
628 41 m 11729	MW	16.50	05/81	16.50	05/81	ADELAIDE	S 378	14.00	05/81			1832	05/81	7.60	8781	16.50	U	Y	U	U	OPR
628 41 m 11730	MW	16.00	05/81	16.00	05/81	ADELAIDE	S 378	13.50	05/81			1832	05/81	7.60	8782	16.00	U	Y	U	U	OPR
628 41 m 11732	MW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	8.10	8784	19.00	U	Y	U	U	OPR
628 41 m 11733	MW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	7.70	8785	19.00	U	Y	U	U	OPR
628 41 m 11734	MW	19.00	05/81	19.00	05/81	ADELAIDE	S 378	16.50	05/81			1804	05/81	7.70	8786	19.00	U	Y	U	U	OPR

Appendix C

Location of Soil Sampling Points



CODE	REVISIONS	DATE

FRANKLIN STREET BUS STATION
SAMPLE LOCATION PLAN

CHECKED	JRH
DRAWN	JRD
DATE	29.5.97
DRAWING No	27J097A4

RUST PPK
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Appendix D

Soil Borelogs

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 11:15 am **Location No:** BH1

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.06		BITUMEN.			
0.06-0.5	0.06-0.3 0.4-0.5	FILL. Sand, off-white/yellow becoming yellow, some fine to medium gravel.	0		
0.5-1.0	0.8-1.0	Silty CLAY. Orange brown.	0		
1.0-2.1	1.4-1.55 2.0-2.1/D	Silty CLAY. Creamy brown, mottled off-white and brown, becoming more clayey with depth.	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 12:00 pm **Location No:** BH2

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.			
0.055-0.7	0.1-0.3/D 0.4-0.5	FILL. Sand, off-white/yellow becoming yellow, some fine to coarse gravel.	0		
0.7-1.55	0.8-1.0 1.35-1.5	Silty Sandy CLAY. Orangey/brown, becoming more silty (less sandy) and calcareous with depth.	0		
1.55-2.0	1.8-2.0	Silty CLAY. Grey brown mottled off-white and brown, calcareous.	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 12:40 pm **Location No:** BH3

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.			
0.055-0.65	0.1-0.3/D 0.4-0.5	FILL. Sand, yellow, some fine to coarse gravel.	0		
0.65-1.2	0.8-1.0	Silty CLAY. Greyish green, mottled brown and off-white (calcareous nodules).	0		
1.2-2.1	1.4-1.55 2.0-2.1	Silty CLAY. Greyish green, mottled red and mustard yellow. (Hindmarsh clay).	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 1:10 pm **Location No:** BH4

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.25		BITUMEN.			
0.025-0.4	0.1-0.3	FILL. Sand, yellow, some fine to coarse gravel.	0		
0.4-1.0	0.45-0.6/D 0.8-1.0	FILL. Sandy clay, dark brown, occasional fine to medium gravel, occasional fine to medium orange brick fragments, some fine to coarse black ash and cinders, some creamy brown calcareous nodules, very occasional fine to medium silvery black, vesicular slag fragments, very occasional medium china fragments.	1		
1.0-1.6	1.55-1.7	Silty CLAY. Creamy brown, mottled brown, calcareous.	0		
1.6-2.1	2.0-2.1	Silty CLAY. Greyish green, mottled creamy brown and brown, and yellow brown, some grey/black mottling towards bottom.	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 2:00 pm **Location No:** BH5

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.4		BITUMEN.			
0.04-0.7	0.1-0.3 0.4-0.5/D	FILL. Sand, yellow, some fine to medium gravel.	0		
0.7-0.85	0.7-0.8	FILL. Sandy clay, dark brown, occasional fine black ash/cinders, occasional fine to medium orange brick fragments, occasional fine gravel.	1		
0.85-1.3	0.8-1.0	Silty CLAY. Orangey brown, mottled creamy brown.	0		
1.3-2.1	1.35-1.5 1.7-1.8 2.0-2.1	Silty CLAY. Greyish brown, mottled off-white and brown (calcareous).	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 2:40 pm **Location No:** BH6

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.05		BITUMEN.			
0.05-0.65	0.1-0.3 0.4-0.5	FILL. Sand, yellow, some fine to medium gravel.	0		
0.65-0.75	0.65-0.75	FILL. Sandy clay, dark brown, some fine to medium gravel, occasional fine to medium orange brick fragments, occasional fine to medium black ash/cinders.	1		
0.75-1.2	1.0-1.2/D	Silty CLAY. Creamy brown mottled brown.	0		
1.2-1.8	1.7-1.8	Hindmarsh CLAY. Greyish green, mottled brown, yellow and reddy brown.	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 3:30 pm **Location No:** BH7

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.07					
0.07-0.8	0.1-0.3 0.4-0.5	FILL. Silty sand, yellow, some powered green siltstone, some fine to coarse gravel.	0		
0.8-1.35	0.8-1.0	Silty CLAY. Orangey brown.	0		
1.35-2.0	1.35-1.5/D 1.8-2.0	Silty CLAY. Creamy brown, mottled brown and off-white, calcareous.	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 20/5/97 **Time:** 4:00 pm **Location No:** BH8

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.10		BITUMEN.			
0.1-0.5	0.1-0.3 0.4-0.5/D	FILL. Silty sand, yellow (creamy brown), occasional fine to medium gravel.	0		
0.5-1.8	0.8-1.0 1.35-1.55	Silty CLAY. Creamy brown mottled brown.	0		
1.8-2.0	1.8-2.0	Silty CLAY. Off-white, some fine limestone gravel (moist - perched water table).	0		

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 21/5/97 **Time:** 9:30 am **Location No:** BH9

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.45		BITUMEN.			
0.045-0.9	0.1-0.3 0.35-0.5	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0	(0.3-0.4) 4.3	
0.9-2.1	0.7-0.9/D 1.3-1.45 2.0-2.1	Silty CLAY. Creamy brown, mottled brown, calcareous.	0	(0.6-0.7) 5.3 (1.5-1.6) 6.8	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 21/5/97 **Time:** 10:10 am **Location No:** BH10

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.45		BITUMEN.			
0.045-0.65	0.1-0.3 0.35-0.5	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0	(0.55-0.65) 4.5	
0.65-0.7		FILL. Silty clay, dark brown, occasional fine black ash/cinders, occasional fine orange-brick fragments, occasional fine gravel.	1		
0.7-0.85	0.7-0.85/D	Silty CLAY. Orangey brown mottled creamy brown, occasional fine yellow roots, occasional fine to medium brown roots.	0	(0.75-0.85) 10.5	
0.85-2.0	1.0-1.2 1.4-1.55 1.8-2.0	Silty CLAY. Creamy brown mottled brown and off-white, occasional fine black spots,, very occasional fine roots, calcareous.	0	(1.2-1.3) 8.0	

Logged by: JRH **Sampled by:** JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 11:00 am **Location No:** BH11

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.03		BITUMEN.			
0.03-0.7	0.1-0.3 0.35-0.5/D	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel, some silty clay pockets (orangey brown).	0	(0.3-0.4) 11.2	
0.7-1.0	0.8-1.0	Silty CLAY. Orangey brown, mottled creamy brown, calcareous, occasional fine to medium roots.	0	(0.65-0.75) 11.9	
1.0-2.0	1.3-1.45 1.8-2.0	Silty CLAY. Creamy brown, mottled off-white and brown calcareous, very occasional fine to coarse brown roots.	0	(1.6-1.7) 27.9	

Logged by: JRH **Sampled by:** JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 9:00 am **Location No:** BH12

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.03		BITUMEN.			
0.03-0.45	0.15-0.3	FILL. Silty sand, yellow, fine to coarse sand, some fine to coarse gravel.	0	(0.4-0.5) 66.7	
0.45-0.55		FILL. Silty sand, brown and yellow, occasional silty clay pockets, dark brown, fine to medium gravel.	0		
0.55-0.7	0.55-0.7/D	FILL. Silty clay, dark brown, very occasional fine black ash/cinders.	1		
0.7-1.0	0.85-1.0	Silty CLAY. Orangey brown, calcareous, mottled off-white and brown.	0	(0.7-0.8) 25.8	
1.0-2.0	1.55-1.7 1.85-2.0	Silty CLAY. Creamy brown, mottled off-white and brown, very occasional large roots, becoming greeny brown mottled off-white and brown.	0	(1.7-1.8) 49.3	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 11:45 am **Location No:** BH13

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.35		BITUMEN.			
0.035-0.15	0.05-0.15 0.2-0.35	FILL. Silty sand, yellow, fine to coarse grains, occasional bitumen fragments from surface, some fine to coarse gravel.	0		
0.15-0.6	0.35-0.5	FILL. Silty sand, grey/brown, some fine to coarse gravel.	0	(0.5-0.6) 6.0	
0.6-0.9	0.7-0.9/D	FILL. Silty clay, dark brown, some fine to medium gravel, some fine to medium roots, some fine to medium black ash/cinders and orange brick fragments from 0.7-0.8 m.	1		
0.9-2.0	1.35-1.5 1.8-2.0	Silty CLAY. Creamy brown mottled off-white and brown, calcareous.	0	(1.0-1.2) 8.2 (1.2-1.8) 6.9	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 12:30 pm **Location No:** BH14

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.035		BITUMEN.			
0.035-0.15	0.05-0.15	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0		
0.15-0.70	0.15-0.3 0.55-0.7	FILL. Silty sand, grey/brown, some fine to coarse gravel, occasional silty clay pockets with fine black ash/cinders and occasional fine to medium orange brick fragments.	1		
0.70-1.2	0.7-0.85 1.0-1.2	FILL. Silty clay. Some fine to medium orange brick fragments, some fine to medium gravel, some off-white calcareous limestone fragments.	0	(0.8-1.0) 9.3	
1.2-2.0	1.85-2.0/D	Silty CLAY. Creamy brown mottled off-white and brown, calcareous.	0	(1.3-1.4) 16.6	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 1:00 pm **Location No:** BH15

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.			
0.055-0.55	0.15-0.3 0.3-0.5	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0	(0.3-0.4) 6.6	
0.55-0.7		FILL. Silty clay, dark brown mottled off-white and orangey brown, occasional fine to medium black ash/cinders, occasion fine orange brick fragments, occasional fine to medium roots, some off-white pockets.	1	(0.55-0.65) 10.7	
0.7-1.1	0.7-0.85/D	Silty clay, orangey brown (disturbed natural soil?).	0	(0.8-0.9) 9.2	
1.1-2.1	1.5-1.6 2.0-2.1	Silty CLAY. Creamy brown, mottled brown and off-white.	0	(1.6-1.7) 13.0	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 1:45 pm **Location No:** BH16

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.045		BITUMEN.			
0.045-0.3	0.1-0.3/D	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0		
0.3-0.6	0.4-0.5	FILL. Silty clay, greeny brown, occasional fine to medium roots, mottled off-white and brown, occasional fine orange brick fragments, occasional fine black ash/cinders.	1	(0.3-0.4) 6.9	
0.6-1.2	0.85-1.0	Silty CLAY. Greeny brown mottled off-white and brown.	0		
1.4-2.0	1.75-1.85	Silty CLAY. Grey/green mottled yellow and reddish brown. (Hindmarsh clay).	0	(1.5-1.6) 8.6	

Logged by: JRH	Sampled by: JRH
Field Classification 0 No obvious contamination 1 Slight visual contamination and/or slight odour 2 Visual contamination and/or odour 3 Gross visual contamination and/or strong odour	**Comments** **

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 2:50 pm **Location No:** BH17

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.075		BITUMEN.			
0.075-0.65	0.1-0.3 0.35-0.5/D	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0	(0.3-0.4) 6.9	
0.75-0.7		FILL. Silty clay, dark brown, occasional fine black ash/cinders, occasional fine to medium orange brick fragments, occasional fine to medium gravel.	1		
0.7-1.0	0.8-1.0	Silty CLAY. Orangey brown mottled brown, occasional coarse limestone gravel.	0	(0.7-0.8) 7.3	
1.0-2.0	1.8-2.0	Silty CLAY. Creamy brown mottled brown and off-white, calcareous, becoming greenish brown with depth.	0	(1.4-1.5) 12.5	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 3:45 pm **Location No:** BH18

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.			
0.055-0.15	0.05-0.15	FILL. Gravelly sand, fine to coarse gravel, browny yellow.	0		
0.15-0.4	0.15-0.3	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	0		
0.4-0.5	0.4-0.5	FILL. Silty clay, dark brown, occasional fine black ash/cinders, occasional fine orange brick fragments, occasional fine to medium gravel.	1		
0.5-1.6	0.8-1.0 1.45-1.6	Silty CLAY. Orangey brown mottled off-white and brown.	0	(0.75-0.85) 25.7 (1.0-1.2) 9.0	
1.6-2.3	2.15-2.3	Silty CLAY. Creamy brown, mottled brown and off-white, becoming greeny brown mottled off-white and brown with depth.	0	(1.6-1.7) 130	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 10:00 am **Location No:** BH19

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.01		BITUMEN.			
0.01-0.4	0.1-0.3/D	FILL. Silty sand, yellowy brown, fine to coarse sand, some fine to coarse gravel.	0	(0.3-0.4) 10.5	
0.4-0.6		FILL. Silty sand, brown and yellow, fine to coarse sand, occasional fine to coarse gravel, occasional fine to coarse orange brick fragments.	0 0		
0.6-0.7	0.55-0.7	FILL. Silty clay, dark brown, very occasional fine black ash/cinders, occasional fine orange brick fragments.	1		
0.7-0.9		Silty clay, brown (disturbed natural soil?).	0	(0.7-0.8) 201	
0.9-1.4	0.95-1.1	Silty CLAY. Orangey brown, mottled off-white and brown, calcareous, occasional fine to coarse limestone fragments.	0		
1.4-2.0	1.85-2.0	Silty CLAY. Creamy brown mottled brown and off-white, calcareous.	0	(1.6-1.7) 195	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

RUST PPK
Environment & Infrastructure

Environmental Field Sampling Record

Project: Franklin Street Bus Station **Job No:** 27J097A

Date: 22/5/97 **Time:** 10:40 am **Location No:** BH20

Coordinates (AMG): N E **Reduced Level (mAHD)**

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.015		BITUMEN.			
0.015-0.2	0.05-0.2	FILL. Silty clay, brown, occasional fine to medium gravel, occasional fine orange brick fragments, very occasional fine black ash/cinders.	1		
0.2-0.35	0.2-0.35	FILL. Silty sand, grey/brown, some fine to coarse gravel, occasional fine orange brick fragments.	0		
0.35-0.55	0.45-0.55/D	FILL. Silty clay, dark brown, very occasional fine orange brick fragments, occasional fine black ash/cinders.	1	(0.5-0.6) 99.0	
0.55-1.1	0.85-1.0	Silty CLAY. Orangey brown, mottled off-white and brown, calcareous, occasional fine limestone gravel.	0	(1.0-1.2) 33	
1.1-2.0	1.8-1.95	Silty CLAY. Creamy brown mottled off-white and brown, calcareous.	0	(1.7-1.8) 25.4	

Logged by: JRH

Sampled by: JRH

Field Classification

0 No obvious contamination
1 Slight visual contamination and/or slight odour
2 Visual contamination and/or odour
3 Gross visual contamination and/or strong odour

Comments

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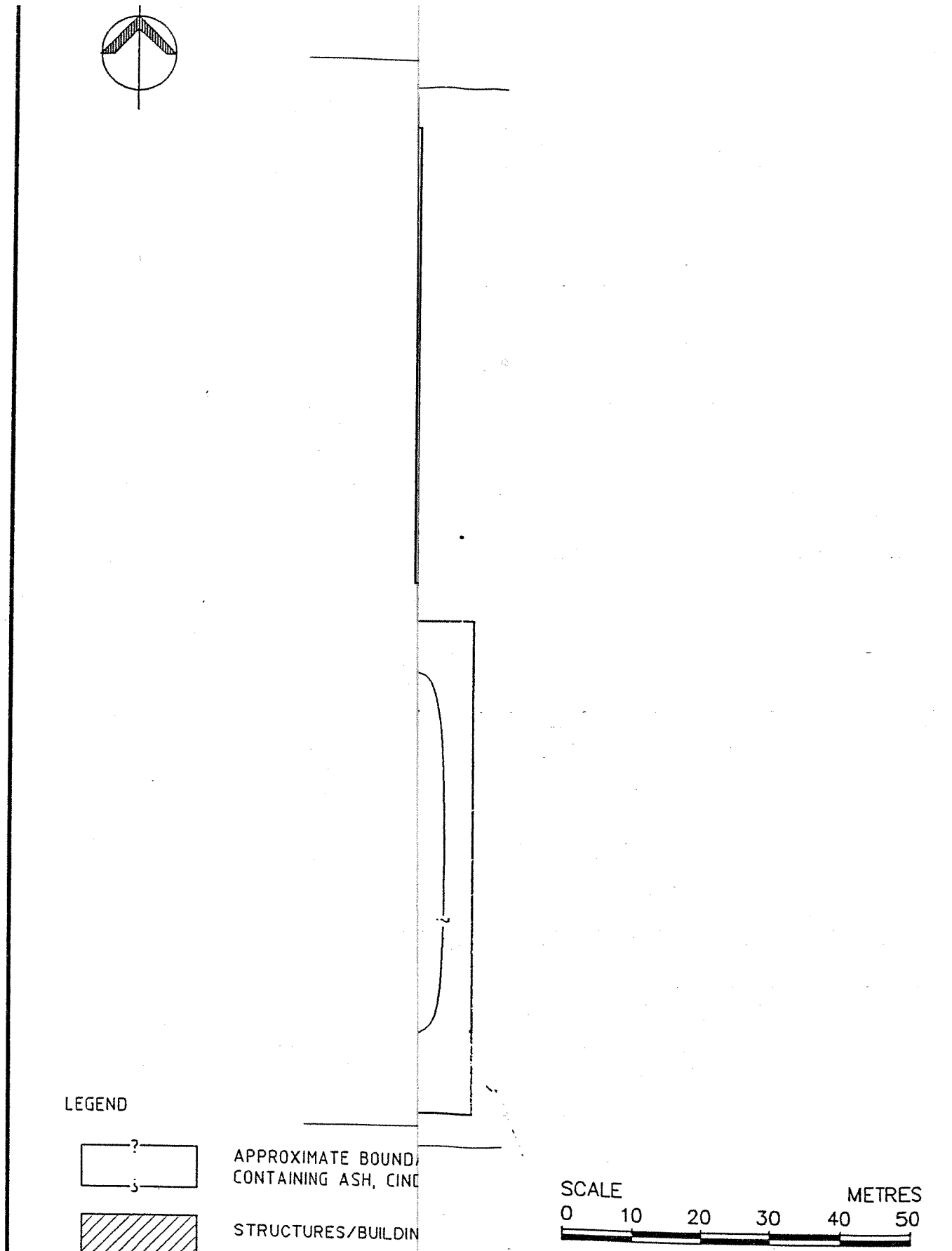
Appendix E

Interpolated Area of Potentially Impacted Soils



FRANKLIN STREET BUS STATION

lated Area of Potentially Impacted Soil.

CHECKED	JRH
DRAWN	JRD
DATE	29.5.97
DRAWING No.	27J097A

PPK Infrastructure
100 NORTH TERRACE ADELAIDE
SOUTH AUSTRALIA, 5000
TELEPHONE (08) 2125733
FAX. (08) 2124686

Appendix F

Chain of Custody Forms

Lab Name	AGAL
Address	5 Re-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
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Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location: Franklin Street Bus Station

Rust PPK Job Number: 27J097A

Relinquished By	Jane Hewitt
Date	22/5/97
Company	Rust PPK Pty Ltd, Adelaide
Signature	JHewitt

Received by	Perla Manuel
Date	23-05-97 VIC
Company	AGAL
Signature	

Samples on Ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs	Sampler Initials	Comments
20/5/97	11:15	BH1	0.06-0.3	250ml	S	<4°C	X		X		V97/18593	JRH	
20/5/97	11:15	BH1	0.4-0.5	250ml	S	<4°C						JRH	
20/5/97	11:15	BH1	0.8-1.0	250ml	S	<4°C						JRH	
20/5/97	11:15	BH1	1.4-1.55	250ml	S	<4°C						JRH	
20/5/97	11:15	BH1	2.0-2.1	250ml	S	<4°C						JRH	
20/5/97	11:15	BH1	2.0-2.1	250ml	S	<4°C						JRH	
20/5/97	12:00	BH2	0.1-0.3	250ml	S	<4°C						JRH	
20/5/97	12:00	BH2	0.4-0.5	250ml	S	<4°C						JRH	
20/5/97	12:00	BH2	0.8-1.0	250ml	S	<4°C						JRH	
20/5/97	12:00	BH2	1.35-1.5	250ml	S	<4°C						JRH	
20/5/97	12:00	BH2	1.8-2.0	250ml	S	<4°C	X			18594		JRH	
20/5/97	12:40	BH3	0.1-0.3	250ml	S	<4°C						JRH	
20/5/97	12:40	BH3	0.1-0.3	250ml	S	<4°C						JRH	
20/5/97	12:40	BH3	0.4-0.5	250ml	S	<4°C						JRH	
20/5/97	12:40	BH3	0.8-1.0	250ml	S	<4°C	X		X		18595	JRH	
20/5/97	12:40	BH3	1.4-1.55	250ml	S	<4°C						JRH	

Please fax back a signed copy when samples are recieved at the laboratory.

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location: Franklin Street Bus Station

Rust PPK Job Number: 27J097A

Relinquished By	Jane Hewitt
Date	22/5/97
Company	Rust PPK Pty Ltd, Adelaide
Signature	JHewitt

Received by	Perla Manuel
Date	23.05.97
Company	AGAL VIC
Signature	

Samples on Ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs	Sampler Initials	Comments
20/5/97	2:40	BH6	1.0-1.2	250ml	S	<4°C						JRH	
20/5/97	2:40	BH6/D	1.0-1.2	250ml	S	<4°C						JRH	
20/5/97	2:40	BH6	1.7-1.8	250ml	S	<4°C						JRH	
20/5/97	3:30	BH7	0.1-0.3	250ml	S	<4°C						JRH	
20/5/97	3:30	BH7	0.4-0.5	250ml	S	<4°C	X		X		18599	JRH	
20/5/97	3:30	BH7	0.8-1.0	250ml	S	<4°C						JRH	
20/5/97	3:30	BH7	1.35-1.5	250ml	S	<4°C						JRH	
20/5/97	3:30	BH7	1.8-2.0	250ml	S	<4°C						JRH	
20/5/97	4:00	BH8	0.1-0.3	250ml	S	<4°C						JRH	
20/5/97	4:00	BH8	0.4-0.5	250ml	S	<4°C						JRH	
20/5/97	4:00	BH8/D	0.4-0.5	250ml	S	<4°C						JRH	
20/5/97	4:00	BH8	0.8-1.0	250ml	S	<4°C	X		X		18550	JRH	
20/5/97	4:00	BH8	1.35-1.55	250ml	S	<4°C						JRH	
20/5/97	4:00	BH8	1.8-2.0	250ml	S	<4°C						JRH	
21/5/97	9:30	BH9	0.1-0.3	250ml	S	<4°C						JRH	
21/5/97	9:30	BH9	0.35-0.5	250ml	S	<4°C						JRH	

Please fax back a signed copy when samples are recieved at the laboratory.

22.05.97 20:37 633 P05 RUST PPK ADE - DE 3182311290

CHAIN OF CUSTODY

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location	Franklin Street Bus Station

Rust PPK Job Number
27J097A

Relinquished By	Jane Hewitt	Received by	Perla Manuel
Date	22/5/97	Date	23.05.97
Company	Rust PPK Pty Ltd, Adelaide	Company	AGAL VIC
Signature	JRHewitt	Signature	

Samples on Ice: YES

Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs										Sampler Initials	Comments
21/5/97	2:50	BH17	1.8-2.0	250ml	S	<4°C															JRH	
21/5/97	3:45	BH18	0.05-0.15	250ml	S	<4°C															JRH	
21/5/97	3:45	BH18	0.15-0.3	250ml	S	<4°C															JRH	
21/5/97	3:45	BH18	0.4-0.5	250ml	S	<4°C		X	X		18560										JRH	
21/5/97	3:45	BH18	0.8-1.0	250ml	S	<4°C															JRH	
21/5/97	3:45	BH18	1.45-1.6	250ml	S	<4°C															JRH	
21/5/97	3:45	BH18	2.15-2.3	250ml	S	<4°C															JRH	
22/5/97	10:00	BH19	0.1-0.3	250ml	S	<4°C															JRH	
22/5/97	10:00	BH19/D	0.1-0.3	250ml	S	<4°C															JRH	
22/5/97	10:00	BH19	0.55-0.7	250ml	S	<4°C	X	X	X	X	18561										JRH	
22/5/97	10:00	BH19	0.95-1.1	250ml	S	<4°C															JRH	
22/5/97	10:00	BH19	1.85-2.0	250ml	S	<4°C															JRH	
22/5/97	10:40	BH20	0.05-0.2	250ml	S	<4°C	X	X	X	X	18562										JRH	
22/5/97	10:40	BH20	0.2-0.35	250ml	S	<4°C															JRH	
22/5/97	10:40	BH20	0.45-0.55	250ml	S	<4°C															JRH	
22/5/97	10:40	BH20/D	0.45-0.55	250ml	S	<4°C															JRH	

Please fax back a signed copy when samples are recieved at the laboratory.

Lab Name	AGAL
Address	51-65 Clarke St, Sth Melbourne.
Phone Number	(03) 9685 1777

RUST PPK
Environment & Infrastructure

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Job Location	Franklin Street Bus Station

Rust PPK Job Number
27J097A

Relinquished By	Jane Hewitt	Received by	Perla Manuel
Date	22/5/97	Date	23.05.97
Company	Rust PPK Pty Ltd, Adelaide	Company	AGAL VIC
Signature	JRHewitt	Signature	

Samples on Ice: YES
Metals: As, Cd, Cr, Cu, Hg, Pb, Zn

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes: Metals	PAHs	pH	TPH/BTEX	OCPs										Sampler Initials	Comments
22/5/97	10:40	BH20	0.85-1.0	250ml	S	<4°C															JRH	
22/5/97	10:40	BH20	1.8-1.95	250ml	S	<4°C															JRH	
20/5/97		BD1		250ml	S	<4°C															JRH	
20/5/97		BD2		250ml	S	<4°C	X	X	X		18563										JRH	
20/5/97		BD3		250ml	S	<4°C															JRH	
21/5/97		BD4		250ml	S	<4°C															JRH	
21/5/97		BD6		250ml	S	<4°C	X		X		18564										JRH	
20/5/97		ER1	BH8	2x500ml	W	<4°C	X	X			X	18565									JRH	Please composite before analysing
21/5/97		ER2	BH18	2x500ml	W	<4°C	X	X			X	18566									JRH	Please composite before analysing

→ bottle had BH17 label

'Please fax back a signed copy when samples are recieved at the laboratory

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CHAIN OF CUSTODY

RUST PPK
Environment & Infrastructure

Job Name	AGAL
Address	51-55 Clarke St, Sth Melbourne,
Phone Number	(03) 9685 1777

Job Location	Franklin Street Bus Station

Rust PPK Job Number
27J097A

Results Due	
Turnaround Time	3-5 days
Fax Results To	Jane Hewitt
Fax Number	(08) 8405 4301
Phone Number	(08) 8405 4300
Project Manager	Stuart Taylor
Invoice To	Stuart Taylor

Relinquished By	Jane Hewitt	Received by	ONUR MEHMET
Date	22/5/97	Date	28/5/97 - MGT
Company	Rust PPK Pty Ltd, Adelaide	Company	
Signature	JRHewitt	Signature	

Samples on Ice: YES

Metals:

Date Sampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Analytes	Sampler Initials	Comments
22/5/97	9:00	BH12/D	0.55-0.7	250ml	S	<4°C	FULL VICTORIAN EPA SCREEN	JRH	OCPs by GC ECD
21/5/97	1:00	BH15/D	0.7-0.85	250ml	S	<4°C	FULL VICTORIAN EPA SCREEN	JRH	OCPs by GC ECD

Please fax back a signed copy when samples are recieved at the laboratory.

Appendix G

Assessment Criteria for Analytical Results

Assessment Criteria for Comparison with Soil Analytical Results
Metals, pH and PAH

All criteria expressed in mg/kg (ppm)

Analyte	Assessment Criteria			
	ANZECC	SAHC	Langley (D)	Langley (F)
Metals:				
Arsenic	20	100	400	500
Beryllium			80	100
Cadmium	3	20	80	100
Cobalt				
Chromium	50			
Copper	60	100	4000	5000
Mercury	1	2	60	75
Manganese	500		6000	7500
Molybdenum				
Nickel	60		2400	3000
Lead	300	300	1200	1500
Antimony	20			
Selenium				
Tin	50			
Zinc	200	500	28000	35000
pH	8	9		
Polycyclic Aromatic Hydrocarbons (PAH):				
Naphthalene	5			
Acenaphthylene				
Acenaphthene				
Fluorene	10			
Phenanthrene	10			
Anthracene	10			
Fluoranthrene	10			
Pyrene				
Benz(a)anthracene				
Chrysene				
Benzo(b)fluoranthene and Benzo(k)fluoranthrene				
Benzo(a)pyrene		1	4	5
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				
Total PAH		20	80	100

ANZECC	Environmental Guidelines (1992)
SAHC	South Australian Health Commission health based Guidelines (1993)
Langley (D)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting D - restricted residential)
Langley (F)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting F - commercial/industrial)

Assessment Criteria for Comparison with Soil Analytical Results OCPs and PCBs

All results expressed in mg/kg (ppm)

Analyte	Assessment Criteria			
	ANZECC	SAHC	Langley (D)	Langley (F)
Organochlorine Pesticides:				
HCB				
Dichloran				
Total BHC				
Lindane				
Heptachlor			40	50
Heptachlor Epoxide				
Total Chlordane (ocy, cis, trans, chlordene, nonachlor)			200	250
Total endosulphan				
Aldrin			40	50
Dieldrin	0.2		40	50
Endrin Total				
Dicofol				
op-DDE, pp-DDE				
op-DDD pp-DDD				
op DDT pp-DDT			800	1000
Methoxychlor				
Total OCPs				
Polychlorinated Biphenyls (PCB's):				
A1016				
A1221				
A1232				
A1242				
A1248				
A1254				
A1260				
A1262				
Total Aroclors	1		40	50

ANZECC	Environmental Guidelines (1992)
SAHC	South Australian Health Commission health based Guidelines (1993)
Langley (D)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting D - restricted residential)
Langley (F)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting F - commercial/industrial)

Assessment Criteria for Comparison with Soil Analytical Results
BTEX, TPH, Phenols, Fluoride, Cyanide, Cresols

All results expressed in mg/kg (ppm)

Analyte	Assessment Criteria						
	ANZECC	SAHC	Langley (D)	Langley (F)	Dutch	NSW EPA	Dutch C
BTEX:							
Benzene	1				1	0.5	
Toluene					130	3	
Ethyl Benzene					50	5	
Xylene					25	5	
Total BTEX							
Total Petroleum Hydrocarbons (TPH):							
C_6-C_9						65	800
C_{10}-C_{14}							
C_{15}-C_{28}						1000	5000
C_{29}-C_{36}							
Total TPH							
Phenols:							
Phenol			34000	42500			
3-Methylphenol							
2-Methylphenol							
4-Methylphenol							
2-Ethylphenol							
4-Ethylphenol							
2,4-Dimehtylphenol							
2,3,5-Trimethylphenol							
4-Nitrophenol							
Cresols					5		
Fluoride					2000		
Cyanide		250	2000	2500			

ANZECC	Environmental Guidelines (1992)
SAHC	South Australian Health Commission health based Guidelines (1993)
Langley (D)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting D - restricted residential)
Langley (F)	Proposed Health Based Soil Guidelines (Langley et al 1996, Exposure Setting F - commercial/industrial)
Dutch	Dutch Intervention Criteria (1994)
NSW EPA	Guidelines for Assessing Service Station Sites - Threshold Concentrations for sensitive land use (soils) (1994)
Dutch C	Dutch C Criteria

Appendix H

Tabulated Soil Analysis Results

Analytical Results - Soil
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH4/D* 0.45-0.6	BH5 0.8-1.0	BH6 0.65-0.75	BH7 0.4-0.5	BH8 0.8-1.0	BH9 2.0-2.1
Metals:							
Arsenic	5			5.6	<LOR	10	9.3
Cadmium	1			<LOR	-<LOR	<LOR	<LOR
Cobalt	1						
Chromium (total)	2			22	13	17	16
Copper	2			24	4.6	9	5.5
Mercury	0.5			<LOR	<LOR	<LOR	<LOR
Nickel	1						
Lead	5			45	<LOR	5.3	5.3
Selenium	5						
Zinc	2			69	17	15	14
Manganese	10						
Beryllium	1						
Molybdenum	5						
Antimony	5						
Tin	2						
pH	0.1		**9.5** [1,2]	**9.4** [1,2]	**9.8** [1,2]	**10** [1,2]	
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1	<LOR	<LOR	<LOR			
Acenaphthylene	0.1	<LOR	<LOR	0.1			
Acenaphthene	0.1	<LOR	<LOR	<LOR			
Fluorene	0.1	<LOR	<LOR	<LOR			
Phenanthrene	0.1	<LOR	<LOR	0.2			
Anthracene	0.1	<LOR	<LOR	0.1			
Fluoranthrene	0.1	<LOR	<LOR	0.9			
Pyrene	0.1	<LOR	<LOR	0.9			
Benz(a)anthracene	0.1	<LOR	<LOR	0.5			
Chrysene	0.1	<LOR	<LOR	0.4			
Benzo(b)fluoranthene an	0.1	<LOR	<LOR	0.4			
Benzo(k)fluoranthrene	0.1	<LOR	<LOR	0.4			
Benzo(a)pyrene	0.1	<LOR	<LOR	0.6			
Indeno(1,2,3-cd)pyrene	0.1	<LOR	<LOR	0.4			
Dibenz(a,h)anthracene	0.1	<LOR	<LOR	<LOR			
Benzo(g,h,i)perylene	0.1	<LOR	<LOR	0.4			
Total PAH	1.6	<LOR	<LOR	5.3			

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH1	BH2	BH3	BH4	BH4*	BH4/D
Sample Depth	Reporting	0.06-0.3	1.8-2.0	0.8-1.0	0.45-0.6	0.45-0.6	0.45-0.6
Metals:							
Arsenic	5	<LOR	9.4	7.4	7.6	7.5	8.5
Cadmium	1	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Cobalt	1				8	7.6	
Chromium (total)	2	9.2	29	31	31	29	26
Copper	2	9.5	7	7.3	32	29	34
Mercury	0.5	<LOR	<LOR	<LOR	<LOR	<LOR	**1.6** [1]
Nickel	1				15	14	
Lead	5	<LOR	7.5	10	**446** [1,2]	**670** [1,2]	**440** [1,2]
Selenium	5				<LOR	<LOR	
Zinc	2	8.7	19	21	**280** [1]	**270** [1]	**270** [1]
Manganese	10				200		
Beryllium	1				1.2	1.2	
Molybdenum	5				<LOR	<LOR	
Antimony	5				<LOR	<LOR	
Tin	2				28	26	
pH	0.1	**9.5** [1,2]		**9.5** [1,2]			**9.2** [1,2]
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1				<LOR		<LOR
Acenaphthylene	0.1				<LOR		<LOR
Acenaphthene	0.1				<LOR		<LOR
Fluorene	0.1				<LOR		<LOR
Phenanthrene	0.1				<LOR		<LOR
Anthracene	0.1				<LOR		<LOR
Fluoranthrene	0.1				0.1		<LOR
Pyrene	0.1				0.1		<LOR
Benz(a)anthracene	0.1				<LOR		<LOR
Chrysene	0.1				<LOR		<LOR
Benzo(b)fluoranthene an	0.1				0.1		<LOR
Benzo(k)fluoranthrene	0.1				<LOR		<LOR
Benzo(a)pyrene	0.1				0.1		<LOR
Indeno(1,2,3-cd)pyrene	0.1				<LOR		<LOR
Dibenz(a,h)anthracene	0.1				<LOR		<LOR
Benzo(g,h,i)perylene	0.1				<LOR		<LOR
Total PAH	1.6				<LOR		<LOR

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH10 0.7-0.85	BH11 0.8-1.0	BH11* 0.8-1.0	BH12 0.55-0.7	BH12/D 0.55-0.7	BH12/D* 0.55-0.7
Metals:							
Arsenic	5	5	8.9	9.8	<LOR	2.8	2.8
Cadmium	1	<LOR	<LOR	<LOR	<LOR	<0.5	<0.5
Cobalt	1					8.5	8.5
Chromium (total)	2	46	11	12	29	28	26
Copper	2	18	5.7	6	10	14	14
Mercury	0.5	<LOR	<LOR	<LOR	<LOR	<0.1	<0.1
Nickel	1					14	12
Lead	5	13	<LOR	<LOR	11	14	15
Selenium	5					<0.5	<0.5
Zinc	2	30	9.8	10	17	28	32
Manganese	10					220	210
Beryllium	1					<2	<2
Molybdenum	5					<10	<10
Antimony	5					<10	<10
Tin	2					<10	<10
pH	0.1	**8.8** [1]	**9.3** [1,2]		**9.2** [1,2]		
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1				<LOR	<0.1	
Acenaphthylene	0.1				<LOR	<0.1	
Acenaphthene	0.1				<LOR	<0.1	
Fluorene	0.1				<LOR	<0.1	
Phenanthrene	0.1				<LOR	<0.1	
Anthracene	0.1				<LOR	<0.1	
Fluoranthrene	0.1				<LOR	<0.1	
Pyrene	0.1				<LOR	<0.1	
Benz(a)anthracene	0.1				<LOR	<0.1	
Chrysene	0.1				<LOR	<0.1	
Benzo(b)fluoranthene an	0.1				<LOR	<0.1	
Benzo(k)fluoranthrene	0.1				<LOR	<0.1	
Benzo(a)pyrene	0.1				<LOR	<0.1	
Indeno(1,2,3-cd)pyrene	0.1				<LOR	<0.1	
Dibenz(a,h)anthracene	0.1				<LOR	<0.1	
Benzo(g,h,i)perylene	0.1				<LOR	<0.1	
Total PAH	1.6				<LOR		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
Metals, pH and PAH
All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH13 0.7-0.9	BH13* 0.7-0.9	BH13/D 0.7-0.9	BH13/D* 0.7-0.9	BH14 0.55-0.7	BH15 0.7-0.85
Metals:							
Arsenic	5	5.1	<LOR	<LOR	5	19	<LOR
Cadmium	1	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Cobalt	1	7.7	8.1				
Chromium (total)	2	29	29	33	34	18	26
Copper	2	16	16	17	17	**450** [1,2]	9.9
Mercury	0.5	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Nickel	1	15	15				
Lead	5	43	36	39	34	**1600** [1,2,3,4]	11
Selenium	5	<LOR	<LOR				
Zinc	2	32	32	32	32	**2000** [1,2]	14
Manganese	10	260	270				
Beryllium	1		1.2	1.1			
Molybdenum	5		<LOR	<LOR			
Antimony	5		<LOR	<LOR			
Tin	2		2.6	2.8			
pH	0.1			**8.9** [1]		**11** [1,2]	**9.3** [1,2]
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1	<LOR	<LOR			<LOR	
Acenaphthylene	0.1	<LOR	<LOR			<LOR	
Acenaphthene	0.1	<LOR	<LOR			<LOR	
Fluorene	0.1	<LOR	<LOR			<LOR	
Phenanthrene	0.1	<LOR	0.2			<LOR	
Anthracene	0.1	<LOR	0.1			<LOR	
Fluoranthrene	0.1	0.1	0.3			0.2	
Pyrene	0.1	0.1	0.2			0.2	
Benz(a)anthracene	0.1	<LOR	0.2			<LOR	
Chrysene	0.1	<LOR	0.1			<LOR	
Benzo(b)fluoranthene an	0.1	0.1	0.1			0.1	
Benzo(k)fluoranthrene	0.1	<LOR	0.1			0.1	
Benzo(a)pyrene	0.1	<LOR	0.1			0.1	
Indeno(1,2,3-cd)pyrene	0.1	<LOR	<LOR			<LOR	
Dibenz(a,h)anthracene	0.1	<LOR	<LOR			<LOR	
Benzo(g,h,i)perylene	0.1	<LOR	<LOR			<LOR	
Total PAH	1.6	<LOR	1.4			<LOR	

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH15/D 0.7-0.85	BH15/D* 0.7-0.85	BH16 0.4-0.5	BH17 0.8-1.0	BH18 0.4-0.5	BH18* 0.4-0.5
Metals:							
Arsenic	5	2.8		9.5	11		
Cadmium	1	<0.5		<LOR	<LOR		
Cobalt	1	9.4					
Chromium (total)	2	28		29	13		
Copper	2	16		10	7.3		
Mercury	0.5	<0.1		<LOR	<LOR		
Nickel	1	11					
Lead	5	15		11	<LOR		
Selenium	5	<0.5					
Zinc	2	26		21	11		
Manganese	10	260					
Beryllium	1	<2					
Molybdenum	5	<10					
Antimony	5	<10					
Tin	2	<10					
pH	0.1			**9.7** [1,2]	**9.8** [1,2]	**9.4** [1,2]	**9.4** [1,2]
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1	<0.1	<0.1	<LOR		<LOR	
Acenaphthylene	0.1	<0.1	<0.1	<LOR		<LOR	
Acenaphthene	0.1	<0.1	<0.1	<LOR		<LOR	
Fluorene	0.1	<0.1	<0.1	<LOR		<LOR	
Phenanthrene	0.1	<0.1	<0.1	<LOR		<LOR	
Anthracene	0.1	<0.1	<0.1	<LOR		<LOR	
Fluoranthrene	0.1	<0.1	<0.1	<LOR		<LOR	
Pyrene	0.1	<0.1	<0.1	<LOR		<LOR	
Benz(a)anthracene	0.1	<0.1	<0.1	<LOR		<LOR	
Chrysene	0.1	<0.1	<0.1	<LOR		<LOR	
Benzo(b)fluoranthene an	0.1	<0.1	<0.1	<LOR		<LOR	
Benzo(k)fluoranthrene	0.1	<0.1	<0.1	<LOR		<LOR	
Benzo(a)pyrene	0.1	<0.1	<0.1	<LOR		<LOR	
Indeno(1,2,3-cd)pyrene	0.1	<0.1	<0.1	<LOR		<LOR	
Dibenz(a,h)anthracene	0.1	<0.1	<0.1	<LOR		<LOR	
Benzo(g,h,i)perylene	0.1	<0.1	<0.1	<LOR		<LOR	
Total PAH	1.6			<LOR		<LOR	

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Soil
OCPs and OPPs

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH13	BH13*	BH12/D	BH15/D	BH15/D*
Sample Depth	**Reporting**	0.45-0.6	0.7-0.9	0.7-0.9	0.55-0.7	0.7-0.85	0.7-0.85
Organochlorine Pesticides:							
HCB	0.05	<LOR	<LOR	<LOR			
Dichloran	0.05	<LOR	<LOR	<LOR			
Total BHC	0.05	<LOR	<LOR	<LOR			
Lindane	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
Heptachlor	0.05	<LOR	<LOR	<LOR			
Heptachlor Epoxide	0.05	<LOR	<LOR	<LOR			
Total Chlordane (ocy, cis, trans, chlordene, nonachlor)	0.05	<LOR	<LOR	<LOR			
Total endosulphan	0.05	<LOR	<LOR	<LOR			
Aldrin	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
Dieldrin	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
Endrin Total	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
Dicofol	0.05	<LOR	<LOR	<LOR			
op-DDE, pp-DDE	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
op-DDD pp-DDD	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
op DDT pp-DDT	0.05	<LOR	<LOR	<LOR	<0.1	<0.1	<0.01
Methoxychlor	0.05	<LOR	<LOR	<LOR			
Total OCPs	0.2	<LOR	<LOR	<LOR			
Organophosphate Pesticides:							
Dichlorvos	0.1	<LOR	<LOR	<LOR			
Mevinphos	0.1	<LOR	<LOR	<LOR			
Diazinon	0.1	<LOR	<LOR	<LOR			
Chlorpyrifos-Methyl	0.1	<LOR	<LOR	<LOR			
Fenchlorvos	0.1	<LOR	<LOR	<LOR			
Parathion-methyl	0.1	<LOR	<LOR	<LOR			
Chlorpyriphos	0.1	<LOR	<LOR	<LOR			
Malathion	0.1	<LOR	<LOR	<LOR			
Fenitrothion	0.1	<LOR	<LOR	<LOR			
Parathion	0.1	<LOR	<LOR	<LOR			
Chlorfenvinphos	0.1	<LOR	<LOR	<LOR			
Bromophos-Ethyl	0.1	<LOR	<LOR	<LOR			
Tetrachlorvinphos	0.1	<LOR	<LOR	<LOR			
Ethion	0.1	<LOR	<LOR	<LOR			
Total OPPs	0.2	<LOR	<LOR	<LOR			

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

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Analytical Results

BTEX, TPH, Phenols, Fluoride, Cyanide, Cresols, PCBs

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of Reporting	BH4 0.45-0.6	BH4* 0.45-0.6	BH12/D 0.55-0.7	BH12/D* 0.55-0.7	BH13 0.7-0.9	BH13* 0.7-0.9
BTEX:							
Benzene	0.5	<LOR	<LOR	<0.01	<0.01	<LOR	
Toluene	0.5	<LOR	<LOR	<0.01	<0.01	<LOR	
Ethyl Benzene	0.5	<LOR	<LOR	<0.01	<0.01	<LOR	
Xylene	1	<LOR	<LOR	<0.01	<0.01	<LOR	
Total BTEX	2	<LOR	<LOR	<0.01		<LOR	
Total Petroleum Hydrocarbons (TPH):							
C_6-C_9	25	<LOR	<LOR	<20		<LOR	
C_{10}-C_{14}	25	<LOR	<LOR	<50		<LOR	
C_{15}-C_{28}	25	<LOR	<LOR	<100		<LOR	
C_{29}-C_{36}	25	<LOR	<LOR	<100		<LOR	
Total TPH	100	<LOR	<LOR			<LOR	
Phenols							
Phenol	0.1	<LOR	<LOR	<0.1	<0.1	<LOR	<LOR
3-Methylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2-Methylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2-Ethylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2,4-Dimehtylphenol	0.1	<LOR	<LOR			<LOR	<LOR
2,3,5-Trimethylphenol	0.1	<LOR	<LOR			<LOR	<LOR
4-Nitrophenol	0.1	<LOR	<LOR			<LOR	<LOR
Cresols				<0.1	<0.1		
Fluoride				260			
Cyanide				<5			
Polychlorinated Biphenyls (PCBs)							
A1016	0.2	<LOR				<LOR	<LOR
A1221	0.2	<LOR				<LOR	<LOR
A1232	0.2	<LOR				<LOR	<LOR
A1242	0.2	<LOR				<LOR	<LOR
A1248	0.2	<LOR				<LOR	<LOR
A1254	0.2	<LOR				<LOR	<LOR
A1260	0.2	<LOR				<LOR	<LOR
A1262	0.2	<LOR				<LOR	<LOR
Total Aroclors	1	<LOR				<LOR	<LOR

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Analytical Results
Volatile Organic Scan

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH4 0.45-0.6	BH13 0.7-0.9
Monocyclic Aromatic Hydrocarbons			
Benzene	1.0	<LOR	<LOR
Toluene	1.0	<LOR	<LOR
Ethylbenzene	1.0	<LOR	<LOR
m.p-xylene	1.0	<LOR	<LOR
o-xylene	1.0	<LOR	<LOR
Styrene	1.0	<LOR	<LOR
Isopropylbenzene	1.0	<LOR	<LOR
n-propylbenzene	1.0	<LOR	<LOR
1,3,5-Trimethylbenzene	1.0	<LOR	<LOR
tert-Butylbenzene	1.0	<LOR	<LOR
1,2,4-Trimethylbenzene	1.0	<LOR	<LOR
sec-Butylbenzene	1.0	<LOR	<LOR
n-Butylbenzene	1.0	<LOR	<LOR
Fumigants			
2,2-Dichloropropane	1.0	<LOR	<LOR
1,2-Dichloropropane	1.0	<LOR	<LOR
1,2-dibromoethane	1.0	<LOR	<LOR
Halogenated Aliphatic Hydrocarbons:			
Dichlorofluoromethane	1.0	<LOR	<LOR
Chloromethane	1.0	<LOR	<LOR
Vinyl Chloride	1.0	<LOR	<LOR
Bromomethane	1.0	<LOR	<LOR
Chlorethane	1.0	<LOR	<LOR
Trichlorofluoromethane	1.0	<LOR	<LOR
1,1-Dichloroethene	1.0	<LOR	<LOR
Methylene Chloride	1.0	<LOR	<LOR
trans-1,2-Dichloroethene	1.0	<LOR	<LOR
1,1-Dichloroethane	1.0	<LOR	<LOR
cis-1,2-Dichloroethene	1.0	<LOR	<LOR
Bromochloromethane	1.0	<LOR	<LOR
1,1,1-Trichloroethane	1.0	<LOR	<LOR
Carbon Tetrachloride	1.0	<LOR	<LOR
1.1-Dichloropropene	1.0	<LOR	<LOR
1,2-Dichloroethane	1.0	<LOR	<LOR

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Appendix I

Certified Laboratory Results

REPORT OF ANALYSIS

RE-ISSUE OF REPORT

Client: Rust PPK
GPO Box 398
ADELAIDE SA 5001

Attention: Stuart Taylor/Jane Hewitt

Sample Description: Soil/Water - Project No27J097A - Franklin Street Bus Station

Lab Registration Nos: V97/18543 to V97/18566

Date Received: 23rd May 1997

Samples submitted to AGAL have been analysed as received. The information below is provided as part of our commitment to the quality of the analytical results. Please contact the undersigned for any further details relating to this Report.

Methods of Analysis:

• BTEX & TPH (C_6-C_9)	AGAL(Vic) Method VL234 (Purge & Trap GC/MS)
• TPH (C_{10}-C_{36}) - Soil	AGAL(Vic) Method VL228 (GC/FID)
• VOC's	AGAL(Vic) Method VL234 (Purge & Trap GC/MS)
• PAH's - Soil/Water	AGAL(Vic) Method VL221/222 (GC/MS)
• Metals - Soil/Water	AGAL(Vic) Method VL239/250 (ICP/MS/AES)
• OC/OP pesticides/PCB's - Soil/Water	AGAL(Vic) Method VL206/207 (GC determination)
• Phenols - Soil	AGAL(Vic) Method VL210 (HPLC determination)
• pH	AGAL(Vic) Method VL271 (Using APHA 4500B)

Quality Assurance:

The QA procedures conducted with the analyses include -

- Analysis of reagent blanks
- Analysis of recoveries
- Analysis of samples in duplicate

Results obtained for recoveries of selected analytes were as follows:

Analyte	Soil	Water
Toluene-d8	95%	-
TPH	91%	-
Phenanthrene	87%	106%
Dieldrin	84%	103%
3-Methyl phenol	81%	-
Lead	85%	101%
Zinc	78%	99%

Results of Analysis:

Analytical results on samples as received appear on the following page(s). All results are based on using one technique for each test. Soil results are reported on a dry weight basis.

This report shall not be reproduced except in full.

Barrie Magor
B.Sc.(Hons), Grad.Dip.App.Sci., MRACI
(Organics Analyses)

Roger Cromie
Dip.App.Sci., Grad.Dip.App.Sci., MRACI
(Metals Analyses)

Anthony Crane
B.App.Sci.
(Inorganics Analyses)

Date: 18-6-97

File : h:\word\reports\1997\18593.doc

REPORT OF ANALYSIS

Client Reference No: / Lab Registration No:	Units	LOR	BH4 (0.45-0.6) V97/18546	BH13 (0.7-0.9) V97/18555
Dichlorodifluoromethane	mg/kg	1.0	<1.0	<1.0
Chloromethane	mg/kg	1.0	<1.0	<1.0
Vinyl chloride	mg/kg	1.0	<1.0	<1.0
Bromomethane	mg/kg	1.0	<1.0	<1.0
Chloroethane	mg/kg	1.0	<1.0	<1.0
Trichlorofluoromethane	mg/kg	1.0	<1.0	<1.0
1,1-Dichloroethene	mg/kg	1.0	<1.0	<1.0
Methylene chloride	mg/kg	1.0	<1.0	<1.0
trans-1,2-Dichloroethene	mg/kg	1.0	<1.0	<1.0
1,1-Dichloroethane	mg/kg	1.0	<1.0	<1.0
2,2-Dichloropropane	mg/kg	1.0	<1.0	<1.0
cis-1,2-Dichloroethene	mg/kg	1.0	<1.0	<1.0
Bromochloromethane	mg/kg	1.0	<1.0	<1.0
Chloroform	mg/kg	1.0	<1.0	<1.0
1,1,1-Trichloroethane	mg/kg	1.0	<1.0	<1.0
Carbon tetrachloride	mg/kg	1.0	<1.0	<1.0
1,1-Dichloropropene	mg/kg	1.0	<1.0	<1.0
Benzene	mg/kg	1.0	<1.0	<1.0
1,2-Dichloroethane	mg/kg	1.0	<1.0	<1.0
Trichloroethene	mg/kg	1.0	<1.0	<1.0
1,2-Dichloropropane	mg/kg	1.0	<1.0	<1.0
Dibromomethane	mg/kg	1.0	<1.0	<1.0
Bromodichloromethane	mg/kg	1.0	<1.0	<1.0
cis-1,3-dichloropropene	mg/kg	1.0	<1.0	<1.0
Toluene	mg/kg	1.0	<1.0	<1.0
trans-1,3-dichloropropene	mg/kg	1.0	<1.0	<1.0
1,1,2-Trichloroethane	mg/kg	1.0	<1.0	<1.0
Tetrachloroethene	mg/kg	1.0	<1.0	<1.0
1,3-Dichloropropane	mg/kg	1.0	<1.0	<1.0
Dibromochloromethane	mg/kg	1.0	<1.0	<1.0

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REPORT OF ANALYSIS

Client Reference No: / Lab Registration No:	Units	LOR	BH4 (0.45-0.6) V97/18546	BH5 (0.8-1.0) V97/18547	BH6 (0.65-0.75) V97/18548	BH12 (0.55-0.7) V97/18554	BH13 (0.7-0.9) V97/18555	
PAH's:								
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.2
Anthracene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.1
Fluoranthene	mg/kg	0.1	0.1	<0.1	0.9	<0.1	0.1	0.3
Pyrene	mg/kg	0.1	0.1	<0.1	0.9	<0.1	0.1	0.2
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	0.5	<0.1	<0.1	0.2
Chrysene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	0.1
Benzo(b)fluoranthene	mg/kg	0.1	0.1	<0.1	0.4	<0.1	0.1	0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	0.1
Benzo(a)pyrene	mg/kg	0.1	0.1	<0.1	0.6	<0.1	<0.1	0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1
Total PAH's (as above)	mg/kg	**1.6**	**<1.6**	**<1.6**	**5.3**	**<1.6**	**<1.6**	**1.4**

Client Reference No: / Lab Registration No:	Units	LOR	BH14 (0.55-0.7) V97/18556	BH16 (0.4-0.5) V97/18558	BH18 (0.4-0.5) V97/18560	BH19 (0.55-0.7) V97/18561	BH20 (0.05-0.2) V97/18562	BD2 V97/18563	
PAH's:									
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1	2.1	<0.1	<0.1
Pyrene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1	2.2	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Benzo(b)fluoranthene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.5	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.7	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Dibenz(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Total PAH's (as above)	mg/kg	**1.6**	**<1.6**	**<1.6**	**<1.6**	**<1.6**	**15**	**<1.6**	**<1.6**

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REPORT OF ANALYSIS

Client Reference No: / Lab Registration No:	Units	LOR	BH4 (0.45-0.6) V97/18546	BH13 (0.7-0.9) V97/18555	
PCB's (as Aroclors):					
A1016	mg/kg	0.2	<0.2	<0.2	<0.2
A1221	mg/kg	0.2	<0.2	<0.2	<0.2
A1232	mg/kg	0.2	<0.2	<0.2	<0.2
A1242	mg/kg	0.2	<0.2	<0.2	<0.2
A1248	mg/kg	0.2	<0.2	<0.2	<0.2
A1254	mg/kg	0.2	<0.2	<0.2	<0.2
A1260	mg/kg	0.2	<0.2	<0.2	<0.2
Total PCB's	mg/kg	**1.0**	**<1.0**	**<1.0**	**<1.0**

Client Reference No: / Lab Registration No:	Units	LOR	BH1 (0.06-0.3) V97/18543	BH3 (0.8-1.0) V9718545	BH5 (0.8-1.0) V97/18547	BH6 (0.65-0.75) V97/18548	BH7 (0.4-0.5) V97/18549
pH	–	0.1	9.5	9.5	9.5	9.4	9.8

Client Reference No: / Lab Registration No:	Units	LOR	BH8 (0.8-1.0) V97/18550	BH10 (0.7-0.85) V97/18552	BH11 (0.8-1.0) V97/18553	BH12 (0.55-0.7) V97/18554	BH14 (0.55-0.7) V97/18556
pH	–	0.1	10	8.8	9.3	9.2	11

Client Reference No: / Lab Registration No:	Units	LOR	BH15 (0.7-0.85) V97/18557	BH16 (0.4-0.5) V97/18558	BH17 (0.8-1.0) V97/18559	BH18 (0.4-0.5) V97/18560	BH19 (0.55-0.7) V97/18561
pH	–	0.1	9.3	9.7	9.8	9.4 9.4	9.1

Client Reference No: / Lab Registration No:	Units	LOR	BH20 (0.05-0.2) V97/18562	BD2 V97/18563	BD6 V97/18564
pH	–	0.1	9.5	9.2	8.9

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REPORT OF ANALYSIS

Results for water

Client Reference No: Lab Registration No:	Units	LOR	ER1 V97/18565	ER2 V97/18566
OC Pesticides:				
HCB	µg/L	0.05	<0.05	<0.05
Dichloran	µg/L	0.05	<0.05	<0.05
BHC (α,β,δ)	µg/L	0.05	<0.05	<0.05
Lindane (γ-BHC)	µg/L	0.05	<0.05	<0.05
Heptachlor	µg/L	0.05	<0.05	<0.05
Heptachlor Epoxide	µg/L	0.05	<0.05	<0.05
Chlordane (total)	µg/L	0.05	<0.05	<0.05
Endosulphan (total)	µg/L	0.05	<0.05	<0.05
Aldrin	µg/L	0.05	<0.05	<0.05
Dieldrin	µg/L	0.05	<0.05	<0.05
Endrin (total)	µg/L	0.05	<0.05	<0.05
Dicofol	µg/L	0.05	<0.05	<0.05
DDT's (total)	µg/L	0.05	<0.05	<0.05
Methoxychlor	µg/L	0.05	<0.05	<0.05
Total OC's (as above)	µg/L	**0.2**	**<0.2**	**<0.2**

Client Reference No: Lab Registration No:	Units	LOR	ER1 V97/18565	ER2 V97/18566
PAH's:				
Naphthalene	µg/L	0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1
Benzo(b)fluoranthene	µg/L	0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1
Dibenz(ah)anthracene	µg/L	0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1
Total PAH's (as above)	µg/L	**1.0**	**<1.0**	**<1.0**

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REPORT OF ANALYSIS

Client:	**Rust PPK** **GPO Box 398** **ADELAIDE SA 5001**
Attention:	**Stuart Taylor/Jane Hewitt**
Sample Description:	**Soil/Water - Project No27J097A - Franklin Street Bus Station**
Lab Registration Nos:	**V97/18543 to V97/18566**
Date Received:	**23rd May 1997**

Samples submitted to AGAL have been analysed as received. The information below is provided as part of our commitment to the quality of the analytical results. Please contact the undersigned for any further details relating to this Report.

Methods of Analysis:

- Metals - Soil — AGAL(Vic) Method VL239 (ICP/MS/AES)

Quality Assurance:

The QA procedures conducted with the analyses include -

- Analysis of reagent blanks
- Analysis of recoveries
- Analysis of samples in duplicate

Results obtained for recoveries of selected analytes were as follows:

Analyte	Soil
Beryllium	98%
Mercury	106%
Antimony	89%

Results of Analysis:

Analytical results on samples as received appear on the following page(s). All results are based on using one technique for each test. Soil results are reported on a dry weight basis.

This report shall not be reproduced except in full.

Roger Cromie
Dip.App.Sci., Grad.Dip.App.Sci., MRACI
(Metals Analyses)

Date: 30 - 5 - 97

File : h:\word\reports\1997\18543.doc

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RUST PPK Pty. Ltd.
101 Pirie Street
Adelaide
South Australia 5001
Site : FRANKLIN ST BUS STATION 27J097A

CHLORINATED HYDROCARBONS US EPA SW486 METHOD 8010 & 8080.

Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank		
Lab. No.	MY1968	MY1969	MY1969D			
Benzyl chloride	<0.01	<0.01	<0.01	<0.001		
2-Chloronaphthalene	<0.01	<0.01	<0.01	<0.001		
1,2-Dichlorobenzene	<0.01	<0.01	<0.01	<0.001		
1,3-Dichlorobenzene	<0.01	<0.01	<0.01	<0.001		
1,4-Dichlorobenzene	<0.01	<0.01	<0.01	<0.001		
Hexachlorobenzene	<0.01	<0.01	<0.01	<0.001		
Hexachlorobutadiene	<0.01	<0.01	<0.01	<0.001		
Hexachlorocyclopentadiene	<0.01	<0.01	<0.01	<0.001		
Hexachloroethane	<0.01	<0.01	<0.01	<0.001		
Tetrachlorobenzenes	<0.01	<0.01	<0.01	<0.001		
1,2,4-Trichlorobenzene	<0.01	<0.01	<0.01	<0.001		

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 23/05/97 Date Reported 10/06/97

G. Black

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Site : FRANKLIN ST BUS STATION 27J097A

MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

Sample	BH12/D	BH15/D				
Lab. No.	MY1968	MY1969				
Fluoride (Total)	260	190				

Results in ppm (soils mg/kg dry, waters mg/l.)

Date received 23/05/97 Date Reported 10/06/97

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RUST PPK Pty. Ltd.
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Site : FRANKLIN ST BUS STATION 27J097A

MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8020&5030.

Sample	BH12/D	BH12/D Dup	BH15/D	Method Blank	Spike % Recov	
Lab. No.	MY1968	MY1968D	MY1969			
Benzene	<0.01	<0.01	<0.01	<0.001	112%	
Toluene	<0.01	<0.01	<0.01	<0.001	106%	
Ethyl Benzene	<0.01	<0.01	<0.01	<0.001	104%	
Xylenes	<0.01	<0.01	<0.01	<0.001	108%	

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 23/05/97 Date Reported 10/06/97

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Site : FRANKLIN ST BUS STATION 27J097A

POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8100(GC).

Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank	Spike % Recov	
Lab. No.	MY1968	MY1969	MY1969D			
Naphthalene	<0.1	<0.1	<0.1	<0.001	-	
Acenaphthylene	<0.1	<0.1	<0.1	<0.001	-	
Acenaphthene	<0.1	<0.1	<0.1	<0.001	-	
Fluorene	<0.1	<0.1	<0.1	<0.001	-	
Phenanthrene	<0.1	<0.1	<0.1	<0.001	-	
Anthracene	<0.1	<0.1	<0.1	<0.001	-	
Fluoranthrene	<0.1	<0.1	<0.1	<0.001	90%	
Pyrene	<0.1	<0.1	<0.1	<0.001	92%	
Benzo(a)anthracene	<0.1	<0.1	<0.1	<0.001	-	
Chrysene	<0.1	<0.1	<0.1	<0.001	-	
Benzo(b)fluoranthene	<0.1	<0.1	<0.1	<0.001	-	
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.001	-	
Benzo(a)pyrene	<0.1	<0.1	<0.1	<0.001	96%	
Dibenzo(a,h)anthracene	<0.1	<0.1	<0.1	<0.001	-	
Benzo(g,h,i)perylene	<0.1	<0.1	<0.1	<0.001	-	
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.001	-	

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 23/05/97 Date Reported 10/06/97

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Site : FRANKLIN ST BUS STATION 27J097A

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410, GC- US EPA SW846 8040

Sample	BH12/D	BH12/D Dup	BH15/D	Method Blank		
Lab. No.	MY1968	MY1968D	MY1969			
Phenol	<0.1	<0.1	<0.1	<0.01		
Cresols (Total)	<0.1	<0.1	<0.1	<0.01		

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 23/05/97 Date Reported 10/06/97

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CRITERIA USED TO ASSESS QUALITY CONTROL RESULTS

VALIDITY AND RELIABILITY OF TEST RESULTS

The continuing validity and reliability of results is accomplished by monitoring a number of factors

1. Analysis of duplicates. Duplicates run at a minimum of 5 %
2. Recovery of known additions. Spikes run at a minimum of 5 % with each batch of samples.
3. Analysis of reagent blanks run with each batch of samples.

1 Analysis of Duplicates

Duplicates are analysed as a matter of course and the data analysed by means of a range chart type system. The range for each duplicate pair is determined and 'normalised' by dividing by the average of the duplicate results.
Once enough data has been gathered control data for each method can be developed. The mean range (R) is determined as

$$R = \frac{(\Sigma R_i)}{n}$$

where n = number of observations
and R_i = normalised range

and the variance (square of the standard deviation) is determined as

$$s_r^2 = \frac{(\Sigma R_i^2 - nR^2)}{n-1}$$

The control criteria thus become :

Average range	R
Warning Limit	$R + 2s_r$
Control Limit	$R + 3s_r$

The normalised range for each duplicate pair is calculated and compared with the above criteria. (This can be achieved either graphically or by visual comparison of the data) Since the limits are based on 95 % and 90 % confidence levels respectively , the following actions are taken, based on these statistical parameters

Control Limit

If one measurement exceeds the C.L. repeat the analysis. If the repeat is within the C.L. continue analyses . If it exceeds the C.L. discontinue analyses and correct the problem

Warning Limit

If two out of three successive points exceed the W.L. analyse another sample. If the next point is less than the W.L. continue analyses, if the next point exceeds the W.L. discontinue analyses and correct the problem.

***Particular care needs to be taken with some soil samples with regard to sample homogeneity, especially with regard to 'organics' analyses. Statistical analysis may indicate a problem exists when in fact the problem is really only sample homogeneity

2. Recovery of known additions.

The recovery of known additions is used to verify the absence of matrix effects and absence of interferences. Recovery from standards is used to verify method performance. Recovery data is compared against acceptance criteria published in Standards Methods for Examination of Water and Waste water, or appropriate U.S. EPA Methods.

If recoveries fall outside acceptance criteria, analyses should be discontinued and the problem rectified.

3.0 Analysis of Reagent Blanks

Reagent blanks are used to monitor purity of reagents and the overall procedural blank Reagent blanks are run as a matter of course with each batch for analysis. Unusual or out of the 'norm' results for blanks are investigated and corrective action taken before analysis of any batch is completed.

G. Black.

Appendix J

Tabulated Results of Replicate and Duplicate Analysis

Analytical Results - Laboratory Replicates
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH4 0.45-0.6	BH4* 0.45-0.6	BH4/D 0.45-0.6	BH4/D* 0.45-0.6	BH11 0.8-1.0	BH11* 0.8-1.0
Metals:							
Arsenic	5	7.6	7.5	8.5		8.9	9.8
Cadmium	1	<LOR	<LOR	<LOR		<LOR	<LOR
Cobalt	1	8	7.6				
Chromium (total)	2	31	29	26		11	12
Copper	2	32	29	34		5.7	6
Mercury	0.5	<LOR	<LOR	**1.6** [1]		<LOR	<LOR
Nickel	1	15	14				
Lead	5	**446** [1,2]	**670** [1,2]	**440** [1,2]		<LOR	<LOR
Selenium	5	<LOR	<LOR				
Zinc	2	**280** [1]	**270** [1]	**270** [1]		9.8	10
Manganese	10	200					
Beryllium	1	1.2	1.2				
Molybdenum	5	<LOR	<LOR				
Antimony	5	<LOR	<LOR				
Tin	2	28	26				
pH	0.1			**9.2** [1,2]		**9.3** [1,2]	
Polycyclic Aromatic Hydrocarbons (PAH):							
Naphthalene	0.1	<LOR		<LOR	<LOR		
Acenaphthylene	0.1	<LOR		<LOR	<LOR		
Acenaphthene	0.1	<LOR		<LOR	<LOR		
Fluorene	0.1	<LOR		<LOR	<LOR		
Phenanthrene	0.1	<LOR		<LOR	<LOR		
Anthracene	0.1	<LOR		<LOR	<LOR		
Fluoranthrene	0.1	0.1		<LOR	<LOR		
Pyrene	0.1	0.1		<LOR	<LOR		
Benz(a)anthracene	0.1	<LOR		<LOR	<LOR		
Chrysene	0.1	<LOR		<LOR	<LOR		
Benzo(b)fluoranthene and	0.1	0.1		<LOR	<LOR		
Benzo(k)fluoranthrene	0.1	<LOR		<LOR	<LOR		
Benzo(a)pyrene	0.1	0.1		<LOR	<LOR		
Indeno(1,2,3-cd)pyrene	0.1	<LOR		<LOR	<LOR		
Dibenz(a,h)anthracene	0.1	<LOR		<LOR	<LOR		
Benzo(g,h,i)perylene	0.1	<LOR		<LOR	<LOR		
Total PAH	1	<LOR		<LOR	<LOR		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Laboratory Replicates
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH15/D 0.7-0.85	BH15/D* 0.7-0.85	BH18 0.4-0.5	BH18* 0.4-0.5
Metals:					
Arsenic	5				
Cadmium	1				
Cobalt	1				
Chromium (total)	2				
Copper	2				
Mercury	0.5				
Nickel	1				
Lead	5				
Selenium	5				
Zinc	2				
Manganese	10				
Beryllium	1				
Molybdenum	5				
Antimony	5				
Tin	2				
pH	0.1			**9.4** [1,2]	**9.4** [1,2]
Polycyclic Aromatic Hydrocarbons (PAH):					
Naphthalene	0.1	<0.1	<0.1		
Acenaphthylene	0.1	<0.1	<0.1		
Acenaphthene	0.1	<0.1	<0.1		
Fluorene	0.1	<0.1	<0.1		
Phenanthrene	0.1	<0.1	<0.1		
Anthracene	0.1	<0.1	<0.1		
Fluoranthrene	0.1	<0.1	<0.1		
Pyrene	0.1	<0.1	<0.1		
Benz(a)anthracene	0.1	<0.1	<0.1		
Chrysene	0.1	<0.1	<0.1		
Benzo(b)fluoranthene and	0.1	<0.1	<0.1		
Benzo(k)fluoranthrene	0.1	<0.1	<0.1		
Benzo(a)pyrene	0.1	<0.1	<0.1		
Indeno(1,2,3-cd)pyrene	0.1	<0.1	<0.1		
Dibenz(a,h)anthracene	0.1	<0.1	<0.1		
Benzo(g,h,i)perylene	0.1	<0.1	<0.1		
Total PAH	1				

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Analytical Results - Laboratory Replicates
BTEX, TPH, Phenols, Cresols,
All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH4 0.45-0.6	BH4* 0.45-0.6	BH13 0.7-0.9	BH13* 0.7-0.9	BH12/D 0.55-0.7	BH12/D* 0.55-0.7
BTEX:							
Benzene	0.5	<LOR	<LOR			<0.01	<0.01
Toluene	0.5	<LOR	<LOR			<0.01	<0.01
Ethyl Benzene	0.5	<LOR	<LOR			<0.01	<0.01
Xylene	1	<LOR	<LOR			<0.01	<0.01
Total BTEX	2	<LOR	<LOR				
Total Petroleum Hydrocarbons (TPH):							
C_6-C_9	25	<LOR	<LOR				
C_{10}-C_{14}	25	<LOR	<LOR				
C_{15}-C_{28}	25	<LOR	<LOR				
C_{29}-C_{36}	25	<LOR	<LOR				
Total TPH	100	<LOR	<LOR				
Cresols						<0.1	<0.1
Phenols							
Phenol	0.1	<LOR	<LOR	<LOR	<LOR	<0.1	<0.1
3-Methylphenol	0.1	<LOR	<LOR	<LOR	<LOR		
2-Methylphenol	0.1	<LOR	<LOR	<LOR	<LOR		
2-Ethylphenol	0.1	<LOR	<LOR	<LOR	<LOR		
2,4-Dimehtylphenol	0.1	<LOR	<LOR	<LOR	<LOR		
2,3,5-Trimethylphenol	0.1	<LOR	<LOR	<LOR	<LOR		
4-Nitrophenol	0.1	<LOR	<LOR	<LOR	<LOR		
Polychlorinated Biphenyls (PCBs)							
A1016	0.2	<LOR		<LOR	<LOR		
A1221	0.2	<LOR		<LOR	<LOR		
A1232	0.2	<LOR		<LOR	<LOR		
A1242	0.2	<LOR		<LOR	<LOR		
A1248	0.2	<LOR		<LOR	<LOR		
A1254	0.2	<LOR		<LOR	<LOR		
A1260	0.2	<LOR		<LOR	<LOR		
A1262	0.2	<LOR		<LOR	<LOR		
Total Aroclors	1	<LOR		<LOR	<LOR		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Analytical Results - Laboratory Replicates
Volatile Organic Scan

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH15/D 0.7-0.85	BH15/D* 0.7-0.85
Trichloroethene	1.0		
Dibromomethane	1.0		
cis-1,3-dichloropropene	1.0		
trans-1,3-dichloropropene	1.0		
1,1,2-Trichloroethane	1.0		
Tetrachloroethene	1.0		
1,3-Dichloropropane	1.0		
1,1,1,2-Tetrachloroethane	1.0		
1,1,2,2-Tetrachloroethane	1.0		
1,2,3-Trichloropropane	1.0		
4-Isopropyltoluene	1.0		
1,2-Dibromo-3-chloropropane	1.0		
Hexachlorobutadiene	1.0	<0.1	<0.1
Hexachloroethane		<0.1	<0.1
Hexachlorocyclopentadiene		<0.1	<0.1
Halogenated Aromatic			
Hydrocarbons	1.0		
1,2,3-Trichlorobenzene	1.0		
1,2,4-Trichlorobenzene	1.0	<0.1	<0.1
1,2-Dichlorobenzene	1.0	<0.1	<0.1
1,4-Dichlorobenzene	1.0	<0.1	<0.1
1,3-Dichlorobenzene	1.0	<0.1	<0.1
2-Chlorotoluene	1.0		
4-Chlorotoluene	1.0		
Bromobenzene	1.0		
Chlorobenzene		<0.1	<0.1
2-Choronapthalene		<0.1	<0.1
hexachlorobenzene		<0.1	<0.1
tetrachlorobenzene	1.0	<0.1	<0.1
	1.0		
Trihalomethanes	1.0		
(Volatiles)	1.0		
Chloroform	1.0		
Dibromochloromethane			
Bromodichloromethane			
Bromoform			
Naphthalene			

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Analytical Results - Soil Duplicates
Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number Sample Depth	Limit Of Reporting	BH15 0.7-0.85	BH15/D 0.7-0.85
Metals:			
Arsenic	5	<LOR	2.8
Cadmium	1	<LOR	<0.5
Cobalt	1		9.4
Chromium (total)	1	26	28
Copper	2	9.9	16
Mercury	2	<LOR	<0.1
Nickel	0.5		11
Lead	10	11	15
Selenium	5		<0.5
Zinc	1	14	26
Manganese	5		260
Beryllium	5		<2
Molybdenum	5		<10
Antimony	2		<10
Tin	2		<10
pH	0.1	**9.3** [1,2]	
Polycyclic Aromatic Hydrocarbons (PAH):			
Naphthalene	0.1		<0.1
Acenaphthylene	0.1		<0.1
Acenaphthene	0.1		<0.1
Fluorene	0.1		<0.1
Phenanthrene	0.1		<0.1
Anthracene	0.1		<0.1
Fluoranthrene	0.1		<0.1
Pyrene	0.1		<0.1
Benz(a)anthracene	0.1		<0.1
Chrysene	0.1		<0.1
Benzo(b)fluoranthene and	0.1		<0.1
Benzo(k)fluoranthrene	0.1		<0.1
Benzo(a)pyrene	0.1		<0.1
Indeno(1,2,3-cd)pyrene	0.1		<0.1
Dibenz(a,h)anthracene	0.1		<0.1
Benzo(g,h,i)perylene	0.1		<0.1
Total PAH	1		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

[1] denotes greater than the ANZECC environmental guidelines

[2] denotes greater than the SAHC health based guidelines

[3] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

[4] denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Appendix K

Data Validation

Franklin Street Bus Station

Summary of Quality Control Laboratory Replicates

Location Number	Arsenic					Cadmium				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	7.6	7.5	1	1.01	0.99	<LOR	<LOR	0	1.00	1.00
BH11 (0.8-1.0)	8.9	9.8	10	0.95	1.05	<LOR	<LOR	0	1.00	1.00
BH12/D (0.55-0.7)	2.8	2.8	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	5.1	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH13/D (0.7-0.9)	<LOR	5.0	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
				RSD (%)	2				RSD (%)	0

Location Number	Chromium					Copper				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	31	29	7	1.03	0.97	32	29	10	1.05	0.95
BH11 (0.8-1.0)	11	12	9	0.96	1.04	6	6	5	0.97	1.03
BH12/D (0.55-0.7)	28	26	7	1.04	0.96	14	14	0	1.00	1.00
BH13 (0.7-0.9)	29	29	0	1.00	1.00	16	16	0	1.00	1.00
BH13/D (0.7-0.9)	33	34	3	0.99	1.01	17	17	0	1.00	1.00
				RSD (%)	3				RSD (%)	3

Location Number	Lead					Nickel				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val	Norm. Dup.
BH4 (0.45-0.6)	446	670	40	0.80	1.20	15	14	7	1.03	0.97
BH11 (0.8-1.0)	<LOR	<LOR	0	1.00	1.00					
BH12/D (0.55-0.7)	14	15	7	0.97	1.03	14	12	15	1.08	0.92
BH13 (0.7-0.9)	43	36	18	1.09	0.91	15	15	0	1.00	1.00
BH13/D (0.7-0.9)	39	34	14	1.07	0.93					
				RSD (%)	11				RSD (%)	5

Location Number	Mercury					Zinc				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	<LOR	<LOR	0	1.00	1.00	280	270	4	1.02	0.98
BH11 (0.8-1.0)	<LOR	<LOR	0	1.00	1.00	9.8	10	2	0.99	1.01
BH12/D (0.55-0.7)	<LOR	<LOR	0	1.00	1.00	28	32	13	0.93	1.07
BH13 (0.7-0.9)	<LOR	<LOR	0	1.00	1.00	32	32	0	1.00	1.00
BH13/D (0.7-0.9)	<LOR	<LOR	0	1.00	1.00	32	32	0	1.00	1.00
				RSD (%)	0				RSD (%)	3

Location Number	Cobalt					Selenium				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	8.0	7.6	5	1.03	0.97	<LOR	<LOR	0	1.00	1.00
BH12/D (0.55-0.7)	8.5	8.5	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	7.7	8.1	5	0.97	1.03	<LOR	<LOR	0	1.00	1.00
				RSD (%)	2				RSD (%)	0

Location Number	Manganese					Beryllium				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)						1.2	1.2	0	1.00	1.00
BH12/D (0.55-0.7)	220	210	5	1.02	0.98	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	260	270	4	0.98	1.02	1.1	1.2	9	0.96	1.04
				RSD (%)	2				RSD (%)	3

Franklin Street Bus Station

Summary of Quality Control Field Duplicates

Location Number	Arsenic					Cadmium				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	7.6	8.5	11	0.94	1.06	<LOR	<LOR	0	1.00	1.00
BH12 (0.55-0.7)	<LOR	2.8				<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	5.1	<LOR				<LOR	<LOR	0	1.00	1.00
BH15 (0.7-0.85)	<LOR	2.8				<LOR	<LOR	0	1.00	1.00
				RSD (%)	8				RSD (%)	0

Location Number	Chromium					Copper				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	31	26	18	1.09	0.91	32	34	6	0.97	1.03
BH12 (0.55-0.7)	29	28	4	1.02	0.98	10	14	33	0.83	1.17
BH13 (0.7-0.9)	29	33	13	0.94	1.06	16	17	6	0.97	1.03
BH15 (0.7-0.85)	26	28	7	0.96	1.04	9.9	16	47	0.76	1.24
				RSD (%)	6				RSD (%)	16

Location Number	Mercury				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	<LOR	1.6	0	1.00	1.00
BH12 (0.55-0.7)	<LOR	<LOR	0	1.00	1.00
BH13 (0.7-0.9)	<LOR	<LOR	0	1.00	1.00
BH15 (0.7-0.85)	<LOR	<LOR	0	1.00	1.00
			RSD (%)	0	

Location Number	Lead					Zinc				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	446	440	1	1.01	0.99	280	270	4	1.02	0.98
BH12 (0.55-0.7)	11	14	24	0.88	1.12	17	28	49	0.76	1.24
BH13 (0.7-0.9)	43	39	10	1.05	0.95	32	32	0	1.00	1.00
BH15 (0.7-0.85)	11	15	31	0.85	1.15	14	26	60	0.70	1.30
				RSD (%)	11				RSD (%)	21

Location Number	Total PAHs					Benzo(a)pyrene				
	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	<LOR	<LOR	0	1.00	1.00	0.1	<LOR			
BH12 (0.55-0.7)	<LOR	<LOR	0	1.00	1.00	<LOR	<LOR	0	1.00	1.00
				RSD (%)	0				RSD (%)	0

Note:
Where only one result is below the limit of reporting the RPDs can not be calculated

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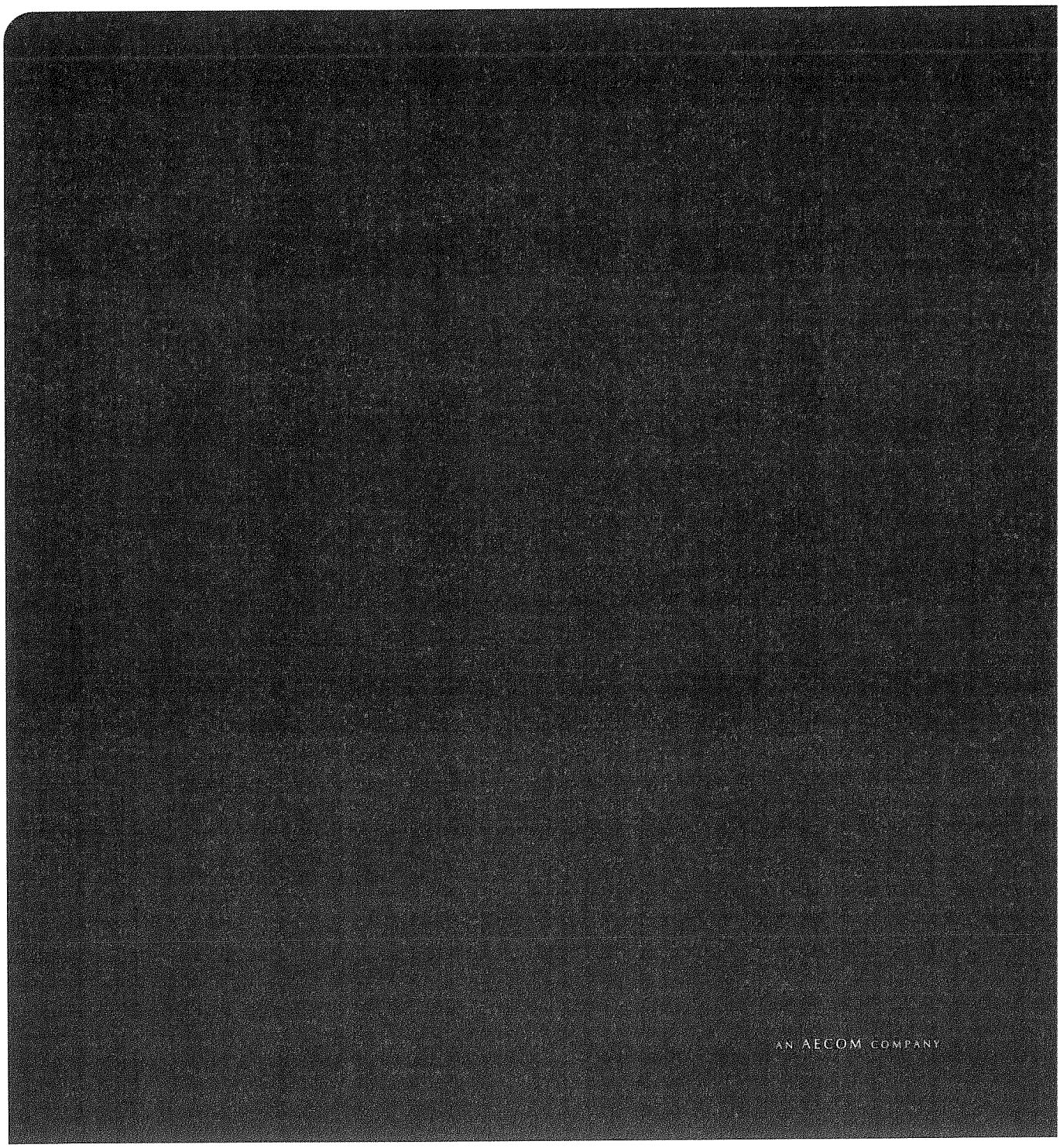
Soil and Groundwater Investigation
Central West Precinct

Franklin Street Bus Station Laboratory Reports

Adelaide City Council

November 2004



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Central West Precinct

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Adelaide City Council

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November 2004

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This document is:

Franklin Street Bus Station Laboratory Reports

This document accompanies:

Soil and Groundwater Investigation
Central West Precinct
Franklin Street Bus Station and Car Parks

mgt

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MGT ANALYSIS REPORT .174918

CLIENT :- Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

SITE :- FRANKLIN ST 40032004.00

DATE RECEIVED :- 20/08/04

DATE EXTRACTED OR PREPARED :- 20/08/04 - 21/08/04

DATE REPORTED :- 23/09/04

QA/QC DETAILS :- **The QA/QC for these samples is detailed in this report no** 174918

A total of 38 duplicate, 18 matrix spike % recovery and 11 method blank analyses or sets of analyses were carried out on this batch of samples.

All QA/QC results for duplicates, matrix spike % recoveries, method blanks and known QC standards were within the set acceptable criteria.

FINAL REPORT :- **The results in this report supersede any previously corresponded results.**

Michael Wright
Laboratory Manager

mgt

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Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Benzyl chloride	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,2-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,3-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,4-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Hexachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobutadiene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorocyclopentadiene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3,5-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
a,a-Dichlorotoluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,3-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
a,a,a-Trichlorotoluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,3,5-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4,5-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,3,4-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

Date Reported 23/09/04

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Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Benzyl chloride	<0.2	<0.5	<0.2	<0.2	<0.2	<0.5
1,2-Dichlorobenzene	<0.2	<0.5	<0.2	<0.2	<0.2	<0.5
1,3-Dichlorobenzene	<0.2	<0.5	<0.2	<0.2	<0.2	<0.5
1,4-Dichlorobenzene	<0.2	<0.5	<0.2	<0.2	<0.2	<0.5
Hexachlorobenzene	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Hexachlorobutadiene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
Hexachlorocyclopentadiene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
Hexachloroethane	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1,3,5-Trichlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1,2,4-Trichlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
a,a-Dichlorotoluene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1,2,3-Trichlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
a,a,a-Trichlorotoluene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1,2,3,5-Tetrachlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1,2,4,5-Tetrachlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1,2,3,4-Tetrachlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

Date Reported 23/09/04

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Maunsell Australia Pty Ltd.
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Adelaide
South Australia 5000

Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Benzyl chloride	<0.5	<0.2	<0.2	<0.1	<0.2	<0.2
1,2-Dichlorobenzene	<0.5	<0.2	<0.2	<0.1	<0.2	<0.2
1,3-Dichlorobenzene	<0.5	<0.2	<0.2	<0.1	<0.2	<0.2
1,4-Dichlorobenzene	<0.5	<0.2	<0.2	<0.1	<0.2	<0.2
Hexachlorobenzene	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Hexachlorobutadiene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
Hexachlorocyclopentadiene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
Hexachloroethane	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1,3,5-Trichlorobenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1,2,4-Trichlorobenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
a,a-Dichlorotoluene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1,2,3-Trichlorobenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
a,a,a-Trichlorotoluene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1,2,3,5-Tetrachlorobenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1,2,4,5-Tetrachlorobenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1,2,3,4-Tetrachlorobenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04 Date Reported 23/09/04

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Benzyl chloride	<0.2	<0.1	<0.2	<0.5	<0.2	<0.2
1,2-Dichlorobenzene	<0.2	<0.1	<0.2	<0.5	<0.2	<0.2
1,3-Dichlorobenzene	<0.2	<0.1	<0.2	<0.5	<0.2	<0.2
1,4-Dichlorobenzene	<0.2	<0.1	<0.2	<0.5	<0.2	<0.2
Hexachlorobenzene	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Hexachlorobutadiene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
Hexachlorocyclopentadiene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
Hexachloroethane	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
1,3,5-Trichlorobenzene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
1,2,4-Trichlorobenzene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
a,a-Dichlorotoluene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
1,2,3-Trichlorobenzene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
a,a,a-Trichlorotoluene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
1,2,3,5-Tetrachlorobenzene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
1,2,4,5-Tetrachlorobenzene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
1,2,3,4-Tetrachlorobenzene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

Date Reported 23/09/04

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Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Benzyl chloride	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,2-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,3-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,4-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Hexachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobutadiene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorocyclopentadiene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3,5-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
a,a-Dichlorotoluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,3-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
a,a,a-Trichlorotoluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,3,5-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4,5-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,3,4-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04 Date Reported 23/09/04

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Benzyl chloride	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,2-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,3-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,4-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Hexachlorobenzene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobutadiene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorocyclopentadiene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachloroethane	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
1,3,5-Trichlorobenzene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4-Trichlorobenzene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
a,a-Dichlorotoluene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,3-Trichlorobenzene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
a,a,a-Trichlorotoluene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,3,5-Tetrachlorobenzene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4,5-Tetrachlorobenzene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,3,4-Tetrachlorobenzene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

Date Reported 23/09/04

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3124S#Soil
Benzyl chloride	<0.2	<0.2	<0.2	<0.2	<0.2	-
1,2-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	-
1,3-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	-
1,4-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	-
Hexachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	-
Hexachlorobutadiene	<0.05	<0.05	<0.05	<0.05	<0.05	92%
Hexachlorocyclopentadiene	<0.05	<0.05	<0.05	<0.05	<0.05	78%
Hexachloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	81%
1,3,5-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2,4-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	-
a,a-Dichlorotoluene	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2,3-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	-
a,a,a-Trichlorotoluene	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2,3,5-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2,4,5-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	-
1,2,3,4-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	-

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	Meth.Bl.(mg/l)					
Lab. No. / Sample matrix						
Benzyl chloride	<0.02					
1,2-Dichlorobenzene	<0.02					
1,3-Dichlorobenzene	<0.02					
1,4-Dichlorobenzene	<0.02					
Hexachlorobenzene	<0.005					
Hexachlorobutadiene	<0.005					
Hexachlorocyclopentadiene	<0.005					
Hexachloroethane	<0.005					
1,3,5-Trichlorobenzene	<0.005					
1,2,4-Trichlorobenzene	<0.005					
a,a-Dichlorotoluene	<0.005					
1,2,3-Trichlorobenzene	<0.005					
a,a,a-Trichlorotoluene	<0.005					
1,2,3,5-Tetrachlorobenzene	<0.005					
1,2,4,5-Tetrachlorobenzene	<0.005					
1,2,3,4-Tetrachlorobenzene	<0.005					

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04 Date Reported 23/09/04

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Pentachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Pentachlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
alpha-BHC	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
gamma-BHC	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
beta-BHC	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
delta-BHC	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Pentachlorobenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
alpha-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
gamma-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
beta-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
delta-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Pentachlorobenzene	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
alpha-BHC	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
gamma-BHC	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
beta-BHC	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
delta-BHC	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Pentachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Pentachlorobenzene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-BHC	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3124S#Soil
Pentachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	-
alpha-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	84%
gamma-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	85%
beta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	79%
delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	91%

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	Meth.Bl.(mg/l)					
Lab. No. / Sample matrix						
Pentachlorobenzene	<0.005					
alpha-BHC	<0.005					
gamma-BHC	<0.005					
beta-BHC	<0.005					
delta-BHC	<0.005					

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Antimony	<10	<10	<10	<10	<10	<10
Arsenic	<2	<2	<2	<2	<2	2.3
Beryllium	<2	<2	<2	<2	<2	<2
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	18	19	8.9	10	11	<5
Cobalt	<5	<5	<5	<5	<5	<5
Copper	<5	<5	<5	11	<5	5.4
Lead	<5	<5	<5	21	<5	20
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	<10	<10	<10	<10	<10	<10
Nickel	<5	<5	5.7	5.6	6.3	<5
Selenium	<2	<2	<2	<2	<2	<2
Tin	<10	<10	<10	<10	<10	<10
Zinc	<5	<5	7.5	72	7.5	39

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

Date received 20/08/04

Date Reported 23/09/04

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Site : FRANKLIN ST 40032004.00

HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS4-A	Dup BUS4-A	BUS5-A	Dup BUS5-A	BUS6-A	BUS6-AA
Lab. No. / Sample matrix	AU3093#Soil	AU3093D#Soil	AU3094#Soil	AU3094D#Soil	AU3095#Soil	AU3096#Soil
Antimony	<10	<10	<10	<10	<10	<10
Arsenic	<2	<2	<2	-	<2	<2
Beryllium	<2	<2	<2	<2	<2	<2
Cadmium	<0.5	<0.5	<0.5	-	<0.5	0.55
Chromium	17	19	9.0	-	17	24
Cobalt	<5	<5	<5	-	<5	<5
Copper	6.5	5.9	<5	-	11	9.3
Lead	9.2	7.7	7.9	-	6.0	5.5
Mercury	<0.1	-	<0.1	-	<0.1	<0.1
Molybdenum	<10	<10	<10	<10	<10	<10
Nickel	5.4	<5	<5	-	10	12
Selenium	<2	<2	<2	<2	<2	<2
Tin	<10	<10	<10	<10	<10	<10
Zinc	19	18	30	-	15	18

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

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Site : FRANKLIN ST 40032004.00

HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS6-B	BUS7-A	BUS7-AA	BUS7-B	BUS7-C	BUS8-A
Lab. No. / Sample matrix	AU3097#Soil	AU3098#Soil	AU3099#Soil	AU3100#Soil	AU3101#Soil	AU3102#Soil
Antimony	<10	<10	<10	<10	<10	<10
Arsenic	2.4	<2	<2	<2	7.4	2.8
Beryllium	<2	<2	<2	<2	<2	<2
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	12	19	27	17	18	<5
Cobalt	<5	<5	<5	<5	<5	<5
Copper	<5	<5	<5	6.7	5.0	<5
Lead	<5	<5	<5	<5	<5	<5
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	<10	<10	<10	<10	<10	<10
Nickel	6.4	<5	<5	8.6	6.8	<5
Selenium	<2	<2	<2	<2	<2	<2
Tin	<10	<10	<10	<10	<10	<10
Zinc	9.0	6.0	6.4	13	16	8.0

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

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HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS9-A	BUS10-A	BUS10-B	BUS11-A	Dup BUS11-A	BUS12-A
Lab. No. / Sample matrix	AU3103#Soil	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3106D#Soil	AU3107#Soil
Antimony	<10	<10	<10	<10	<10	<10
Arsenic	<2	<2	<2	<2	<2	<2
Beryllium	<2	<2	<2	<2	<2	<2
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	9.5	<5	10	20	20	16
Cobalt	<5	<5	<5	<5	<5	<5
Copper	19	<5	<5	12	9.8	21
Lead	80	<5	<5	12	19	8.7
Mercury	0.15	<0.1	<0.1	0.28	0.23	<0.1
Molybdenum	<10	<10	<10	<10	<10	<10
Nickel	<5	<5	6.9	8.5	7.7	<5
Selenium	<2	<2	<2	<2	<2	<2
Tin	<10	<10	<10	<10	<10	<10
Zinc	75	5.0	7.6	23	24	19

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

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HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS12-AA	BUS12-B	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A
Lab. No. / Sample matrix	AU3108#Soil	AU3109#Soil	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil
Antimony	<10	<10	<10	<10	<10	<10
Arsenic	<2	<2	<2	<2	<2	<2
Beryllium	<2	<2	<2	<2	<2	<2
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	18	18	8.7	8.7	<5	<5
Cobalt	<5	<5	<5	<5	<5	<5
Copper	16	12	13	5.2	<5	<5
Lead	20	13	16	<5	<5	<5
Mercury	<0.1	0.14	<0.1	<0.1	<0.1	<0.1
Molybdenum	<10	<10	<10	<10	<10	<10
Nickel	<5	8.5	<5	5.7	<5	<5
Selenium	<2	<2	<2	<2	<2	<2
Tin	<10	<10	<10	<10	13	<10
Zinc	18	13	26	7.3	7.8	7.1

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

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HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS15-A	BUS15-B	BUS16-A	BUS17-A	BUS17-B	BUS19-A
Lab. No. / Sample matrix	AU3113#Soil	AU3114#Soil	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil
Antimony	<10	<10	<10	<10	<10	<10
Arsenic	<2	3.0	<2	<2	<2	<2
Beryllium	<2	<2	<2	<2	<2	<2
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	13	14	7.0	15	9.0	11
Cobalt	<5	<5	<5	<5	<5	<5
Copper	<5	<5	34	690	<5	<5
Lead	8.2	<5	28	40	<5	15
Mercury	0.19	<0.1	<0.1	0.35	<0.1	<0.1
Molybdenum	<10	<10	<10	<10	<10	<10
Nickel	5.7	7.0	<5	6.3	5.7	<5
Selenium	<2	<2	<2	<2	<2	<2
Tin	<10	<10	<10	<10	<10	<10
Zinc	11	8.6	44	25	6.0	13

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

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HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS20-A	BUS20-AA	BUS20-B	BUS21-A	BUS22-A	BUS22-B
Lab. No. / Sample matrix	AU3119#Soil	AU3120#Soil	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil
Antimony	<10	<10	<10	<10	<10	<10
Arsenic	<2	<2	<2	<2	<2	2.5
Beryllium	<2	<2	<2	<2	<2	<2
Cadmium	<0.5	<0.5	0.60	<0.5	<0.5	<0.5
Chromium	6.4	10	28	10	20	20
Cobalt	<5	<5	7.2	<5	<5	5.8
Copper	<5	<5	11	6.4	<5	<5
Lead	7.9	14	5.7	32	<5	<5
Mercury	<0.1	<0.1	<0.1	0.25	<0.1	<0.1
Molybdenum	<10	<10	<10	<10	<10	<10
Nickel	<5	<5	12	<5	<5	5.6
Selenium	<2	<2	<2	<2	<2	<2
Tin	<10	<10	<10	<10	<10	<10
Zinc	5.9	11	18	39	5.0	12

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

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HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS6-C	Spike % Recov	Spike % Recov	Spike % Recov	Meth.Bl.(mg/l)	
Lab. No. / Sample matrix	AU3219#Soil	AU3088S#Soil	AU3106S#Soil	AU3112S#Soil		
Antimony	<10	83%	87%	84%	<0.1	
Arsenic	3.1	81%	91%	83%	<0.01	
Beryllium	<2	82%	82%	81%	<0.01	
Cadmium	<0.5	82%	85%	82%	<0.01	
Chromium	16	86%	82%	84%	<0.05	
Cobalt	<5	81%	87%	82%	<0.05	
Copper	<5	83%	90%	83%	<0.05	
Lead	<5	86%	81%	83%	<0.05	
Mercury	<0.1	-	-	85%	<0.001	
Molybdenum	<10	83%	89%	87%	<0.1	
Nickel	6.2	81%	86%	81%	<0.05	
Selenium	<2	86%	84%	82%	<0.01	
Tin	<10	87%	83%	84%	<0.1	
Zinc	12	86%	91%	77%	<0.05	

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
pH (units) (1:5 aqueous extract)	10	9.9	9.8	8.9	9.5	9.4

Results in ppm (soils mg/kg dry, waters mg/l.) except where specified otherwise.

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Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
pH (units) (1:5 aqueous extract)	9.6	9.0	9.0	8.6	9.0	9.0

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Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
pH (units) (1:5 aqueous extract)	9.1	8.4	8.5	9.2	8.9	8.3

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Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
pH (units) (1:5 aqueous extract)	8.9	8.9	8.7	9.3	9.2	9.2

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Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
pH (units) (1:5 aqueous extract)	9.1	9.1	9.3	9.4	9.0	9.0

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Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
pH (units) (1:5 aqueous extract)	9.0	8.9	9.2	9.5	9.4	9.5

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Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	
pH (units) (1:5 aqueous extract)	9.3	8.8	11	9.6	9.2	

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CYANIDE (CN-) US EPA SW846 METHOD 9010B.

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Cyanide (total)	<5	<5	<5	<5	<5	<5
Results in ppm (soils mg/kg dry, waters mg/l).						

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CYANIDE (CN-) US EPA SW846 METHOD 9010B.

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Cyanide (total)	<5	<5	<5	<5	<5	<5

Results in ppm (soils mg/kg dry, waters mg/l).

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Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Cyanide (total)	<5	<5	<5	<5	<5	22

Results in ppm (soils mg/kg dry, waters mg/l).

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Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Cyanide (total)	<5	<5	<5	<5	<5	<5

Results in ppm (soils mg/kg dry, waters mg/l).

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CYANIDE (CN-) US EPA SW846 METHOD 9010B.

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Cyanide (total)	<5	7.0	<5	<5	<5	<5

Results in ppm (soils mg/kg dry, waters mg/l).

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Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Cyanide (total)	<5	<5	<5	<5	<5	<5

Results in ppm (soils mg/kg dry, waters mg/l).

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CYANIDE (CN-) US EPA SW846 METHOD 9010B.

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3111S#Soil
Cyanide (total)	<5	<5	<5	<5	<5	81%

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 20/08/04

Date Reported 23/09/04

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Site : FRANKLIN ST 40032004.00

CYANIDE (CN-) US EPA SW846 METHOD 9010B.

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	AU3124S#Soil					
Cyanide (total)	95%	<0.005				

Results in ppm (soils mg/kg dry, waters mg/l).

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Site : FRANKLIN ST 40032004.00

MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	<0.05	<0.05	<0.1	<0.2	<0.05	<0.05
Ethyl Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes	<0.05	<0.05	<0.05	0.62	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l).

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MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethyl Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l).

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MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethyl Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes	<0.05	<0.1	<0.1	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l).

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MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethyl Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l).

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MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethyl Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l).

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Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethyl Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 20/08/04

Date Reported 23/09/04

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MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3111S#Soil
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	88%
Toluene	<0.05	<0.05	<0.05	<0.05	<0.05	86%
Ethyl Benzene	<0.05	<0.05	<0.05	<0.05	<0.1	92%
Xylenes	<0.05	<0.05	<0.05	<0.05	0.14	90%

Results in ppm (soils mg/kg dry, waters mg/l).

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MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	Meth.Bl.(mg/l)					
Lab. No. / Sample matrix						
Benzene	<0.001					
Toluene	<0.001					
Ethyl Benzene	<0.001					
Xylenes	<0.001					

Results in ppm (soils mg/kg dry, waters mg/l).

Date received 20/08/04

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Site : FRANKLIN ST 40032004.00

ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lindane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDD	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDT	<0.05	<0.05	<0.05	0.25	<0.05	<0.05
Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulphate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

Date Reported 23/09/04

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Site : FRANKLIN ST 40032004.00

ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Aldrin	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
alpha-BHC	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
beta-BHC	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
delta-BHC	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Lindane	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Chlordane	<0.1	<0.5	<0.1	<0.1	<0.1	<0.5
4,4'-DDD	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
4,4'-DDE	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
4,4'-DDT	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Dieldrin	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Endosulfan I	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Endosulfan II	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Endosulfan Sulphate	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Endrin	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Endrin Aldehyde	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Endrin Ketone	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

Date Reported 23/09/04

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Aldrin	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
alpha-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
beta-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
delta-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Lindane	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Chlordane	<0.5	<0.1	<0.1	<0.2	<0.1	<0.1
4,4'-DDD	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
4,4'-DDE	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
4,4'-DDT	<0.2	<0.05	<0.05	<0.1	<0.05	0.07
Dieldrin	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Endosulfan I	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Endosulfan II	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Endosulfan Sulphate	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Endrin	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Endrin Aldehyde	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Endrin Ketone	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

Date Reported 23/09/04

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Aldrin	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
alpha-BHC	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
beta-BHC	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
delta-BHC	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Lindane	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Chlordane	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1
4,4'-DDD	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
4,4'-DDE	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
4,4'-DDT	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Dieldrin	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Endosulfan I	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Endosulfan II	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Endosulfan Sulphate	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Endrin	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Endrin Aldehyde	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Endrin Ketone	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lindane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDD	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDT	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulphate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

Date Reported 23/09/04

mgt

Environmental Consulting Pty. Ltd.

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Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : FRANKLIN ST 40032004.00

ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Aldrin	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-BHC	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Lindane	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDD	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDT	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulphate	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04 Date Reported 23/09/04

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3124S#Soil
Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	111%
alpha-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	84%
beta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	79%
delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	91%
Lindane	<0.05	<0.05	<0.05	<0.05	<0.05	85%
Chlordane	<0.1	<0.1	<0.1	<0.1	<0.1	-
4,4'-DDD	<0.05	<0.05	<0.05	<0.05	<0.05	81%
4,4'-DDE	<0.05	<0.05	<0.05	<0.05	<0.05	111%
4,4'-DDT	<0.05	<0.05	<0.05	<0.05	<0.05	88%
Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	89%
Endosulfan I	<0.05	<0.05	<0.05	<0.05	<0.05	-
Endosulfan II	<0.05	<0.05	<0.05	<0.05	<0.05	108%
Endosulfan Sulphate	<0.05	<0.05	<0.05	<0.05	<0.05	122%
Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	119%
Endrin Aldehyde	<0.05	<0.05	<0.05	<0.05	<0.05	97%
Endrin Ketone	<0.05	<0.05	<0.05	<0.05	<0.05	-

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	Meth.Bl.(mg/l)					
Lab. No. / Sample matrix						
Aldrin	<0.005					
alpha-BHC	<0.005					
beta-BHC	<0.005					
delta-BHC	<0.005					
Lindane	<0.005					
Chlordane	<0.01					
4,4'-DDD	<0.005					
4,4'-DDE	<0.005					
4,4'-DDT	<0.005					
Dieldrin	<0.005					
Endosulfan I	<0.005					
Endosulfan II	<0.005					
Endosulfan Sulphate	<0.005					
Endrin	<0.005					
Endrin Aldehyde	<0.005					
Endrin Ketone	<0.005					

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Heptachlor	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Heptachlor epoxide	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Hexachlorobenzene	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Methoxychlor	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Toxaphene	<0.1	<0.5	<0.1	<0.1	<0.1	<0.5

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Heptachlor	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Heptachlor epoxide	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Hexachlorobenzene	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Methoxychlor	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Toxaphene	<0.5	<0.1	<0.1	<0.2	<0.1	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Heptachlor	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Heptachlor epoxide	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Hexachlorobenzene	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Methoxychlor	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Toxaphene	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Heptachlor	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3124S#Soil
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	84%
Heptachlor epoxide	<0.05	<0.05	<0.05	<0.05	<0.05	123%
Hexachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	-
Methoxychlor	<0.05	<0.05	<0.05	<0.05	<0.05	-
Toxaphene	<0.1	<0.1	<0.1	<0.1	<0.05	-

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Sample	Meth.Bl.(mg/l)					
Lab. No. / Sample matrix						
Heptachlor	<0.005					
Heptachlor epoxide	<0.005					
Hexachlorobenzene	<0.005					
Methoxychlor	<0.005					
Toxaphene	<0.01					

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Naphthalene	<0.1	<0.1	<0.1	<0.1	<0.1	0.19
Acenaphthylene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	<0.1	<0.1	<0.1	<0.1	<0.1	0.35
Fluorene	<0.1	<0.1	<0.1	<0.1	<0.1	0.28
Phenanthrene	<0.1	<0.1	<0.1	0.15	<0.1	2.0
Anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	0.44
Fluoranthrene	<0.1	<0.1	<0.1	0.38	<0.1	1.6
Pyrene	<0.1	<0.1	<0.1	0.35	<0.1	1.4
Benzo(a)anthracene	<0.1	<0.1	<0.1	0.19	<0.1	0.71
Chrysene	<0.1	<0.1	<0.1	0.21	<0.1	0.71
Benzo(b)fluoranthene	<0.1	<0.1	<0.1	0.26	<0.1	0.72
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	0.16	<0.1	0.37
Benzo(a)pyrene	<0.1	<0.1	<0.1	0.32	<0.1	0.75
Dibenzo(a,h)anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	<0.1	<0.1	<0.1	<0.1	<0.1	0.54
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	0.46
Total PAH's	<2	<2	<2	2.1	<2	11

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Naphthalene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Acenaphthylene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Acenaphthene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Fluorene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Phenanthrene	<0.1	<0.5	<0.1	<0.1	<0.1	<0.2
Anthracene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Fluoranthrene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Pyrene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Benzo(a)anthracene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Chrysene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Benzo(b)fluoranthene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Benzo(k)fluoranthene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Benzo(a)pyrene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Dibenzo(a,h)anthracene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Benzo(g,h,i)perylene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Indeno(1,2,3-cd)pyrene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Total PAH's	<2	<2	<2	<2	<2	<2

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Naphthalene	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	<0.2	<0.1	<0.1	<0.1	<0.1	0.24
Anthracene	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthrene	<0.2	<0.1	<0.1	<0.1	<0.1	0.73
Pyrene	<0.2	<0.1	<0.1	<0.1	<0.1	0.86
Benzo(a)anthracene	<0.2	<0.1	<0.1	<0.1	<0.1	0.47
Chrysene	<0.2	<0.1	<0.1	<0.1	<0.1	0.47
Benzo(b)fluoranthene	<0.2	<0.1	<0.1	<0.1	<0.1	0.57
Benzo(k)fluoranthene	<0.2	<0.1	<0.1	<0.1	<0.1	0.32
Benzo(a)pyrene	<0.2	<0.1	<0.1	<0.1	<0.1	0.66
Dibenzo(a,h)anthracene	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	<0.2	<0.1	<0.1	<0.1	<0.1	0.29
Indeno(1,2,3-cd)pyrene	<0.2	<0.1	<0.1	<0.1	<0.1	0.21
Total PAH's	<2	<2	<2	<2	<2	5.0

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

Date Reported 23/09/04

mgt

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Naphthalene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Acenaphthylene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Acenaphthene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Fluorene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Phenanthrene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Anthracene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Fluoranthrene	<0.1	<0.1	0.11	<0.2	<0.2	<0.1
Pyrene	<0.1	<0.1	0.11	<0.2	<0.2	<0.1
Benzo(a)anthracene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Chrysene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Benzo(b)fluoranthene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Benzo(a)pyrene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Dibenzo(a,h)anthracene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Benzo(g,h,i)perylene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Total PAH's	<2	<2	<2	<2	<2	<2

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Naphthalene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthrene	0.14	<0.1	<0.1	<0.1	0.15	<0.1
Pyrene	0.15	<0.1	<0.1	<0.1	0.15	<0.1
Benzo(a)anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PAH's	<2	<2	<2	<2	<2	<2

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Naphthalene	0.46	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.38	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.82	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.61	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	9.9	<0.1	<0.1	<0.1	0.10	0.13
Anthracene	2.2	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthrene	16	0.17	<0.1	<0.1	0.18	0.40
Pyrene	17	0.20	<0.1	<0.1	0.21	0.41
Benzo(a)anthracene	11	0.18	<0.1	<0.1	0.12	0.21
Chrysene	8.7	0.15	<0.1	<0.1	0.15	0.26
Benzo(b)fluoranthene	11	0.18	<0.1	<0.1	0.16	0.40
Benzo(k)fluoranthene	7.9	0.12	<0.1	<0.1	0.12	0.18
Benzo(a)pyrene	12	0.16	<0.1	<0.1	0.19	0.36
Dibenzo(a,h)anthracene	2.0	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	6.6	<0.1	<0.1	<0.1	<0.1	0.20
Indeno(1,2,3-cd)pyrene	6.9	<0.1	<0.1	<0.1	<0.1	0.19
Total PAH's	110	<2	<2	<2	<2	2.8

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3111S#Soil
Naphthalene	<0.1	<0.1	<0.1	<0.1	<0.1	108%
Acenaphthylene	<0.1	<0.1	<0.1	<0.1	<0.1	98%
Acenaphthene	<0.1	<0.1	<0.1	<0.1	<0.1	108%
Fluorene	<0.1	<0.1	<0.1	<0.1	<0.1	100%
Phenanthrene	<0.1	0.10	<0.1	<0.1	<0.1	93%
Anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	90%
Fluoranthrene	<0.1	0.49	<0.1	<0.1	<0.1	94%
Pyrene	<0.1	0.52	<0.1	<0.1	<0.1	97%
Benzo(a)anthracene	<0.1	0.30	<0.1	<0.1	<0.1	94%
Chrysene	<0.1	0.31	<0.1	<0.1	<0.1	94%
Benzo(b)fluoranthene	<0.1	0.35	<0.1	<0.1	<0.1	107%
Benzo(k)fluoranthene	<0.1	0.23	<0.1	<0.1	<0.1	101%
Benzo(a)pyrene	<0.1	0.30	<0.1	<0.1	<0.1	97%
Dibenzo(a,h)anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	94%
Benzo(g,h,i)perylene	<0.1	0.15	<0.1	<0.1	<0.1	91%
Indeno(1,2,3-cd)pyrene	<0.1	0.14	<0.1	<0.1	<0.1	94%
Total PAH's	<2	3.0	<2	<2	<2	-

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	AU3124S#Soil					
Naphthalene	114%	<0.001				
Acenaphthylene	102%	<0.001				
Acenaphthene	110%	<0.001				
Fluorene	104%	<0.001				
Phenanthrene	115%	<0.001				
Anthracene	86%	<0.001				
Fluoranthrene	104%	<0.001				
Pyrene	104%	<0.001				
Benzo(a)anthracene	92%	<0.001				
Chrysene	92%	<0.001				
Benzo(b)fluoranthene	108%	<0.001				
Benzo(k)fluoranthene	96%	<0.001				
Benzo(a)pyrene	99%	<0.001				
Dibenzo(a,h)anthracene	86%	<0.001				
Benzo(g,h,i)perylene	99%	<0.001				
Indeno(1,2,3-cd)pyrene	89%	<0.001				
Total PAH's	-	<0.02				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Arochlor-1016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1221	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1232	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1242	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1248	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1254	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1260	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PCB's	<1	<1	<1	<1	<1	<1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Arochlor-1016	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Arochlor-1221	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Arochlor-1232	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Arochlor-1242	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Arochlor-1248	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Arochlor-1254	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Arochlor-1260	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Total PCB's	<1	<2	<1	<1	<1	<2

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Arochlor-1016	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1
Arochlor-1221	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1
Arochlor-1232	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1
Arochlor-1242	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1
Arochlor-1248	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1
Arochlor-1254	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1
Arochlor-1260	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1
Total PCB's	<2	<1	<1	<2	<1	<1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Arochlor-1016	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1
Arochlor-1221	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1
Arochlor-1232	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1
Arochlor-1242	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1
Arochlor-1248	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1
Arochlor-1254	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1
Arochlor-1260	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1
Total PCB's	<1	<2	<1	<2	<1	<1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Arochlor-1016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1221	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1232	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1242	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1248	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1254	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1260	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PCB's	<1	<1	<1	<1	<1	<1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Arochlor-1016	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1221	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1232	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1242	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1248	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1254	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1260	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Total PCB's	<2	<1	<1	<1	<1	<1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04 Date Reported 23/09/04

mgt

Environmental Consulting Pty. Ltd.

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Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : FRANKLIN ST 40032004.00

POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3124S#Soil
Arochlor-1016	<0.1	<0.1	<0.1	<0.1	<0.1	81%
Arochlor-1221	<0.1	<0.1	<0.1	<0.1	<0.1	-
Arochlor-1232	<0.1	<0.1	<0.1	<0.1	<0.1	-
Arochlor-1242	<0.1	<0.1	<0.1	<0.1	<0.1	-
Arochlor-1248	<0.1	<0.1	<0.1	<0.1	<0.1	-
Arochlor-1254	<0.1	<0.1	<0.1	<0.1	<0.1	-
Arochlor-1260	<0.1	<0.1	<0.1	<0.1	<0.1	93%
Total PCB's	<1	<1	<1	<1	<1	-

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	Meth.Bl.(mg/l)					
Lab. No. / Sample matrix						
Arochlor-1016	<0.001					
Arochlor-1221	<0.001					
Arochlor-1232	<0.001					
Arochlor-1242	<0.001					
Arochlor-1248	<0.001					
Arochlor-1254	<0.001					
Arochlor-1260	<0.001					
Total PCB's	<0.01					

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cresols (total)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Phenol	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Cresols (total)	<0.1	<0.5	<0.1	<0.1	<0.1	<0.5

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Phenol	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Cresols (total)	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Phenol	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Cresols (total)	<0.1	<0.1	<0.1	<0.5	<0.5	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cresols (total)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cresols (total)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3111S#Soil
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	106%
Cresols (total)	<0.1	<0.1	<0.1	<0.1	<0.1	102%

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	AU3124S#Soil					
Phenol	110%	<0.001				
Cresols (total)	104%	<0.001				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	<20
T.R.H. C10-C14 Fraction by GC	<50	<50	<50	<50	<50	<50
T.R.H. C15-C28 Fraction by GC	<100	<100	<100	<100	<100	110
T.R.H. C29-C36 Fraction by GC	<100	<100	<100	<100	<100	<100

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Site : FRANKLIN ST 40032004.00

TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	<20
T.R.H. C10-C14 Fraction by GC	<50	<50	<50	<50	<50	<100
T.R.H. C15-C28 Fraction by GC	<100	<100	<100	<100	<100	<500
T.R.H. C29-C36 Fraction by GC	<100	160	<100	<100	<100	<500

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	<20
T.R.H. C10-C14 Fraction by GC	<100	<50	<50	<50	<50	<50
T.R.H. C15-C28 Fraction by GC	<500	<100	<100	<100	<100	110
T.R.H. C29-C36 Fraction by GC	<500	<100	<100	<100	<100	<100

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	<20
T.R.H. C10-C14 Fraction by GC	<50	<50	<50	<50	<50	<50
T.R.H. C15-C28 Fraction by GC	<100	<100	<100	<100	<100	<100
T.R.H. C29-C36 Fraction by GC	<100	<100	<100	<100	<100	<100

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	<20
T.R.H. C10-C14 Fraction by GC	<50	<50	<50	<50	<50	<50
T.R.H. C15-C28 Fraction by GC	<100	<100	<100	<100	<100	<100
T.R.H. C29-C36 Fraction by GC	<100	<100	<100	<100	<100	<100

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	<20
T.R.H. C10-C14 Fraction by GC	<50	<50	<50	<50	<50	<50
T.R.H. C15-C28 Fraction by GC	300	<100	<100	<100	<100	<100
T.R.H. C29-C36 Fraction by GC	310	<100	<100	<100	110	<100

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04

Date Reported 23/09/04

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TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3099S#Soil
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	-
T.R.H. C10-C14 Fraction by GC	<50	<50	<50	<50	<50	127%
T.R.H. C15-C28 Fraction by GC	<100	<100	<100	<100	<100	-
T.R.H. C29-C36 Fraction by GC	<100	<100	<100	<100	<100	-

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	Spike % Recov	Spike % Recov	Meth.Bl.(mg/l)			
Lab. No. / Sample matrix	AU3111S#Soil	AU3124S#Soil				
T.R.H. C6-C9 Fraction by GC	-	-	<0.02			
T.R.H. C10-C14 Fraction by GC	123%	98%	<0.05			
T.R.H. C15-C28 Fraction by GC	-	-	<0.1			
T.R.H. C29-C36 Fraction by GC	-	-	<0.1			

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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MGT ANALYSIS REPORT . 176122

CLIENT :- Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

SITE :- CENTRAL WEST 40032004.00

DATE RECEIVED :- 29/09/04

DATE EXTRACTED OR PREPARED :- 29/09/04 - 30/09/04

DATE REPORTED :- 26/10/04

QA/QC DETAILS :- **The QA/QC for these samples is detailed in this report no** 176122

A total of 9 duplicate, 9 matrix spike % recovery and 11 method blank analyses or sets of analyses were carried out on this batch of samples.

All QA/QC results for duplicates, matrix spike % recoveries, method blanks and known QC standards were within the set acceptable criteria.

FINAL REPORT :- **The results in this report supersede any previously corresponded results.**

Michael Wright
Laboratory Manager

mgt

Environmental Consulting Pty. Ltd.

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South Australia 5000

Site : CENTRAL WEST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Benzyl chloride	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2-Dichlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,3-Dichlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,4-Dichlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Hexachlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Hexachlorobutadiene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Hexachlorocyclopentadiene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Hexachloroethane	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,3,5-Trichlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2,4-Trichlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
a,a-Dichlorotoluene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2,3-Trichlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
a,a,a-Trichlorotoluene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2,3,5-Tetrachlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2,4,5-Tetrachlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2,3,4-Tetrachlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

Date Reported 26/10/04

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Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : CENTRAL WEST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	SE3696S#Water					
Benzyl chloride	-	<0.0005				
1,2-Dichlorobenzene	-	<0.0005				
1,3-Dichlorobenzene	-	<0.0005				
1,4-Dichlorobenzene	-	<0.0005				
Hexachlorobenzene	-	<0.0005				
Hexachlorobutadiene	90%	<0.0005				
Hexachlorocyclopentadiene	88%	<0.0005				
Hexachloroethane	89%	<0.0005				
1,3,5-Trichlorobenzene	-	<0.0005				
1,2,4-Trichlorobenzene	-	<0.0005				
a,a-Dichlorotoluene	-	<0.0005				
1,2,3-Trichlorobenzene	-	<0.0005				
a,a,a-Trichlorotoluene	-	<0.0005				
1,2,3,5-Tetrachlorobenzene	-	<0.0005				
1,2,4,5-Tetrachlorobenzene	-	<0.0005				
1,2,3,4-Tetrachlorobenzene	-	<0.0005				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Site : CENTRAL WEST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Pentachlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
alpha-BHC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
gamma-BHC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
beta-BHC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
delta-BHC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0001

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Site : CENTRAL WEST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	SE3696S#Water					
Pentachlorobenzene	-	<0.0005				
alpha-BHC	111%	<0.0005				
gamma-BHC	119%	<0.0005				
beta-BHC	-	<0.0005				
delta-BHC	115%	<0.0005				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Site : CENTRAL WEST 40032004.00

HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Antimony	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	0.004	0.004	0.003	0.004	0.003	0.003
Beryllium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Chromium	0.003	0.004	0.003	0.003	0.003	0.003
Cobalt	<0.001	<0.001	0.001	<0.001	<0.001	0.002
Copper	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001
Molybdenum	<0.005	<0.005	<0.005	<0.005	0.006	0.011
Nickel	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	0.005	0.005	0.006	0.005	<0.005	0.007
Tin	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.025	0.025	0.027	0.012	0.013	0.011

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

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Site : CENTRAL WEST 40032004.00

HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	SE3692S#Water					
Antimony	93%	<0.01				
Arsenic	113%	<0.001				
Beryllium	107%	<0.001				
Cadmium	85%	<0.0002				
Chromium	110%	<0.001				
Cobalt	99%	<0.001				
Copper	95%	<0.001				
Lead	99%	<0.001				
Mercury	-	<0.0001				
Molybdenum	91%	<0.005				
Nickel	92%	<0.001				
Selenium	102%	<0.005				
Tin	96%	<0.005				
Zinc	84%	<0.001				

Extraction with H2O2, HNO3 & HCl. Results in ppm (soils mg/kg dry, waters mg/l).

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

Sample	MW-5	MW-6	MW-7	MW-8	MW-9	
Lab. No. / Sample matrix	SE3692#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water	
pH(units)	7.1	7.1	7.0	7.3	7.1	

Results in ppm (soils mg/kg dry, waters mg/l.) except where specified otherwise.

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Maunsell Australia Pty Ltd.
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Site : CENTRAL WEST 40032004.00

CYANIDE (CN-) US EPA SW846 METHOD 9010B.

Sample	MW-5	MW-6	MW-7	MW-8	MW-9	Meth.Bl.(mg/l)
Lab. No. / Sample matrix	SE3692#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water	
Cyanide (total)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Results in ppm (soils mg/kg dry, waters mg/l).						

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Maunsell Australia Pty Ltd.
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Site : CENTRAL WEST 40032004.00

MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	MW-5	MW-6	MW-7	MW-8	MW-9	Spike % Recov
Lab. No. / Sample matrix	SE3692#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water	SE3696S#Water
Benzene	<0.001	<0.001	<0.001	<0.001	<0.001	90%
Toluene	<0.001	<0.001	<0.001	<0.001	<0.001	85%
Ethyl Benzene	<0.001	<0.001	<0.001	<0.001	<0.001	80%
Xylenes	<0.001	<0.001	<0.001	<0.001	<0.001	87%

Results in ppm (soils mg/kg dry, waters mg/l).

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MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	Meth.Bl.(mg/l)					
Lab. No. / Sample matrix						
Benzene	<0.001					
Toluene	<0.001					
Ethyl Benzene	<0.001					
Xylenes	<0.001					

Results in ppm (soils mg/kg dry, waters mg/l).

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Site : CENTRAL WEST 40032004.00

ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Aldrin	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
alpha-BHC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
beta-BHC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
delta-BHC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Lindane	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chlordane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4,4'-DDD	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
4,4'-DDE	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
4,4'-DDT	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dieldrin	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Endosulfan I	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Endosulfan II	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Endosulfan Sulphate	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Endrin	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Endrin Aldehyde	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Endrin Ketone	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	SE3693S#Water					
Aldrin	92%	<0.0001				
alpha-BHC	94%	<0.0001				
beta-BHC	106%	<0.0001				
delta-BHC	87%	<0.0001				
Lindane	84%	<0.0001				
Chlordane	-	<0.001				
4,4'-DDD	80%	<0.0001				
4,4'-DDE	82%	<0.0001				
4,4'-DDT	81%	<0.0001				
Dieldrin	94%	<0.0001				
Endosulfan I	97%	<0.0001				
Endosulfan II	83%	<0.0001				
Endosulfan Sulphate	80%	<0.0001				
Endrin	99%	<0.0001				
Endrin Aldehyde	93%	<0.0001				
Endrin Ketone	-	<0.0001				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Heptachlor	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Heptachlor epoxide	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hexachlorobenzene	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Methoxychlor	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Toxaphene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	SE3693S#Water					
Heptachlor	92%	<0.0001				
Heptachlor epoxide	86%	<0.0001				
Hexachlorobenzene	-	<0.0001				
Methoxychlor	80%	<0.0001				
Toxaphene	-	<0.001				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

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Site : CENTRAL WEST 40032004.00

POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Naphthalene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Acenaphthylene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Acenaphthene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Fluorene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Phenanthrene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Anthracene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Fluoranthrene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Pyrene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Benzo(a)anthracene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Chrysene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Benzo(b)fluoranthene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Benzo(k)fluoranthene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Benzo(a)pyrene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Dibenzo(a,h)anthracene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Benzo(g,h,i)perylene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Indeno(1,2,3-cd)pyrene	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Total PAH's	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	SE3693S#Water					
Naphthalene	100%	<0.0001				
Acenaphthylene	86%	<0.0001				
Acenaphthene	107%	<0.0001				
Fluorene	98%	<0.0001				
Phenanthrene	104%	<0.0001				
Anthracene	96%	<0.0001				
Fluoranthrene	95%	<0.0001				
Pyrene	95%	<0.0001				
Benzo(a)anthracene	112%	<0.0001				
Chrysene	92%	<0.0001				
Benzo(b)fluoranthene	107%	<0.0001				
Benzo(k)fluoranthene	116%	<0.0001				
Benzo(a)pyrene	110%	<0.0001				
Dibenzo(a,h)anthracene	99%	<0.0001				
Benzo(g,h,i)perylene	112%	<0.0001				
Indeno(1,2,3-cd)pyrene	105%	<0.0001				
Total PAH's	-	<0.002				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

Date Reported 26/10/04

mgt
Environmental Consulting Pty. Ltd.
A.B.N. 50 005 085 521
3 KingstonTown Close, Oakleigh, Victoria, 3166, Australia
Postal Address P.O. Box 276 Oakleigh Victoria, 3166, Australia
Telephone (03) 9564 7055
Fax (03) 9564 7190
Email: mgt@mgtenv.com.au

Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : CENTRAL WEST 40032004.00

POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Arochlor-1016	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arochlor-1221	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arochlor-1232	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arochlor-1242	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arochlor-1248	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arochlor-1254	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arochlor-1260	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total PCB's	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

Date Reported 26/10/04

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South Australia 5000

Site : CENTRAL WEST 40032004.00

POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	Meth.Bl.(mg/l)					
Lab. No. / Sample matrix						
Arochlor-1016	<0.001					
Arochlor-1221	<0.001					
Arochlor-1232	<0.001					
Arochlor-1242	<0.001					
Arochlor-1248	<0.001					
Arochlor-1254	<0.001					
Arochlor-1260	<0.001					
Total PCB's	<0.01					

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

Date Reported 26/10/04

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Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : CENTRAL WEST 40032004.00

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Phenol	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Cresols (total)	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

Date Reported 26/10/04

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Maunsell Australia Pty Ltd.
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Adelaide
South Australia 5000

Site : CENTRAL WEST 40032004.00

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	SE3693S#Water					
Phenol	104%	<0.0001				
Cresols (total)	101%	<0.0002				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

Date Reported 26/10/04

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Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : CENTRAL WEST 40032004.00

TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
T.R.H. C6-C9 Fraction by GC	<0.02	-	<0.02	<0.02	<0.02	<0.02
T.R.H. C10-C14 Fraction by GC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
T.R.H. C15-C28 Fraction by GC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
T.R.H. C29-C36 Fraction by GC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

Date Reported 26/10/04

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Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : CENTRAL WEST 40032004.00

TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	Spike % Recov	Meth.Bl.(mg/l)				
Lab. No. / Sample matrix	SE3696S#Water					
T.R.H. C6-C9 Fraction by GC	-	<0.02				
T.R.H. C10-C14 Fraction by GC	116%	<0.05				
T.R.H. C15-C28 Fraction by GC	-	<0.1				
T.R.H. C29-C36 Fraction by GC	-	<0.1				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 29/09/04

Date Reported 26/10/04

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MGT ANALYSIS REPORT .176799

CLIENT :- Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

SITE :- CENTRAL WEST PRECINCT 40032004.00

DATE RECEIVED :- 26/10/04

DATE EXTRACTED OR PREPARED :- 26/10/04 - 27/10/04

DATE REPORTED :- 03/11/04

QA/QC DETAILS :- **The QA/QC for these samples is detailed in this report no** 176799

A total of 1 method blank analyses or sets of analyses were carried out on this batch of samples.

All QA/QC results for method blank and known QC standards were within the set acceptable criteria.

FINAL REPORT :- **The results in this report supersede any previously corresponded results.**

Michael Wright
Laboratory Manager

Environmental Consulting Pty. Ltd.
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Maunsell Australia Pty Ltd.
Level 6/100 Pirie Street
Adelaide
South Australia 5000

Site : CENTRAL WEST PRECINCT 40032004.00

POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	BUS3-B	BUS9-B	BUS16-B	Meth.Bl.(mg/l)		
Lab. No. / Sample matrix	OC2947#Soil	OC2948#Soil	OC2949#Soil			
Naphthalene	<0.1	<0.1	<0.1	<0.001		
Acenaphthylene	<0.1	<0.1	<0.1	<0.001		
Acenaphthene	<0.1	<0.1	<0.1	<0.001		
Fluorene	<0.1	<0.1	<0.1	<0.001		
Phenanthrene	<0.1	<0.1	0.11	<0.001		
Anthracene	<0.1	<0.1	<0.1	<0.001		
Fluoranthrene	<0.1	<0.1	0.18	<0.001		
Pyrene	<0.1	<0.1	0.19	<0.001		
Benzo(a)anthracene	<0.1	<0.1	0.12	<0.001		
Chrysene	<0.1	<0.1	0.14	<0.001		
Benzo(b)fluoranthene	<0.1	<0.1	0.11	<0.001		
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.001		
Benzo(a)pyrene	<0.1	<0.1	0.15	<0.001		
Dibenzo(a,h)anthracene	<0.1	<0.1	<0.1	<0.001		
Benzo(g,h,i)perylene	<0.1	<0.1	<0.1	<0.001		
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.001		
Total PAH's	<2	<2	<2	<0.02		

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 26/10/04

Date Reported 03/11/04

Report No. 176799

ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT:	MR S GRAY	**BATCH:**	EM26163
CLIENT:	MAUNSELL AUSTRALIA PTY LTD	**SUB BATCH:**	0
ADDRESS:	100 PIRIE STREET ADELAIDE SA 5000	**LABORATORY:**	MELBOURNE
		DATE RECEIVED:	20/08/2004
		DATE COMPLETED:	31/08/2004
		SAMPLE TYPE:	SOIL
ORDER No.:	40032004.00	**No. of SAMPLES:**	3
PROJECT:	FRANKLIN ST		

COMMENTS

pH determined and reported on 1:5 soil/water extract. Results apply to sample(s) as submitted. Samples as received digested by USEPA method 200.2 (modified) prior to the determination of metals. Results reported on a dry weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number.
All pages of this report have been checked and approved for release.

ISSUING LABORATORY: MELBOURNE

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Unit 6 / Adamco Business Park
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Signatory

Valda Chen	Wade Guye	Aaron Stott	Steven McGrath	Phillip Hill
Senior Inorganic Chemist	Inorganic Chemist	Senior Organic Chemist	Organic Chemist	Senior Microbiologist

Reports signed by signatories as required

SOQ

- 6 SEP 2004

AUT

RE

FILE 40032004.00

Batch: EM26163
Sub Batch: 0
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

CERTIFICATE OF ANALYSIS

METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	SAMPLE IDENTIFICATION									
Laboratory I.D.				1	2	3							
Date Sampled				BUS7-AA	BUS12-AA	BUS20-AA							
EA-005	pH Value		0.1	9.3	9.3	9.4							
EA-055	Moisture Content (dried @ 103°C)	%	0.1	3.0	3.1	3.8							
EG-005T	Arsenic - Total	mg/kg	1	<1	<1	1							
EG-005T	Beryllium - Total	mg/kg	1	<1	<1	<1							
EG-005T	Cadmium - Total	mg/kg	1	<1	<1	<1							
EG-005T	Cobalt - Total	mg/kg	1	<1	2	2							
EG-005T	Chromium - Total	mg/kg	1	19	18	12							
EG-005T	Copper - Total	mg/kg	1	3	19	4							
EG-005T	Molybdenum - Total	mg/kg	1	1	<1	<1							
EG-005T	Nickel - Total	mg/kg	1	2	1	2							
EG-005T	Lead - Total	mg/kg	1	5	28	13							
EG-005T	Antimony - Total	mg/kg	1	<1	<1	<1							
EG-005T	Selenium - Total	mg/kg	1	<1	<1	<1							
EG-005T	Tin - Total	mg/kg	1	<1	2	<1							
EG-005T	Zinc - Total	mg/kg	1	10	18	12							
EG-035T	Mercury - Total	mg/kg	0.1	<0.1	<0.1	<0.1							
EK-026	Total Cyanide	mg/kg	1	<1	<1	<1							

Batch: EM26163
Sub Batch: 0
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

QUALITY CONTROL REPORT

				SAMPLE IDENTIFICATION									
		Laboratory I.D.		1	3	200	201	202					
		Date Sampled				20/08/2004	20/08/2004	20/08/2004					
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	BUS7-AA MS	BUS20-AA CHK	METHOD BLANK	LCS	MS					
				CHECKS AND SPIKES									
EA-005	pH Value		0.1	----	----	----	----	----					
EA-055	Moisture Content (dried @ 103'C)	%	0.1	----	----	----	----	----					
EG-005T	Arsenic - Total	mg/kg	1	----	<1	<1	108%	91.0%					
EG-005T	Beryllium - Total	mg/kg	1	----	<1	<1	----	105%					
EG-005T	Cadmium - Total	mg/kg	1	----	<1	<1	102%	100%					
EG-005T	Cobalt - Total	mg/kg	1	----	2	<1	----	98.0%					
EG-005T	Chromium - Total	mg/kg	1	----	12	<1	100%	108%					
EG-005T	Copper - Total	mg/kg	1	----	4	<1	100%	105%					
EG-005T	Molybdenum - Total	mg/kg	1	----	<1	<1	----	83.0%					
EG-005T	Nickel - Total	mg/kg	1	----	2	<1	95.0%	93.0%					
EG-005T	Lead - Total	mg/kg	1	----	12	<1	97.0%	95.0%					
EG-005T	Antimony - Total	mg/kg	1	----	<1	<1	----	----					
EG-005T	Selenium - Total	mg/kg	1	----	<1	<1	----	102%					
EG-005T	Tin - Total	mg/kg	1	----	<1	<1	----	----					
EG-005T	Zinc - Total	mg/kg	1	----	11	<1	101%	103%					
EG-035T	Mercury - Total	mg/kg	0.1	----	<0.1	<0.1	88.0%	92.0%					
EK-026	Total Cyanide	mg/kg	1	87.0%	<1	<1	90.0%	87.0%					

ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT:	MR S GRAY	**BATCH:**	EM26163
CLIENT:	MAUNSELL AUSTRALIA PTY LTD	**SUB BATCH:**	1
ADDRESS:	100 PIRIE STREET ADELAIDE SA 5000	**LABORATORY:**	MELBOURNE
		DATE RECEIVED:	20/08/2004
ORDER No.:	40032004.00	**DATE COMPLETED:**	31/08/2004
PROJECT:	FRANKLIN ST	**SAMPLE TYPE:**	SOIL
		No. of SAMPLES:	3

COMMENTS

Results apply to sample(s) as submitted. Samples analysed on an as received basis. Results reported on a dry weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number.
All pages of this report have been checked and approved for release.

ISSUING LABORATORY: MELBOURNE

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Email: tim.kilmister@alsenviro.com

Signatory

Valda Chen, Senior Inorganic Chemist
Wade Guye, Inorganic Chemist
Aaron Stott, Senior Organic Chemist
Steven McGrath, Organic Chemist
Phillip Hill, Senior Microbiologist

Reports signed by signatories as required

Batch: EM26163
Sub Batch: 1
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

CERTIFICATE OF ANALYSIS

				SAMPLE IDENTIFICATION		
	Laboratory I.D.			1	2	3
	Date Sampled					
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	BUS7-AA	BUS12-AA	BUS20-AA
EA-055	Moisture Content (dried @ 103°C)	%	0.1	3.0	3.1	3.8
EP-075A-SS	**PHENOLS**					
EP-075A-SS	Phenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	2-Chlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	2-Methylphenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	3- & 4-Methylphenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	2-Nitrophenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	2.4-Dimethylphenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	2.4-Dichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	2.6-Dichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	4-Chloro-3-methylphenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	2.4.6-Trichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	2.4.5-Trichlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075A-SS	Pentachlorophenol	mg/kg	1	<1	<1	<1
EP-075B-SS	**POLYNUCLEAR AROMATICS**					
EP-075B-SS	Naphthalene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	2-Methylnaphthalene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	2-Chloronaphthalene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Acenaphthene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Fluorene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Phenanthrene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Anthracene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Fluoranthene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Pyrene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	N-2-Fluorenylacetamide	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Chrysene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Benzo(b) & (k)fluoranthene	mg/kg	1	<1	<1	<1
EP-075B-SS	7.12-Dimethylbenz(a)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	3-Methylcholanthrene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Indeno(1.2.3-cd)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075B-SS	Dibenz(a.h)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5

Batch: EM26163
Sub Batch: 1
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

CERTIFICATE OF ANALYSIS

				SAMPLE IDENTIFICATION		
	Laboratory I.D.			1	2	3
	Date Sampled			BUS7-AA	BUS12-AA	BUS20-AA
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR			
EP-075B-SS	Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075G-SS	**CHLORINATED HYDROCARBONS**					
EP-075G-SS	1.3-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075G-SS	1.4-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075G-SS	1.2-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075G-SS	Hexachloroethane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075G-SS	1.2.4-Trichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075G-SS	Hexachloropropylene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075G-SS	Hexachlorobutadiene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075G-SS	Hexachlorocyclopentadiene	mg/kg	3	<3	<3	<3
EP-075G-SS	Pentachlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-075G-SS	Hexachlorobenzene	mg/kg	1	<1	<1	<1
EP-075S-SS	**ACID EXTRACTABLE SURROGATES**					
EP-075S-SS	2-Fluorophenol	%	1	78	70	41
EP-075S-SS	Phenol-D6	%	1	85	78	80
EP-075S-SS	2-Chlorophenol-D4	%	1	88	70	55
EP-075S-SS	2.4.6-Tribromophenol	%	1	79	73	79
EP-075T-SS	**BASE/NEUTRAL EXTRACTABLE SURROGATES**					
EP-075T-SS	Nitrobenzene-D5	%	1	79	67	47
EP-075T-SS	1.2-Dichlorobenzene-D4	%	1	66	50	28
EP-075T-SS	2-Fluorobiphenyl	%	1	91	82	78
EP-075T-SS	Anthracene-d10	%	1	86	82	86
EP-075T-SS	p-Terphenyl-D14	%	1	89	80	84

Batch: EM26163
Sub Batch: 1
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

QUALITY CONTROL REPORT

				SAMPLE IDENTIFICATION								
		Laboratory I.D.		100	101	102	103	104				
		Date Sampled		20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004				
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	METHOD BLANK	VSVOCS762 SCS	VSVOCS762 DCS	VSVOCS762 MS	VSVOCS762 MSD				
				CHECKS AND SPIKES								
EA-055	Moisture Content (dried @ 103'C)	%	0.1	----	----	----	----	----				
EP-075A-SS	**PHENOLS**											
EP-075A-SS	Phenol	mg/kg	0.5	<0.5	64.5%	63.8%	92.9%	104%				
EP-075A-SS	2-Chlorophenol	mg/kg	0.5	<0.5	65.0%	70.1%	104%	115%				
EP-075A-SS	2-Methylphenol	mg/kg	0.5	<0.5	63.8%	69.6%	----	----				
EP-075A-SS	3- & 4-Methylphenol	mg/kg	0.5	<0.5	67.6%	73.2%	----	----				
EP-075A-SS	2-Nitrophenol	mg/kg	0.5	<0.5	65.4%	72.6%	114%	120%				
EP-075A-SS	2.4-Dimethylphenol	mg/kg	0.5	<0.5	65.3%	72.1%	----	----				
EP-075A-SS	2.4-Dichlorophenol	mg/kg	0.5	<0.5	66.6%	71.8%	----	----				
EP-075A-SS	2.6-Dichlorophenol	mg/kg	0.5	<0.5	67.2%	74.8%	----	----				
EP-075A-SS	4-Chloro-3-methylphenol	mg/kg	0.5	<0.5	68.7%	74.1%	104%	108%				
EP-075A-SS	2.4.6-Trichlorophenol	mg/kg	0.5	<0.5	68.3%	76.0%	----	----				
EP-075A-SS	2.4.5-Trichlorophenol	mg/kg	0.5	<0.5	60.8%	75.6%	----	----				
EP-075A-SS	Pentachlorophenol	mg/kg	1	<1	41.1%	49.6%	107%	111%				
EP-075B-SS	**POLYNUCLEAR AROMATICS**											
EP-075B-SS	Naphthalene	mg/kg	0.5	<0.5	66.6%	73.8%	----	----				
EP-075B-SS	2-Methylnaphthalene	mg/kg	0.5	<0.5	66.3%	73.7%	----	----				
EP-075B-SS	2-Chloronaphthalene	mg/kg	0.5	<0.5	60.2%	65.2%	----	----				
EP-075B-SS	Acenaphthylene	mg/kg	0.5	<0.5	68.4%	74.5%	----	----				
EP-075B-SS	Acenaphthene	mg/kg	0.5	<0.5	66.8%	73.3%	122%	112%				
EP-075B-SS	Fluorene	mg/kg	0.5	<0.5	67.9%	72.8%	----	----				
EP-075B-SS	Phenanthrene	mg/kg	0.5	<0.5	70.9%	77.9%	----	----				
EP-075B-SS	Anthracene	mg/kg	0.5	<0.5	70.9%	77.9%	----	----				
EP-075B-SS	Fluoranthene	mg/kg	0.5	<0.5	72.0%	80.6%	----	----				
EP-075B-SS	Pyrene	mg/kg	0.5	<0.5	72.0%	80.8%	125%	128%				
EP-075B-SS	N-2-Fluorenylacetamide	mg/kg	0.5	<0.5	58.2%	68.2%	----	----				
EP-075B-SS	Benz(a)anthracene	mg/kg	0.5	<0.5	67.7%	79.0%	----	----				
EP-075B-SS	Chrysene	mg/kg	0.5	<0.5	75.2%	80.7%	----	----				
EP-075B-SS	Benzo(b) & (k)fluoranthene	mg/kg	1	<1	71.2%	80.2%	----	----				
EP-075B-SS	7.12-Dimethylbenz(a)anthracene	mg/kg	0.5	<0.5	75.0%	84.4%	----	----				
EP-075B-SS	Benzo(a)pyrene	mg/kg	0.5	<0.5	70.2%	78.9%	----	----				
EP-075B-SS	3-Methylcholanthrene	mg/kg	0.5	<0.5	69.0%	75.9%	----	----				

Batch: EM26163
Sub Batch: 1
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

QUALITY CONTROL REPORT

METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	SAMPLE IDENTIFICATION									
	Laboratory I.D.			100	101	102	103	104					
	Date Sampled			20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004					
				METHOD	VSVOCS762	VSVOCS762	VSVOCS762	VSVOCS762					
				BLANK	SCS	DCS	MS	MSD					
				CHECKS AND SPIKES									
EP-075B-SS	Indeno(1.2.3-cd)pyrene	mg/kg	0.5	<0.5	66.5%	75.7%	----	----					
EP-075B-SS	Dibenz(a.h)anthracene	mg/kg	0.5	<0.5	67.3%	76.0%	----	----					
EP-075B-SS	Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	67.2%	76.1%	----	----					
EP-075G-SS	**CHLORINATED HYDROCARBONS**												
EP-075G-SS	1.3-Dichlorobenzene	mg/kg	0.5	<0.5	61.4%	69.8%	----	----					
EP-075G-SS	1.4-Dichlorobenzene	mg/kg	0.5	<0.5	62.9%	70.6%	97.9%	113%					
EP-075G-SS	1.2-Dichlorobenzene	mg/kg	0.5	<0.5	64.5%	73.9%	----	----					
EP-075G-SS	Hexachloroethane	mg/kg	0.5	<0.5	61.7%	71.0%	----	----					
EP-075G-SS	1.2.4-Trichlorobenzene	mg/kg	0.5	<0.5	66.9%	71.9%	114%	109%					
EP-075G-SS	Hexachloropropylene	mg/kg	0.5	<0.5	66.6%	73.8%	----	----					
EP-075G-SS	Hexachlorobutadiene	mg/kg	0.5	<0.5	69.2%	76.2%	----	----					
EP-075G-SS	Hexachlorocyclopentadiene	mg/kg	3	<3	24.1%	39.4%	----	----					
EP-075G-SS	Pentachlorobenzene	mg/kg	0.5	<0.5	68.5%	75.2%	----	----					
EP-075G-SS	Hexachlorobenzene	mg/kg	1	<1	48.7%	55.8%	----	----					
EP-075S-SS	**ACID EXTRACTABLE SURROGATES**												
EP-075S-SS	2-Fluorophenol	%	1	85	92	84	73	74					
EP-075S-SS	Phenol-D6	%	1	79	69	84	61	70					
EP-075S-SS	2-Chlorophenol-D4	%	1	75	76	83	63	77					
EP-075S-SS	2.4.6-Tribromophenol	%	1	58	87	92	73	89					
EP-075T-SS	**BASE/NEUTRAL EXTRACTABLE SURROGATES**												
EP-075T-SS	Nitrobenzene-D5	%	1	75	74	80	66	77					
EP-075T-SS	1.2-Dichlorobenzene-D4	%	1	77	73	78	55	65					
EP-075T-SS	2-Fluorobiphenyl	%	1	78	80	85	70	86					
EP-075T-SS	Anthracene-d10	%	1	77	78	86	70	84					
EP-075T-SS	p-Terphenyl-D14	%	1	94	83	92	67	84					

ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT:	MR S GRAY	**BATCH:**	EM26163
CLIENT:	MAUNSELL AUSTRALIA PTY LTD	**SUB BATCH:**	2
ADDRESS:	100 PIRIE STREET ADELAIDE SA 5000	**LABORATORY:**	MELBOURNE
		DATE RECEIVED:	20/08/2004
		DATE COMPLETED:	31/08/2004
		SAMPLE TYPE:	SOIL
ORDER No.:	40032004.00	**No. of SAMPLES:**	3
PROJECT:	FRANKLIN ST		

COMMENTS

Results apply to sample(s) as submitted. All analysis and Laboratory QC conducted in accordance with Schedule B(3) NEPM Guideline on Laboratory Analysis of Potentially Contaminated Soil (December 1999). Samples analysed on an as received basis. Results reported on a dry weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number.
All pages of this report have been checked and approved for release.

ISSUING LABORATORY: MELBOURNE

Address
Unit 6 / Adamco Business Park
2 Sarton Road
Clayton VIC 3168

Phone: 61-3-9538 4444
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Email: tim.kilmister@alsenviro.com

Signatory

Valda Chen	Wade Guye	Aaron Stott	Steven McGrath	Phillip Hill
Senior Inorganic Chemist	Inorganic Chemist	Senior Organic Chemist	Organic Chemist	Senior Microbiologist

Reports signed by signatories as required

Batch:	EM26163
Sub Batch:	2
Date of Issue:	31/08/2004
Client:	MAUNSELL AUSTRALIA PTY LTD
Client Reference:	FRANKLIN ST

CERTIFICATE OF ANALYSIS

				SAMPLE IDENTIFICATION								
		Laboratory I.D.		1	2	3						
		Date Sampled		BUS7-AA	BUS12-AA	BUS20-AA						
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR									
EA-055	Moisture Content (dried @ 103°C)	%	0.1	3.0	3.1	3.8						
EP-071-SS	**TOTAL PETROLEUM HYDROCARBONS**											
EP-071-SS	C6 - C9 Fraction	mg/kg	2	<2	<2	<2						
EP-071-SS	C10 - C14 Fraction	mg/kg	50	<50	<50	<50						
EP-071-SS	C15 - C28 Fraction	mg/kg	100	190	<100	<100						
EP-071-SS	C29 - C36 Fraction	mg/kg	100	569	194	204						
EP-080-SS	**BTEX**											
EP-080-SS	Benzene	mg/kg	0.2	<0.2	<0.2	<0.2						
EP-080-SS	Toluene	mg/kg	0.2	<0.2	<0.2	<0.2						
EP-080-SS	Chlorobenzene	mg/kg	0.2	<0.2	<0.2	<0.2						
EP-080-SS	Ethylbenzene	mg/kg	0.2	<0.2	<0.2	<0.2						
EP-080-SS	meta- & para-Xylene	mg/kg	0.2	<0.2	<0.2	<0.2						
EP-080-SS	ortho-Xylene	mg/kg	0.2	<0.2	<0.2	<0.2						
EP-080S-SS	**VOLATILE TPH/BTEX COMPOUND SURROGATES**											
EP-080S-SS	1,2-Dichloroethane-D4	%	1	91	90	89						
EP-080S-SS	Toluene-D8	%	1	87	87	85						
EP-080S-SS	4-Bromofluorobenzene	%	1	89	86	85						

Batch:	EM26163
Sub Batch:	2
Date of Issue:	31/08/2004
Client:	MAUNSELL AUSTRALIA PTY LTD
Client Reference:	FRANKLIN ST

QUALITY CONTROL REPORT

				SAMPLE IDENTIFICATION									
		Laboratory I.D.		3	100	101	102	103	104				
		Date Sampled			20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004				
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	BUS20-AA CHK	METHOD BLANK	VTPHT2229 SCS	VTPHT2229 DCS	BUS7-AA MS	BUS7-AA MSD				
				CHECKS AND SPIKES									
EA-055	Moisture Content (dried @ 103'C)	%	0.1	3.8	----	----	----	----	----				
EP-071-SS	**TOTAL PETROLEUM HYDROCARBONS**												
EP-071-SS	C6 - C9 Fraction	mg/kg	2	<2	<2	98.0%	91.0%	90.0%	91.0%				
EP-071-SS	C10 - C14 Fraction	mg/kg	50	<50	<50	92.0%	92.0%	85.0%	84.0%				
EP-071-SS	C15 - C28 Fraction	mg/kg	100	<100	<100	94.0%	95.0%	84.0%	84.0%				
EP-071-SS	C29 - C36 Fraction	mg/kg	100	220	<100	80.0%	80.0%	108%	106%				
EP-080-SS	**BTEX**												
EP-080-SS	Benzene	mg/kg	0.2	<0.2	<0.2	101%	98.0%	102%	103%				
EP-080-SS	Toluene	mg/kg	0.2	<0.2	<0.2	99.7%	95.1%	100%	102%				
EP-080-SS	Chlorobenzene	mg/kg	0.2	<0.2	<0.2	98.3%	96.1%	87.8%	89.9%				
EP-080-SS	Ethylbenzene	mg/kg	0.2	<0.2	<0.2	97.3%	96.3%	----	----				
EP-080-SS	meta- & para-Xylene	mg/kg	0.2	<0.2	<0.2	96.3%	97.0%	----	----				
EP-080-SS	ortho-Xylene	mg/kg	0.2	<0.2	<0.2	99.6%	99.1%	----	----				
EP-080S-SS	**VOLATILE TPH/BTEX COMPOUND SURROGATES**												
EP-080S-SS	1.2-Dichloroethane-D4	%	1	95	99	110	109	91	83				
EP-080S-SS	Toluene-D8	%	1	90	96	100	100	85	79				
EP-080S-SS	4-Bromofluorobenzene	%	1	90	96	100	104	86	81				

ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT:	MR S GRAY	**BATCH:**	EM26163
CLIENT:	MAUNSELL AUSTRALIA PTY LTD	**SUB BATCH:**	3
ADDRESS:	100 PIRIE STREET ADELAIDE SA 5000	**LABORATORY:**	MELBOURNE
		DATE RECEIVED:	20/08/2004
		DATE COMPLETED:	31/08/2004
ORDER No.:	40032004.00	**SAMPLE TYPE:**	SOIL
PROJECT:	FRANKLIN ST	**No. of SAMPLES:**	3

COMMENTS

Results apply to sample(s) as submitted. All analysis and Laboratory QC conducted in accordance with Schedule B(3) NEPM Guideline on Laboratory Analysis of Potentially Contaminated Soil (December 1999). Samples analysed on an as received basis. Results reported on a dry weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number.
All pages of this report have been checked and approved for release.

ISSUING LABORATORY: MELBOURNE

Address
Unit 6 / Adamco Business Park
2 Sarton Road
Clayton VIC 3168

Phone: 61-3-9538 4444
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Signatory

Valda Chen, Senior Inorganic Chemist
Wade Guye, Inorganic Chemist
Aaron Stott, Senior Organic Chemist
Steven McGrath, Organic Chemist
Phillip Hill, Senior Microbiologist

Reports signed by signatories as required

Australian Laboratory Services Pty Ltd (ABN 84 009 936 029)

A Campbell Brothers Limited Company

Batch: EM26163
Sub Batch: 3
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

CERTIFICATE OF ANALYSIS

				SAMPLE IDENTIFICATION		
	Laboratory I.D.			1	2	3
	Date Sampled					
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	BUS7-AA	BUS12-AA	BUS20-AA
EA-055	Moisture Content (dried @ 103'C)	%	0.1	3.0	3.1	3.8
EP-074D-SS	**FUMIGANTS**					
EP-074D-SS	2.2-Dichloropropane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074D-SS	1.2-Dichloropropane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074D-SS	cis-1.3-Dichloropropylene	mg/kg	1	<1	<1	<1
EP-074D-SS	trans-1.3-Dichloropropylene	mg/kg	1	<1	<1	<1
EP-074D-SS	1.2-Dibromoethane (EDB)	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	**HALOGENATED ALIPHATIC HYDROCARBONS (VOL)**					
EP-074E-SS	Dichlorodifluoromethane	mg/kg	5	<5	<5	<5
EP-074E-SS	Chloromethane	mg/kg	5	<5	<5	<5
EP-074E-SS	Vinyl chloride	mg/kg	5	<5	<5	<5
EP-074E-SS	Bromomethane	mg/kg	5	<5	<5	<5
EP-074E-SS	Chloroethane	mg/kg	5	<5	<5	<5
EP-074E-SS	Trichlorofluoromethane	mg/kg	5	<5	<5	<5
EP-074E-SS	1.1-Dichloroethene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	Iodomethane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	trans-1.2-Dichloroethene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	1.1-Dichloroethane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	cis-1.2-Dichloroethene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	1.1.1-Trichloroethane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	1.1-Dichloropropylene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	Carbon tetrachloride	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	1.2-Dichloroethane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	Trichloroethene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	Dibromomethane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	1.1.2-Trichloroethane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	1.3-Dichloropropane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	Tetrachloroethene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	1.1.1.2-Tetrachloroethane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	trans-1.4-Dichloro-2-butene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	cis-1.4-Dichloro-2-butene	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	1.1.2.2-Tetrachloroethane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	1.2.3-Trichloropropane	mg/kg	0.5	<0.5	<0.5	<0.5
EP-074E-SS	Pentachloroethane	mg/kg	0.5	<0.5	<0.5	<0.5

Batch: EM26163
Sub Batch: 3
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

CERTIFICATE OF ANALYSIS

				SAMPLE IDENTIFICATION								
		Laboratory I.D.		1	2	3						
		Date Sampled										
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	BUS7-AA	BUS12-AA	BUS20-AA						
EP-074E-SS	1.2-Dibromo-3-chloropropane	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074E-SS	Hexachlorobutadiene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074F-SS	**HALOGENATED AROMATIC HYDROCARBONS**											
EP-074F-SS	Chlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074F-SS	Bromobenzene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074F-SS	2-Chlorotoluene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074F-SS	4-Chlorotoluene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074F-SS	1.3-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074F-SS	1.4-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074F-SS	1.2-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074F-SS	1.2.4-Trichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074F-SS	1.2.3-Trichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074G-SS	**TRIHALOMETHANES (VOLATILES)**											
EP-074G-SS	Chloroform	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074G-SS	Bromodichloromethane	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074G-SS	Dibromochloromethane	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074G-SS	Bromoform	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074S-SS	**VOLATILE COMPOUND SURROGATES**											
EP-074S-SS	1.2-Dichloroethane-D4	%	1	94	93	92						
EP-074S-SS	Toluene-D8	%	1	89	89	87						
EP-074S-SS	4-Bromofluorobenzene	%	1	92	89	88						

Batch: EM26163
Sub Batch: 3
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

QUALITY CONTROL REPORT

				SAMPLE IDENTIFICATION									
		Laboratory I.D.		100	101	102	103	104					
		Date Sampled		20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004					
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	METHOD BLANK	VVSCS357 SCS	VVSCS357 DCS	VVSCS357 MS	VVSCS357 MSD					
				CHECKS AND SPIKES									
EA-055	Moisture Content (dried @ 103°C)	%	0.1	----	----	----	----	----					
EP-074D-SS	**FUMIGANTS**												
EP-074D-SS	2.2-Dichloropropane	mg/kg	0.5	<0.5	108%	90.7%	----	----					
EP-074D-SS	1.2-Dichloropropane	mg/kg	0.5	<0.5	115%	98.6%	----	----					
EP-074D-SS	cis-1.3-Dichloropropylene	mg/kg	1	<1	104%	93.6%	----	----					
EP-074D-SS	trans-1.3-Dichloropropylene	mg/kg	1	<1	100%	89.5%	----	----					
EP-074D-SS	1.2-Dibromoethane (EDB)	mg/kg	0.5	<0.5	99.3%	99.0%	----	----					
EP-074E-SS	**HALOGENATED ALIPHATIC HYDROCARBONS (VOL)**												
EP-074E-SS	Dichlorodifluoromethane	mg/kg	5	<5	113%	98.7%	----	----					
EP-074E-SS	Chloromethane	mg/kg	5	<5	117%	91.7%	----	----					
EP-074E-SS	Vinyl chloride	mg/kg	5	<5	103%	96.8%	----	----					
EP-074E-SS	Bromomethane	mg/kg	5	<5	110%	88.7%	----	----					
EP-074E-SS	Chloroethane	mg/kg	5	<5	121%	96.0%	----	----					
EP-074E-SS	Trichlorofluoromethane	mg/kg	5	<5	123%	95.7%	----	----					
EP-074E-SS	1.1-Dichloroethene	mg/kg	0.5	<0.5	106%	93.7%	108%	115%					
EP-074E-SS	Iodomethane	mg/kg	0.5	<0.5	103%	88.8%	----	----					
EP-074E-SS	trans-1.2-Dichloroethene	mg/kg	0.5	<0.5	101%	96.9%	----	----					
EP-074E-SS	1.1-Dichloroethane	mg/kg	0.5	<0.5	101%	96.5%	----	----					
EP-074E-SS	cis-1.2-Dichloroethene	mg/kg	0.5	<0.5	119%	98.6%	----	----					
EP-074E-SS	1.1.1-Trichloroethane	mg/kg	0.5	<0.5	110%	89.0%	----	----					
EP-074E-SS	1.1-Dichloropropylene	mg/kg	0.5	<0.5	118%	94.7%	----	----					
EP-074E-SS	Carbon tetrachloride	mg/kg	0.5	<0.5	104%	83.6%	----	----					
EP-074E-SS	1.2-Dichloroethane	mg/kg	0.5	<0.5	113%	98.9%	----	----					
EP-074E-SS	Trichloroethene	mg/kg	0.5	<0.5	110%	106%	85.1%	89.5%					
EP-074E-SS	Dibromomethane	mg/kg	0.5	<0.5	106%	102%	----	----					
EP-074E-SS	1.1.2-Trichloroethane	mg/kg	0.5	<0.5	102%	103%	----	----					
EP-074E-SS	1.3-Dichloropropane	mg/kg	0.5	<0.5	106%	101%	----	----					
EP-074E-SS	Tetrachloroethene	mg/kg	0.5	<0.5	95.6%	92.4%	----	----					
EP-074E-SS	1.1.1.2-Tetrachloroethane	mg/kg	0.5	<0.5	94.4%	81.6%	----	----					
EP-074E-SS	trans-1.4-Dichloro-2-butene	mg/kg	0.5	<0.5	76.9%	75.0%	----	----					
EP-074E-SS	cis-1.4-Dichloro-2-butene	mg/kg	0.5	<0.5	89.9%	96.7%	----	----					
EP-074E-SS	1.1.2.2-Tetrachloroethane	mg/kg	0.5	<0.5	102%	101%	----	----					

Batch: EM26163
Sub Batch: 3
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

QUALITY CONTROL REPORT

METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	SAMPLE IDENTIFICATION								
	Laboratory I.D.			100	101	102	103	104				
	Date Sampled			20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004				
				METHOD	VVSCS357	VVSCS357	VVSCS357	VVSCS357				
				BLANK	SCS	DCS	MS	MSD				
				CHECKS AND SPIKES								
EP-074E-SS	1.2.3-Trichloropropane	mg/kg	0.5	<0.5	99.7%	102%	----	----				
EP-074E-SS	Pentachloroethane	mg/kg	0.5	<0.5	96.2%	70.3%	----	----				
EP-074E-SS	1.2-Dibromo-3-chloropropane	mg/kg	0.5	<0.5	96.2%	87.3%	----	----				
EP-074E-SS	Hexachlorobutadiene	mg/kg	0.5	<0.5	102%	90.2%	----	----				
EP-074F-SS	**HALOGENATED AROMATIC HYDROCARBONS**											
EP-074F-SS	Chlorobenzene	mg/kg	0.5	<0.5	101%	96.4%	84.5%	89.5%				
EP-074F-SS	Bromobenzene	mg/kg	0.5	<0.5	102%	101%	----	----				
EP-074F-SS	2-Chlorotoluene	mg/kg	0.5	<0.5	111%	95.4%	----	----				
EP-074F-SS	4-Chlorotoluene	mg/kg	0.5	<0.5	115%	97.3%	----	----				
EP-074F-SS	1.3-Dichlorobenzene	mg/kg	0.5	<0.5	97.8%	94.9%	----	----				
EP-074F-SS	1.4-Dichlorobenzene	mg/kg	0.5	<0.5	109%	95.9%	----	----				
EP-074F-SS	1.2-Dichlorobenzene	mg/kg	0.5	<0.5	105%	98.9%	----	----				
EP-074F-SS	1.2.4-Trichlorobenzene	mg/kg	0.5	<0.5	100%	91.0%	----	----				
EP-074F-SS	1.2.3-Trichlorobenzene	mg/kg	0.5	<0.5	101%	94.3%	----	----				
EP-074G-SS	**TRIHALOMETHANES (VOLATILES)**											
EP-074G-SS	Chloroform	mg/kg	0.5	<0.5	115%	103%	----	----				
EP-074G-SS	Bromodichloromethane	mg/kg	0.5	<0.5	106%	90.3%	----	----				
EP-074G-SS	Dibromochloromethane	mg/kg	0.5	<0.5	91.5%	82.2%	----	----				
EP-074G-SS	Bromoform	mg/kg	0.5	<0.5	92.8%	85.6%	----	----				
EP-074S-SS	**VOLATILE COMPOUND SURROGATES**											
EP-074S-SS	1.2-Dichloroethane-D4	%	1	105	106	103	91	93				
EP-074S-SS	Toluene-D8	%	1	100	97	100	88	89				
EP-074S-SS	4-Bromofluorobenzene	%	1	91	90	102	90	91				

ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT:	MR S GRAY	**BATCH:**	EM26163
CLIENT:	MAUNSELL AUSTRALIA PTY LTD	**SUB BATCH:**	4
ADDRESS:	100 PIRIE STREET ADELAIDE SA 5000	**LABORATORY:**	MELBOURNE
		DATE RECEIVED:	20/08/2004
		DATE COMPLETED:	31/08/2004
		SAMPLE TYPE:	SOIL
		No. of SAMPLES:	3
ORDER No.:	40032004.00		
PROJECT:	FRANKLIN ST		

COMMENTS

Results apply to sample(s) as submitted. All analysis and Laboratory QC conducted in accordance with Schedule B(3) NEPM Guideline on Laboratory Analysis of Potentially Contaminated Soil (December 1999). Samples analysed on an as received basis. Results reported on a dry weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number.
All pages of this report have been checked and approved for release.

ISSUING LABORATORY: MELBOURNE

Address
Unit 6 / Adamco Business Park
2 Sarton Road
Clayton VIC 3168

Phone: 61-3-9538 4444
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Email: tim.kilmister@alsenviro.com

Signatory

Valda Chen, Senior Inorganic Chemist
Wade Guye, Inorganic Chemist
Aaron Stott, Senior Organic Chemist
Steven McGrath, Organic Chemist
Phillip Hill, Senior Microbiologist

Reports signed by signatories as required

Batch: EM26163
Sub Batch: 4
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

CERTIFICATE OF ANALYSIS

				SAMPLE IDENTIFICATION								
		Laboratory I.D.		1	2	3						
		Date Sampled		BUS7-AA	BUS12-AA	BUS20-AA						
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR									
EA-055	Moisture Content (dried @ 103'C)	%	0.1	3.0	3.1	3.8						
EP-068A-SS	**ORGANOCHLORINE PESTICIDES**											
EP-068A-SS	alpha-BHC	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	HCB	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	beta-BHC & gamma-BHC	mg/kg	0.1	<0.1	<0.1	<0.1						
EP-068A-SS	delta-BHC	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Heptachlor	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Aldrin	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Heptachlor epoxide	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Chlordane - trans	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Endosulfan 1	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Chlordane - cis	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Dieldrin	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	DDE	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Endrin	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Endosulfan 2	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	DDD	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Endrin aldehyde	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Endosulfan sulfate	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	DDT	mg/kg	0.2	<0.2	<0.2	<0.2						
EP-068A-SS	Endrin ketone	mg/kg	0.05	<0.05	<0.05	<0.05						
EP-068A-SS	Methoxychlor	mg/kg	0.2	<0.2	<0.2	<0.2						
EP-068S-SS	**ORGANOCHLORINE PESTICIDE SURROGATE**											
EP-068S-SS	Dibromo-DDE	%	1	90	80	93						

Batch: EM26163
Sub Batch: 4
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

QUALITY CONTROL REPORT

METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	SAMPLE IDENTIFICATION					
	Laboratory I.D.			3	100	101	102	103	104
	Date Sampled				20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004
				BUS20-AA	METHOD	VOCOPS496	VOCOPS496	BUS7-AA	BUS7-AA
				CHK	BLANK	SCS	DCS	MS	MSD
				CHECKS AND SPIKES					
EA-055	Moisture Content (dried @ 103°C)	%	0.1	3.8	----	----	----	----	----
EP-068A-SS	ORGANOCHLORINE PESTICIDES								
EP-068A-SS	alpha-BHC	mg/kg	0.05	<0.05	<0.05	85.9%	86.1%	----	----
EP-068A-SS	HCB	mg/kg	0.05	<0.05	<0.05	85.6%	87.3%	----	----
EP-068A-SS	beta-BHC & gamma-BHC	mg/kg	0.1	<0.1	<0.1	85.9%	89.0%	77.5%	79.5%
EP-068A-SS	delta-BHC	mg/kg	0.05	<0.05	<0.05	86.6%	89.8%	----	----
EP-068A-SS	Heptachlor	mg/kg	0.05	<0.05	<0.05	83.9%	89.1%	72.9%	62.5%
EP-068A-SS	Aldrin	mg/kg	0.05	<0.05	<0.05	86.3%	88.8%	81.8%	88.1%
EP-068A-SS	Heptachlor epoxide	mg/kg	0.05	<0.05	<0.05	87.8%	92.2%	----	----
EP-068A-SS	Chlordane - trans	mg/kg	0.05	<0.05	<0.05	89.1%	93.3%	----	----
EP-068A-SS	Endosulfan 1	mg/kg	0.05	<0.05	<0.05	85.9%	90.0%	----	----
EP-068A-SS	Chlordane - cis	mg/kg	0.05	<0.05	<0.05	88.9%	93.1%	----	----
EP-068A-SS	Dieldrin	mg/kg	0.05	<0.05	<0.05	87.8%	92.6%	78.7%	80.8%
EP-068A-SS	DDE	mg/kg	0.05	<0.05	<0.05	87.5%	91.3%	----	----
EP-068A-SS	Endrin	mg/kg	0.05	<0.05	<0.05	85.9%	92.1%	73.5%	73.8%
EP-068A-SS	Endosulfan 2	mg/kg	0.05	<0.05	<0.05	86.6%	90.4%	----	----
EP-068A-SS	DDD	mg/kg	0.05	<0.05	<0.05	87.7%	91.4%	----	----
EP-068A-SS	Endrin aldehyde	mg/kg	0.05	<0.05	<0.05	89.4%	92.6%	----	----
EP-068A-SS	Endosulfan sulfate	mg/kg	0.05	<0.05	<0.05	89.7%	96.8%	----	----
EP-068A-SS	DDT	mg/kg	0.2	<0.2	<0.2	83.0%	90.3%	49.7%	42.2%
EP-068A-SS	Endrin ketone	mg/kg	0.05	<0.05	<0.05	94.0%	101%	----	----
EP-068A-SS	Methoxychlor	mg/kg	0.2	<0.2	<0.2	80.7%	88.3%	----	----
EP-068S-SS	ORGANOCHLORINE PESTICIDE SURROGATE								
EP-068S-SS	Dibromo-DDE	%	1	102	78	68	75	83	80

ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT:	MR S GRAY	**BATCH:**	EM26163
CLIENT:	MAUNSELL AUSTRALIA PTY LTD	**SUB BATCH:**	5
ADDRESS:	100 PIRIE STREET ADELAIDE SA 5000	**LABORATORY:**	MELBOURNE
		DATE RECEIVED:	20/08/2004
ORDER No.:	40032004.00	**DATE COMPLETED:**	31/08/2004
PROJECT:	FRANKLIN ST	**SAMPLE TYPE:**	SOIL
		No. of SAMPLES:	3

COMMENTS

Results apply to sample(s) as submitted. All analysis and Laboratory QC conducted in accordance with Schedule B(3) NEPM Guideline on Laboratory Analysis of Potentially Contaminated Soil (December 1999). Samples analysed on an as received basis. Results reported on a dry weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number.
All pages of this report have been checked and approved for release.

ISSUING LABORATORY: MELBOURNE

Address
Unit 6 / Adamco Business Park
2 Sarton Road
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Signatory

Valda Chen, Senior Inorganic Chemist
Wade Guye, Inorganic Chemist
Aaron Stott, Senior Organic Chemist
Steven McGrath, Organic Chemist
Phillip Hill, Senior Microbiologist

Reports signed by signatories as required

Batch:	EM26163
Sub Batch:	5
Date of Issue:	31/08/2004
Client:	MAUNSELL AUSTRALIA PTY LTD
Client Reference:	FRANKLIN ST

CERTIFICATE OF ANALYSIS

				SAMPLE IDENTIFICATION								
		Laboratory I.D.		1	2	3						
		Date Sampled										
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	BUS7-AA	BUS12-AA	BUS20-AA						
EA-055	Moisture Content (dried @ 103'C)	%	0.1	3.0	3.1	3.8						
EP-066-SS	Total Polychlorinated biphenyls	mg/kg	0.1	<0.1	<0.1	<0.1						
EP-066S-SS	**POLYCHLORINATED BIPHENYL SURROGATE**											
EP-066S-SS	Decachlorobiphenyl	%	1	72	75	70						

Batch: EM26163
Sub Batch: 5
Date of Issue: 31/08/2004
Client: MAUNSELL AUSTRALIA PTY LTD
Client Reference: FRANKLIN ST

QUALITY CONTROL REPORT

METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	SAMPLE IDENTIFICATION								
	Laboratory I.D.			100	101	102	103	104				
	Date Sampled			20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004				
				METHOD	VPCBS225	VPCBS225	VPCBS225	VPCBS225				
				BLANK	SCS	DCS	MS	MSD				
				CHECKS AND SPIKES								
EA-055	Moisture Content (dried @ 103°C)	%	0.1	----	----	----	----	----				
EP-066-SS	Total Polychlorinated biphenyls	mg/kg	0.1	<0.1	98.1%	108%	70.9%	79.4%				
EP-066S-SS	**POLYCHLORINATED BIPHENYL SURROGATE**											
EP-066S-SS	Decachlorobiphenyl	%	1	86	90	94	63	63				

ALS Environmental

ORGANICS QUALITY CONTROL REPORT

BATCH NO: EM26163

DATE BATCH RECEIVED: 20/8/04

CLIENT: Maunsell (Adelaide)

DATE BATCH COMPLETED: 31/8/04

PROJECT: FRANKLIN ST

Method Code	Test	Matrix	Method Reference		QC Lot Number	Date Samples Extracted	Date Samples Analysed
			Extraction	Analysis			
EP-066	PCB	Soil	Tumbler	USEPA 8270B	VPCBS225	24/08/04	25/08/04
EP-068	Pesticides	Soil	Tumbler	USEPA 8270B	VOCOPS496	24/08/04	25/08/04
EP-071	TPH(SV)	Soil	Tumbler	USEPA 8015A	VTPHT2229	24/08/04	25/08/04
EP-071/80	TPH(V)/BTEX	Soil	USEPA 5030A	USEPA 8260A	VVOCS2229	24/08/04	24/08/04
EP-074	Volatiles Scan	Soil	USEPA 5030A	USEPA 8260A	VVSCS357	24/08/04	24/08/04
EP-075	SV Scan	Soil	Tumbler	USEPA 8270B	VSVOCS762	26/08/04	26/08/04

All analysis and laboratory QC pertaining to Environmental Site Assessments and Remedition have been conducted in accordance with Schedule (B3) NEPM Guidline on Laboratory Analysis of Potentially Contaminated Soil (December 1999). Please refer to Certificate of analysis for any exceptions to this clause.
Where applicable, internal standards are added to sample extracts prior to instrumental analysis. Absolute peak areas and retention times fall within the criteria specified in the individual methods. Continuing Calibration (CC) standards are run at the frequency of 1 in every 20 samples.

Abbreviations: SV = semivolatile, V = volatile
*: In-house methods

BATCH QUALITY CONTROL : PCB SCS / DCS

ALS EP-066 : POLYCHLORINATED BIPHENYLS

VPCBS225
MATRIX: Soil

ANALYST: N.WANG

COMPOUND	Blank Conc.	QC SPIKE RESULTS				Control Limits		
		SCS Conc	DCS Conc	Average Rec.	RPD	Rec.		RPD
	mg/kg	%	%	%	%	Low	High	%
Total PCB	<LOR	98	108	103	9	72	129	20
Surrogate								
DCBP	86.00	90	94	92	4	55	132	20

COMMENTS :

1) The control limits are based on ALS laboratory statistical data (Method QWI-ORG/07)

2) The control limits on RPD (relative percentage deviation) are fixed.

3) * : RPD or recovery falls outside the recommended control limit.

4) ND : Compound not detected

BATCH QUALITY CONTROL : DUPLICATE 1

ALS EP-066 : PCB

VPCBS225
MATRIX: Soil

ANALYST: N.WANG
SAMPLE ID: EM26140-10

COMPOUND	QC DUPLICATE RESULTS		
	SAMPLE Conc	DUPLICATE Conc	RPD
	ng/uL	ng/uL	%
Total PCB	<LOR	<LOR	0
Surrogate	66	61	8

Note: The permitted range for RPD (relative percentage deviation) is specified by ALS Method QWI-EN/38 and is dependent on the magnitude of the result in comparision to the level of reporting.
Result < 10 times LOR, no limit.
Result between 10 and 20 times LOR, 0% -50 %.
Results > 20 times LOR, 0% - 20 %.

BATCH QUALITY CONTROL : MATRIX SPIKE / DUPLICATE

ALS EP-066 : POLYCHLORINATED BIPHENYL ANALYSIS

VPCBS225
MATRIX: Soil

ANALYST: N.WANG
SPIKED SAMPLE : EM26140-10

COMPOUND	Sample Results	Spike Level	MS Conc	MSD Conc	Average Rec.	RPD	Control Limit RPD
	mg/kg	mg/kg	%	%	%	%	%
Total PCB	<LOR	10	71	79	75	11	20
Surrogate							
DCBP	66	10	63	63	63	0	20

COMMENTS :

1) The control limits on RPD (relative percent deviation) are fixed.

2) * : RPD falls outside the recommended control limit.

3) # : Unable to determine result due to sample matrix.

4) ND : Compound not detected

BATCH QUALITY CONTROL -- CONTROL SPIKE/DUPLICATE

ALS EP-068 : Pesticides

QC LOT No. : VOCOPS496 ANALYST NW

MATRIX: Soils

COMPOUND	Blank Conc	Spike Level	SPIKE QC RESULTS				Control Limits		
			SCS Rec.	DCS Rec.	Average Rec.	RPD	Rec.		RPD
	mg/kg	mg/kg	%		%	%	Low	High	%
EP068A : OC Pesticides									
a-BHC	<0.025	0.25	85.9	86.1	86	0.23	63	105	0 - 20
HCB	<0.025	0.25	85.6	87.3	86.5	1.97	63.4	102	0 - 20
b- & g-BHC	<0.05	0.5	85.9	89	87.5	3.54	67.4	105	0 - 20
d-BHC	<0.025	0.25	86.6	89.8	88.2	3.63	64.7	105	0 - 20
Heptachlor	<0.025	0.25	83.9	89.1	86.5	6.01	71.4	106	0 - 20
Aldrin	<0.025	0.25	86.3	88.8	87.6	2.86	65.8	107	0 - 20
Heptachlor epoxide	<0.025	0.25	87.8	92.2	90	4.89	68	107	0 - 20
Chlordane peak no 1	<0.025	0.25	89.1	93.3	91.2	4.61	67.5	109	0 - 20
Endosulfan 1	<0.025	0.25	85.9	90	88	4.66	67.6	111	0 - 20
Chlordane peak no. 2	<0.025	0.25	88.9	93.1	91	4.62	63.2	117	0 - 20
Dieldrin	<0.025	0.25	87.8	92.6	90.2	5.32	64.8	114	0 - 20
DDE	<0.025	0.25	87.5	91.3	89.4	4.25	68.3	107	0 - 20
Endrin	<0.025	0.25	85.9	92.1	89	6.97	69.5	122	0 - 20
Endosulfan 2	<0.025	0.25	86.6	90.4	88.5	4.29	67.3	116	0 - 20
DDD	<0.025	0.25	87.7	91.4	89.6	4.13	68.7	108	0 - 20
Endrin aldehyde	<0.025	0.25	89.4	92.6	91	3.52	57.5	110	1 - 20
Endosulfan sulfate	<0.025	0.25	89.7	96.8	93.3	7.61	57	117	0 - 20
DDT	<0.1	0.25	83	90.3	86.7	8.42	67.8	113	0 - 20
Endrin ketone	<0.025	0.25	94	101	97.5	7.18	67.2	108	0 - 20
Methoxychlor	<0.1	0.25	80.7	88.3	84.5	8.99	65.8	117	0 - 20
EP068S : OC Surrogate									
Dibromo-DDE	78.1%	0.5	68.3	75.1	71.7	9.48	58.8	102	0 - 20

COMMENTS:

1) The recovery control limits are based on ALS laboratory statistical data. (Method QWI-ORG/07)

2) The control limits on RPD (relative percent deviation) are fixed.

3) * : Recovery or RPD falls outside of the recommended control limits.

BATCH QUALITY CONTROL -- DUPLICATE

ALS EP-068 : Pesticides

QC LOT No. : VOCOPS496
MATRIX : Soils
ANALYST: NW

COMPOUND	LOR	QC DUPLICATE RESULTS			
		EM26163 3	**EM26163** 3D	RPD	Cont. Limit
	mg/kg	mg/kg	mg/kg	%	
EP068A : OC Pesticides					
a-BHC	0.025	<0.025	<0.025	n/a	
HCB	0.025	<0.025	<0.025	n/a	
b- & g-BHC	0.05	<0.05	<0.05	n/a	
d-BHC	0.025	<0.025	<0.025	n/a	
Heptachlor	0.025	<0.025	<0.025	n/a	
Aldrin	0.025	<0.025	<0.025	n/a	
Heptachlor epoxide	0.025	<0.025	<0.025	n/a	
Chlordane peak no 1	0.025	<0.025	<0.025	n/a	
Endosulfan 1	0.025	<0.025	<0.025	n/a	
Chlordane peak no. 2	0.025	<0.025	<0.025	n/a	
Dieldrin	0.025	<0.025	<0.025	n/a	
DDE	0.025	<0.025	<0.025	n/a	
Endrin	0.025	<0.025	<0.025	n/a	
Endosulfan 2	0.025	<0.025	<0.025	n/a	
DDD	0.025	<0.025	<0.025	n/a	
Endrin aldehyde	0.025	<0.025	<0.025	n/a	
Endosulfan sulfate	0.025	<0.025	<0.025	n/a	
DDT	0.1	<0.1	<0.1	n/a	
Endrin ketone	0.025	<0.025	<0.025	n/a	
Methoxychlor	0.1	<0.1	<0.1	n/a	
EP068S : OC Surrogate					
Dibromo-DDE	1%	93.3%	102%	8.91	0 - 20

Note: The permitted range for RPD (relative percent deviation) is specified in ALS Method QWI-EN/38 and is dependent on the magnitude of results in comparison to the level of reporting:
Result < 10 times LOR, no limit.
Result between 10 and 20 times LOR, 0% - 50%.
Results > 20 times LOR, 0% - 20%.

BATCH QUALITY CONTROL -- MATRIX SPIKE/DUPLICATE

ALS EP-068 : Semivolatile Organic Compounds

QC LOT No. : VOCOPS496 ANALYST : NW

MATRIX: Soils Sample ID: EM26163-1

COMPOUND	Sample Results	Spike Level	SPIKE QC RESULTS				Cont. Limit
			MS Rec.	MSD Rec.	Average Rec.	RPD	RPD
	mg/kg	mg/kg	%	%	%	%	%
EP068A : OC Pesticides							
b- & g-BHC	<0.05	0.25	77.5	79.5	78.5	2.55	0 - 20
Heptachlor	<0.025	0.25	72.9	62.5	67.7	15.4	0 - 20
Aldrin	<0.025	0.25	81.8	88.1	85	7.42	0 - 20
Dieldrin	<0.025	0.25	78.7	80.8	79.8	2.63	0 - 20
Endrin	<0.025	0.25	73.5	73.8	73.7	0.407	0 - 20
DDT	<0.1	0.25	49.7	42.2	46	16.3	0 - 20
EP068S : OC Surrogate							
Dibromo-DDE	89.7%	0.5	83	79.8	81.4	3.93	0 - 20

COMMENTS:

1) The RPD control limits are fixed.

2) *: RPD falls outside the recommended control limit.

BATCH QUALITY CONTROL - CONTROL SPIKE/DUPLICATE

ALS EP-071 : Total Petroleum Hydrocarbons by Fractions

Vol QC Lot : VVOCS2229
Semivol QC Lot : VTPHT2229

MATRIX : Soil

COMPOUND	BATCH ADJ. (MDL)	Blank Conc.	Spike Conc.	Spike Results				Control Limits		
				SCS Conc.	DCS Conc.	Av. Rec.	RPD	Recovery %		RPD
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	Low	High	%
C6-C9	2.0	<LOR	20	20	18	94	7	81	123	20
C10-C14	25	<LOR	524	484	484	92	0	79	121	20
C15-C28	50	<LOR	906	850	862	94	1	78	120	20
C29-C36	50	<LOR	410	330	330	80	0	63	105	20

COMMENTS:

1) The control limits are based on ALS laboratory statistical data (Method QWI-ORG/07).
2) * : Recovery or RPD falls outside the recommended control limit.
3) MDL = Method Detection Limit
4) LOR = Level Of Reporting

BATCH QUALITY CONTROL

ALS EP-071 : TOTAL PETROLEUM HYDROCARBONS

Svol QC Lot No :	VTPHT2229	SVol Analyst :	Maria Ashton
Vol QC Lot No :	VVOCS2229	Vol Analyst :	Emily Yuen
Matrix :	SOIL		

COMPOUND	QC DUPLICATE RESULTS		
	EM26163 -3 mg/kg	EM26163 -3D mg/kg	RPD %
EP-071 : TOTAL PETROLEUM HYDROCARBONS			
C6-C9	<LOR	<LOR	--
C10-C14	30.00	<LOR	--
C15-C28	54.00	<LOR	--
C29-C36	196.00	212.00	8

BATCH QUALITY CONTROL - MATRIX SPIKE/DUPLICATE

ALS EP-071 : Total Petroleum Hydrocarbons by Fractions

Vol QC Lot : VVOCS2229
Semivol QC Lot : VTPHT2229

SPIKED SAMPLE : EM26163 1
MATRIX : Soil

COMPOUND	Sample Results	Spike Level	Spike Results				Control Limits
			MS Conc	MSD Conc	Av. Rec.	RPD	
	mg/kg	mg/kg	mg/kg	mg/kg	%	%	RPD
C6-C9	<LOR	10	9.0	9.1	90	1	20
C10-C14	<LOR	582	496	488	85	2	20
C15-C28	184	1320	1112	1104	84	1	20
C29-C36	552	368	398	390	107	2	20

COMMENTS :

1) LOR: level of reporting
2) The control limits are based on ALS laboratory statistical data. (Method QWI-ORG/06)
3) * : Recovery or RPD falls outside of the recommended control limits.
4) # : Unable to determine result due to sample matrix.

BATCH QUALITY CONTROL - CONTROL SPIKE/DUPLICATE

ALS EP-080 : BTEX ANALYSIS

QC Lot No. : VVOCS2229

MATRIX : Soil

COMPOUND	BATCH ADJ. (MDL)	Blank Conc.	Spike Conc.	Spike Results				Control Limits		
				SCS Conc.	DCS Conc.	Av. Rec.	RPD	Recovery %		RPD
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	Low	High	%
Benzene	0.1	<LOR	2.0	2.02	1.95	99	3	80	122	20
Toluene	0.1	<LOR	2.0	1.99	1.90	97	5	80	122	20
Chlorobenzene	0.1	<LOR	2.0	1.97	1.92	97	2	81	123	20
Ethylbenzene	0.1	<LOR	2.0	1.95	1.93	97	1	80	122	20
m- & p-Xylene	0.1	<LOR	4.0	3.85	3.88	97	1	80	122	20
o-Xylene	0.1	<LOR	2.0	1.99	1.98	99	0	81	123	20

COMMENTS :

1) The control limits are based on ALS laboratory statistical data (Method QWI-ORG/07).
2) * : Recovery or RPD falls outside the recommended control limit.
3) MDL = Method Detection Limit
4) LOR = Level Of Reporting

BATCH QUALITY CONTROL

ALS EP-071 : TOTAL PETROLEUM HYDROCARBONS
ALS EP-080 : BTEX

Vol QC Lot No : VVOCS2229
Vol Analyst : Emily Yuen
Matrix : SOIL

COMPOUND	QC DUPLICATE RESULTS		
	EM26163 -3 mg/kg	EM26163 -3D mg/kg	RPD %
EP-080 : BTEX			
Benzene	<LOR	<LOR	--
Toluene	<LOR	<LOR	--
Chlorobenzene	<LOR	<LOR	--
Ethylbenzene	<LOR	<LOR	--
meta- & para-Xylene	<LOR	<LOR	--
ortho-Xylene	<LOR	<LOR	--

BATCH QUALITY CONTROL - MATRIX SPIKE/DUPLICATE

ALS EP-080 : BTEX ANALYSIS

QC Lot No. : VVOCS2229

SPIKED SAMPLE : EM26163 1
MATRIX : Soil

COMPOUND	Sample Results	Spike Level	Spike Results				Control Limits
			MS Conc	MSD Conc	Av. Rec.	RPD	
	mg/kg	mg/kg	mg/kg	mg/kg	%	%	RPD
Benzene	<LOR	2.0	2.0	2.1	102	1	20
Toluene	<LOR	2.0	2.0	2.0	101	2	20
Chlorobenzene	<LOR	2.0	1.8	1.8	89	2	20

COMMENTS :

1) LOR: level of reporting
2) The control limits are based on ALS laboratory statistical data. (Method QWI-ORG/06)
3) * : Recovery or RPD falls outside of the recommended control limits.

BATCH QUALITY CONTROL -- CONTROL SPIKE/DUPLICATE

ALS EP-074 : Volatile Organic Compounds

OC LOT No. : VVSCS357 ANALYST EMILY YUEN

MATRIX: Soils

	Blank Conc	Spike Level	SPIKE OC RESULTS				Control Limits		
			SCS Rec.	DCS Rec.	Average Rec.	RPD	Rec.		RPD
COMPOUND	mg/kg	mg/kg	%		%	%	Low	High	%
EP-07D-SS : Fumigants									
2,2-Dichloropropane	<LOR	10.0	108	90.7	99.4	17.4	57.3	134	0 - 20
1,2-Dichloropropane	<LOR	10.0	115	98.6	107	15.4	89	125	0 - 20
cis-1,3-Dichloropropene	<LOR	20.0	104	93.6	98.8	10.5	80	121	0 - 20
trans-1,3-Dichloropropene	<LOR	20.0	100	89.5	94.8	11.1	81.9	123	0 - 20
1,2-Dibromoethane	<LOR	10.0	99.3	99	99.2	0.3	79.2	129	0 - 20
EP-074E-SS : Chlorinated Aliphatic Compounds									
Dichlorodifluoromethane	<LOR	100.0	113	98.7	106	13.5	74.9	128	0 - 20
Chloromethane	<LOR	100.0	116	91.7	104	23.4 *	85.3	110	0 - 20
Vinyl chloride	<LOR	100.0	103	96.8	99.9	6.21	82.7	116	0 - 20
Bromomethane	<LOR	100.0	110	88.7	99.4	21.4 *	81.5	129	0 - 20
Chloroethane	<LOR	100.0	121	96	109	23 *	78.1	119	0 - 20
Trichlorofluoromethane	<LOR	100.0	123	95.7	109	25 *	86.1	118	0 - 20
1,1-Dichloroethene	<LOR	10.0	106	93.7	99.9	12.3	74.4	125	0 - 20
Iodomethane	<LOR	10.0	103	88.8	95.9	14.8	41.5	143	0 - 20
Methylene chloride	--	10.0	--	--	n/a	n/a	n/a	n/a	0 - 20
trans-1,2-Dichloroethene	<LOR	10.0	101	96.9	99	4.14	86.5	114	0 - 20
1,1-Dichloroethane	<LOR	10.0	101	96.5	98.8	4.56	81.7	120	0 - 20
cis-1,2-Dichloroethene	<LOR	10.0	119	98.6	109	18.8	87.2	116	0 - 20
1,1,1-Trichloroethane	<LOR	10.0	110	89	99.5	21.1 *	66.2	131	0 - 20
1,1-Dichloropropylene	<LOR	10.0	118	94.7	108	21.9 *	78.2	125	0 - 20
Carbon tetrachloride	<LOR	10.0	104	83.6	93.8	21.7 *	70.9	132	0 - 20
1,2-Dichloroethane	<LOR	10.0	113	98.9	106	13.3	83.9	121	0 - 20
Trichloroethene	<LOR	10.0	110	106	108	3.7	83.5	121	0 - 20
Dibromomethane	<LOR	10.0	106	102	104	3.85	83	117	0 - 20
1,1,2-Trichloroethane	<LOR	10.0	102	103	103	0.98	70.9	139	0 - 20
1,3-Dichloropropane	<LOR	10.0	106	101	104	4.83	76.3	130	0 - 20
Tetrachloroethene	<LOR	10.0	95.6	92.4	94	3.4	71.2	135	0 - 20
1,1,1,2-Tetrachloroethane	<LOR	10.0	94.4	81.6	88	14.5	72.2	140	0 - 20
trans-1,4-Dichloro-2-butene	<LOR	10.0	76.9	75	76	2.5	52.4	140	0 - 20
cis-1,4-Dichloro-2-butene	<LOR	10.0	89.9	96.7	93.3	7.29	65.1	136	0 - 20
1,1,2,2-Tetrachloroethane	<LOR	10.0	102	101	102	0.99	84.2	127	0 - 20
1,2,3-Trichloropropane	<LOR	10.0	99.7	102	101	2.28	76.5	131	0 - 20
Pentachloroethane	<LOR	10.0	96.2	70.3	83.3	31.1 *	71.2	147	0 - 20
1,2-Dibromo-3-chloropropan	<LOR	10.0	96.2	87.3	91.8	9.7	69.1	141	0 - 20
Hexachlorobutadiene	<LOR	10.0	102	90.2	96.1	12.3	67.1	117	0 - 20
EP-074F-SS : Chlorinated Aromatic Compounds									
Chlorobenzene	<LOR	10.0	101	96.4	98.7	4.66	81	123	0 - 20
Bromobenzene	<LOR	10.0	102	101	102	0.99	81	123	0 - 20
2-Chlorotoluene	<LOR	10.0	111	95.4	103	15.1	77.9	120	0 - 20
4-Chlorotoluene	<LOR	10.0	115	97.3	106	16.7	80.9	120	0 - 20
1,3-Dichlorobenzene	<LOR	10.0	97.8	94.9	96.4	3.01	80.9	121	0 - 20
1,4-Dichlorobenzene	<LOR	10.0	109	95.9	102	12.8	81.5	122	0 - 20
1,2-Dichlorobenzene	<LOR	10.0	105	98.9	102	5.98	81	126	0 - 20
1,2,4-Trichlorobenzene	<LOR	10.0	100	91	95.5	9.42	71.7	123	0 - 20
1,2,3-Trichlorobenzene	<LOR	10.0	101	94.3	97.7	6.86	76.6	129	0 - 20
EP-074G-SS : Trihalomethanes									
Chloroform	<LOR	10.0	115	103	109	11	77.9	120	0 - 20
Bromodichloromethane	<LOR	10.0	106	90.3	98.2	16	74	128	0 - 20
Dibromochloromethane	<LOR	10.0	91.5	82.2	86.9	10.7	83.5	134	0 - 20
Bromoform	<LOR	10.0	92.8	85.6	89.2	8.07	84.6	133	0 - 20
EP-074S-SS : Surrogates									
1,2-Dichloroethane-d4	105%	50.0	106	103	105	2.87	85.8	115	0 - 20
Toluene-d8	99.7%	50.0	97.3	99.7	98.5	2.44	85.4	111	0 - 20
4-Bromofluorobenzene	90.8%	50.0	89.7	102	95.9	12.8	83.9	111	0 - 20

COMMENTS:

1) The recovery control limits are based on ALS laboratory statistical data. (Method OWI-ORG/07)

2) The control limits on RPD (relative percent deviation) are fixed.

3) * : Recovery or RPD falls outside of the recommended control limits.

BATCH QUALITY CONTROL -- DUPLICATE

ALS EP-074 : Volatile Organic Compounds

OC LOT No. : VVSCS357
MATRIX : Soils
ANALYST: EMILY YUEN

COMPOUND	LOR	OC DUPLICATE RESULTS EM26161 2	OC DUPLICATE RESULTS EM26161 2D	RPD RPD	RPD Cont. Limit
	mg/kg	mg/kg	mg/kg	%	
EP-07D-SS : Fumigants					
2,2-Dichloropropane	0.5	<LOR	<LOR	n/a	
1,2-Dichloropropane	0.5	<LOR	<LOR	n/a	
cis-1,3-Dichloropropene	1	<LOR	<LOR	n/a	
trans-1,3-Dichloropropene	1	<LOR	<LOR	n/a	
1,2-Dibromoethane	0.5	<LOR	<LOR	n/a	
EP-074E-SS : Chlorinated Aliphatic Compounds					
Dichlorodifluoromethane	5	<LOR	<LOR	n/a	
Chloromethane	5	<LOR	<LOR	n/a	
Vinyl chloride	5	<LOR	<LOR	n/a	
Bromomethane	5	<LOR	<LOR	n/a	
Chloroethane	5	<LOR	<LOR	n/a	
Trichlorofluoromethane	5	<LOR	<LOR	n/a	
1,1-Dichloroethene	0.5	<LOR	<LOR	n/a	
Iodomethane	0.5	<LOR	<LOR	n/a	
Methylene chloride	--	--	--	n/a	
trans-1,2-Dichloroethene	0.5	<LOR	<LOR	n/a	
1,1-Dichloroethane	0.5	<LOR	<LOR	n/a	
cis-1,2-Dichloroethene	0.5	<LOR	<LOR	n/a	
1,1,1-Trichloroethane	0.5	<LOR	<LOR	n/a	
1,1-Dichloropropylene	0.5	<LOR	<LOR	n/a	
Carbon tetrachloride	0.5	<LOR	<LOR	n/a	
1,2-Dichloroethane	0.5	<LOR	<LOR	n/a	
Trichloroethene	0.5	<LOR	<LOR	n/a	
Dibromomethane	0.5	<LOR	<LOR	n/a	
1,1,2-Trichloroethane	0.5	<LOR	<LOR	n/a	
1,3-Dichloropropane	0.5	<LOR	<LOR	n/a	
Tetrachloroethene	0.5	<LOR	<LOR	n/a	
1,1,1,2-Tetrachloroethane	0.5	<LOR	<LOR	n/a	
trans-1,4-Dichloro-2-butene	0.5	<LOR	<LOR	n/a	
cis-1,4-Dichloro-2-butene	0.5	<LOR	<LOR	n/a	
1,1,2,2-Tetrachloroethane	0.5	<LOR	<LOR	n/a	
1,2,3-Trichloropropane	0.5	<LOR	<LOR	n/a	
Pentachloroethane	0.5	<LOR	<LOR	n/a	
1,2-Dibromo-3-chloropropane	0.5	<LOR	<LOR	n/a	
Hexachlorobutadiene	0.5	<LOR	<LOR	n/a	
EP-074F-SS : Chlorinated Aromatic Compounds					
Chlorobenzene	0.5	<LOR	<LOR	n/a	
Bromobenzene	0.5	<LOR	<LOR	n/a	
2-Chlorotoluene	0.5	<LOR	<LOR	n/a	
4-Chlorotoluene	0.5	<LOR	<LOR	n/a	
1,3-Dichlorobenzene	0.5	<LOR	<LOR	n/a	
1,4-Dichlorobenzene	0.5	<LOR	<LOR	n/a	
1,2-Dichlorobenzene	0.5	<LOR	<LOR	n/a	
1,2,4-Trichlorobenzene	0.5	<LOR	<LOR	n/a	
1,2,3-Trichlorobenzene	0.5	<LOR	<LOR	n/a	
EP-074G-SS : Trihalomethanes					
Chloroform	0.5	<LOR	<LOR	n/a	
Bromodichloromethane	0.5	<LOR	<LOR	n/a	
Dibromochloromethane	0.5	<LOR	<LOR	n/a	
Bromoform	0.5	<LOR	<LOR	n/a	
EP-074S-SS : Surrogates					
1,2-Dichloroethane-d4	1%	91.9%	102%	10.4	0 - 20
Toluene-d8	1%	88.3%	94%	6.25	0 - 20
4-Bromofluorobenzene	1%	89.4%	96.5%	7.64	0 - 20

Note: The permitted range for RPD (relative percent deviation) is specified in ALS Method QWI-EN/38 and is dependent on the magnitude of results in comparison to the level of reporting:
Result < 10 times LOR, no limit.
Result between 10 and 20 times LOR. 0% - 50%.
Results > 20 times LOR. 0% - 20%.

BATCH QUALITY CONTROL -- MATRIX SPIKE/DUPLICATE

ALS EP-074 : Volatile Organic Compounds

QC LOT No. : VVSCS357 ANALYST : EMILY YUEN

MATRIX: Soils Sample ID: EM26161-1

COMPOUND	Sample Results	Spike Level	SPIKE QC RESULTS				Cont. Limit
			MS Rec.	MSD Rec.	Average Rec.	RPD	RPD
	mg/kg	mg/kg	%	%	%	%	%
EP-074E-SS : Chlorinated Aliphatic Compounds							
1,1-Dichloroethene	<LOR	20	108	115	112	6.28	0 - 35
Trichloroethene	<LOR	20	85.1	89.6	87.4	5.15	0 - 35
EP-074F-SS : Chlorinated Aromatic Compounds							
Chlorobenzene	<LOR	20	84.5	89.5	87	5.75	0 - 35
EP-074S-SS : Surrogates							
1,2-Dichloroethane-d4	81.2%	50	90.7	92.5	91.6	1.97	0 - 35
Toluene-d8	79.6%	50	87.9	88.5	88.2	0.68	0 - 35
4-Bromofluorobenzene	84.5%	50	89.9	91	90.5	1.22	0 - 35

COMMENTS:

1) The RPD control limits are fixed.
2) *: RPD falls outside the recommended control limit.
3) # Unable to determine due to matrix interference

BATCH QUALITY CONTROL -- CONTROL SPIKE/DUPLICATE

ALS EP-075 : Semivolatile Organic Compounds

QC LOT No. : VSVOCS762 ANALYST X.LIN

MATRIX: Soils

COMPOUND	Blank Conc	Spike Level	SPIKE QC RESULTS				Control Limits		
			SCS Rec.	DCS Rec.	Average Rec.	RPD	Rec.		RPD
	mg/kg	mg/kg	%		%	%	Low	High	%
EP-075A : PHENOLS									
Phenol	<LOR	10.0	64.5	63.8	64.2	1.09	45.9	125	0 - 35
2-Chlorophenol	<LOR	10.0	65	70.1	67.6	7.55	43.5	121	0 - 35
2-Methylphenol	<LOR	10.0	63.8	69.6	66.7	8.7	48.7	116	0 - 35
4-Methylphenol	<LOR	10.0	67.6	73.2	70.4	7.95	50.4	121	0 - 35
2-Nitrophenol	<LOR	10.0	65.4	72.6	69	10.4	45.5	126	0 - 35
2,4-Dimethylphenol	<LOR	10.0	65.3	72.1	68.7	9.9	21.9	120	0 - 35
2,4-Dichlorophenol	<LOR	10.0	66.6	71.8	69.2	7.51	46.4	124	0 - 35
2,6-Dichlorophenol	<LOR	10.0	67.2	74.8	71	10.7	48.3	122	0 - 35
4-Chloro-3-methylphenol	<LOR	10.0	68.7	74.1	71.4	7.56	55.9	128	0 - 35
2,4,6-Trichlorophenol	<LOR	10.0	68.3	76	72.2	10.7	34.4	135	0 - 35
2,4,5-Trichlorophenol	<LOR	10.0	60.8	75.6	68.2	21.7	44.1	133	0 - 35
Pentachlorophenol	<LOR	10.0	41.1	49.6	45.4	18.7	5.8	109	0 - 35
EP-075B : POLYAROMATIC HYDROCARBONS									
Naphthalene	<LOR	10.0	66.6	73.8	70.2	10.3	47.4	122	0 - 35
2-Methylnaphthalene	<LOR	10.0	66.3	73.7	70	10.6	49.9	122	0 - 35
2-Chloronaphthalene	<LOR	10.0	60.2	65.2	62.7	7.97	53.7	125	0 - 35
Acenaphthylene	<LOR	10.0	68.4	74.5	71.5	8.54	52.4	125	0 - 35
Acenaphthene	<LOR	10.0	66.8	73.3	70.1	9.28	48.6	130	0 - 35
Fluorene	<LOR	10.0	67.9	72.8	70.4	6.97	51.9	129	0 - 35
Phenanthrene	<LOR	10.0	70.9	77.9	74.4	9.41	53.7	132	0 - 35
Anthracene	<LOR	10.0	70.9	77.9	74.4	9.41	51.1	131	0 - 35
Fluoranthene	<LOR	10.0	72	80.6	76.3	11.3	57.9	130	0 - 35
Pyrene	<LOR	10.0	72	80.8	76.4	11.5	62.4	128	0 - 35
N-2-Fluorenylacetamide	<LOR	10.0	58.2	68.2	63.2	15.8	61.1	135	0 - 35
Benz(a)anthracene	<LOR	10.0	67.7	79	73.4	15.4	54.8	134	0 - 35
Chrysene	<LOR	10.0	75.2	80.7	78	7.06	57.2	130	0 - 35
Benzo(b)&(k)fluoranthene	<LOR	20.0	71.2	80.2	75.7	11.9	48.6	136	0 - 35
7,12-Dimethylbenz(a)anthrac	<LOR	10.0	75	84.4	79.7	11.8	60.6	133	0 - 35
Benzo(a)pyrene	<LOR	10.0	70.2	78.9	74.6	11.7	50.9	133	0 - 35
3-Methylchloanthrene	<LOR	10.0	69	75.9	72.5	9.52	45.2	138	0 - 35
Indeno(1,2,3-cd)pyrene	<LOR	10.0	66.5	75.7	71.1	12.9	52.7	126	0 - 35
Dibenz(a,h)anthracene	<LOR	10.0	67.3	76	71.7	12.1	53.2	129	0 - 35
Benzo(g,h,i)perylene	<LOR	10.0	67.2	76.1	71.7	12.4	51.7	129	0 - 35

BATCH QUALITY CONTROL -- CONTROL SPIKE/DUPLICATE

ALS EP-075 : Semivolatile Organic Compounds

QC LOT No. : VSVOCS762 ANALYST X.LIN

MATRIX: Soils

COMPOUND	Blank Conc	Spike Level	SPIKE QC RESULTS				Control Limits		
			SCS Rec.	DCS Rec.	Average Rec.	RPD	Rec.		RPD
	mg/kg	mg/kg	%		%	%	Low	High	%
EP-075G : CHLORINATED HYDROCARBONS									
1,3-Dichlorobenzene	<LOR	10.0	61.4	69.8	65.6	12.8	50.7	113	0 - 35
1,4-Dichlorobenzene	<LOR	10.0	62.9	70.6	66.8	11.5	52	113	0 - 35
1,2-Dichlorobenzene	<LOR	10.0	64.5	73.9	69.2	13.6	50.1	117	0 - 35
Hexachloroethane	<LOR	10.0	61.7	71	66.4	14	47.9	116	0 - 35
1,2,4-Trichlorobenzene	<LOR	10.0	66.9	71.9	69.4	7.2	48.9	122	0 - 35
Hexachloropropylene	<LOR	10.0	66.6	73.8	70.2	10.3	35.5	135	0 - 35
Hexachlorobutadiene	<LOR	10.0	69.2	76.2	72.7	9.63	48.6	124	0 - 35
Hexachlorocyclopentadiene	<LOR	10.0	24.1	39.4	31.8	48.2 *	13.4	116	0 - 35
Pentachlorobenzene	<LOR	10.0	68.5	75.2	71.9	9.32	55.6	130	0 - 35
Hexachlorobenzene	<LOR	20.0	48.7	55.8	52.3	13.6	38.4	146	0 - 35
EP-075S : ACID EXTRACTABLE SURROGATES									
2-Fluorophenol	85%	10.0	91.9	84.4	88.2	8.51	44.7	127	0 - 35
Phenol-d6	78.7%	10.0	69.4	83.5	76.5	18.4	52.5	123	0 - 35
2-Chlorophenol-d4	75.3%	10.0	76.2	82.8	79.5	8.3	55.9	111	0 - 35
2,4,6-Tribromophenol	57.7%	10.0	86.5	92.4	89.5	6.6	52	116	0 - 35
EP-075T : BASE/NEUTRAL EXTRACTABLE SURROGATES									
Nitrobenzene-d5	74.9%	10.0	74	79.9	77	7.67	60.9	122	0 - 35
1,2-Dichlorobenzene-d4	77.1%	10.0	72.7	78.4	75.6	7.54	58.8	111	0 - 35
2-Fluorobiphenyl	77.8%	10.0	80.2	85.1	82.7	5.93	64.9	111	0 - 35
Anthracene-d10	76.6%	10.0	77.9	86.4	82.2	10.3	65.3	110	0 - 35
4-Terphenyl-d14	93.9%	10.0	83.3	91.5	87.4	9.38	70.4	111	0 - 35

COMMENTS:

1) The recovery control limits are based on ALS laboratory statistical data. (Method QWI-ORG/07)

2) The control limits on RPD (relative percent deviation) are fixed.

3) * : Recovery or RPD falls outside of the recommended control limits.

BATCH QUALITY CONTROL -- DUPLICATE

ALS EP-075 : Semivolatile Organic Compounds

QC LOT No. : VSVOCS762
MATRIX : Soils
ANALYST: X.LIN

COMPOUND	LOR	QC DUPLICATE RESULTS		RPD	
		EM26213 7	EM26213 7D	RPD	Cont. Limit
	mg/kg	mg/kg	mg/kg	%	
EP-075A : PHENOLS					
Phenol	0.5	<LOR	<LOR	n/a	
2-Chlorophenol	0.5	<LOR	<LOR	n/a	
2-Methylphenol	0.5	<LOR	<LOR	n/a	
4-Methylphenol	0.5	<LOR	<LOR	n/a	
2-Nitrophenol	0.5	<LOR	<LOR	n/a	
2,4-Dimethylphenol	0.5	<LOR	<LOR	n/a	
2,4-Dichlorophenol	0.5	<LOR	<LOR	n/a	
2,6-Dichlorophenol	0.5	<LOR	<LOR	n/a	
4-Chloro-3-methylphenol	0.5	<LOR	<LOR	n/a	
2,4,6-Trichlorophenol	0.5	<LOR	<LOR	n/a	
2,4,5-Trichlorophenol	0.5	<LOR	<LOR	n/a	
Pentachlorophenol	1	<LOR	<LOR	n/a	
EP-075B : POLYNUCLEAR AROMATIC HYDROCARBONS					
Naphthalene	0.5	<LOR	<LOR	n/a	
2-Methylnaphthalene	0.5	<LOR	<LOR	n/a	
2-Chloronaphthalene	0.5	<LOR	<LOR	n/a	
Acenaphthylene	0.5	<LOR	<LOR	n/a	
Acenaphthene	0.5	<LOR	<LOR	n/a	
Fluorene	0.5	<LOR	<LOR	n/a	
Phenanthrene	0.5	<LOR	<LOR	n/a	
Anthracene	0.5	<LOR	<LOR	n/a	
Fluoranthene	0.5	<LOR	<LOR	n/a	
Pyrene	0.5	<LOR	<LOR	n/a	
N-2-Fluorenylacetamide	0.5	<LOR	<LOR	n/a	
Benz(a)anthracene	0.5	<LOR	<LOR	n/a	
Chrysene	0.5	<LOR	<LOR	n/a	
Benzo(b)&(k)fluoranthene	1	<LOR	<LOR	n/a	
7,12-Dimethylbenz(a)anthracene	0.5	<LOR	<LOR	n/a	
Benzo(a)pyrene	0.5	<LOR	<LOR	n/a	
3-Methylchloanthrene	0.5	<LOR	<LOR	n/a	
Indeno(1,2,3-cd)pyrene	0.5	<LOR	<LOR	n/a	
Dibenz(a,h)anthracene	0.5	<LOR	<LOR	n/a	
Benzo(g,h,i)perylene	0.5	<LOR	<LOR	n/a	

BATCH QUALITY CONTROL -- DUPLICATE

ALS EP-075 : Semivolatile Organic Compounds

QC LOT No. : VSVOCS762
MATRIX : Soils
ANALYST: X.LIN

COMPOUND	LOR	QC DUPLICATE RESULTS		RPD	
		EM26213 7	EM26213 7D	RPD	Cont. Limit
	mg/kg	mg/kg	mg/kg	%	
EP-075G : CHLORINATED HYDROCARBONS					
1,3-Dichlorobenzene	0.5	<LOR	<LOR	n/a	
1,4-Dichlorobenzene	0.5	<LOR	<LOR	n/a	
1,2-Dichlorobenzene	0.5	<LOR	<LOR	n/a	
Hexachloroethane	0.5	<LOR	<LOR	n/a	
1,2,4-Trichlorobenzene	0.5	<LOR	<LOR	n/a	
Hexachloropropylene	0.5	<LOR	<LOR	n/a	
Hexachlorobutadiene	0.5	<LOR	<LOR	n/a	
Hexachlorocyclopentadiene	2.5	<LOR	<LOR	n/a	
Pentachlorobenzene	0.5	<LOR	<LOR	n/a	
Hexachlorobenzene	1	<LOR	<LOR	n/a	
EP-075S : ACID EXTRACTABLE SURROGATES					
2-Fluorophenol	1%	68.7%	77.7%	12.3	0 - 20
Phenol-d6	1%	67.9%	68.5%	0.88	0 - 20
2-Chlorophenol-d4	1%	73%	70.2%	3.91	0 - 20
2,4,6-Tribromophenol	1%	70.4%	64.8%	8.28	0 - 20
EP-075T : BASE/NEUTRAL EXTRACTABLE SURROGATES					
Nitrobenzene-d5	1%	71.9%	73.8%	2.61	0 - 20
1,2-Dichlorobenzene-d4	1%	62.4%	59.6%	4.59	0 - 20
2-Fluorobiphenyl	1%	75.6%	73.2%	3.23	0 - 20
Anthracene-d10	1%	79.1%	77%	2.69	0 - 20
4-Terphenyl-d14	1%	81.4%	75.5%	7.52	0 - 20

Note: The permitted range for RPD (relative percent deviation) is specified in ALS Method QWI-EN/38 and is dependent on the magnitude of results in comparison to the level of reporting:
Result < 10 times LOR, no limit.
Result between 10 and 20 times LOR, 0% - 50%.
Results > 20 times LOR, 0% - 20%.

BATCH QUALITY CONTROL -- MATRIX SPIKE/DUPLICATE

ALS EP-075 : Semivolatile Organic Compounds

QC LOT No. : VSVOCS762 ANALYST : X.LIN

MATRIX: Soils Sample ID: EM26213-6

COMPOUND	Sample Results	Spike Level	SPIKE QC RESULTS				Cont. Limit
			MS Rec.	MSD Rec.	Average Rec.	RPD	RPD
	mg/kg	mg/kg	%	%	%	%	%
EP-075A : PHENOLS							
Phenol	<LOR	5	92.9	104	98.5	11.3	0 - 35
2-Chlorophenol	<LOR	5	103	115	109	11	0 - 35
2-Nitrophenol	<LOR	5	113	120	117	6.01	0 - 35
4-Chloro-3-methylphenol	<LOR	5	104	108	106	3.77	0 - 35
Pentachlorophenol	<LOR	5	107	111	109	3.67	0 - 35
EP-075B : POLYAROMATIC HYDROCARBONS							
Acenaphthene	<LOR	5	121	112	117	7.73	0 - 35
Pyrene	<LOR	5	124	128	126	3.17	0 - 35
EP-075G : CHLORINATED HYDROCARBONS							
1,4-Dichlorobenzene	<LOR	5	97.9	113	105	14.3	0 - 35
1,2,4-Trichlorobenzene	<LOR	5	114	109	112	4.48	0 - 35
EP-075S : ACID EXTRACTABLE SURROGATES							
2-Fluorophenol	53.8%	2.5	72.9	74.1	73.5	1.63	0 - 35
Phenol-d6	61.3%	2.5	60.9	69.7	65.3	13.5	0 - 35
2-Chlorophenol-d4	66.6%	2.5	62.7	76.9	69.8	20.3	0 - 35
2,4,6-Tribromophenol	77.5%	2.5	72.9	88.5	80.7	19.3	0 - 35
EP-075T : BASE/NEUTRAL EXTRACTABLE SURROGATES							
Nitrobenzene-d5	64.2%	2.5	65.5	77	71.3	16.1	0 - 35
1,2-Dichlorobenzene-d4	55.8%	2.5	54.8	65.2	60	17.3	0 - 35
2-Fluorobiphenyl	67.7%	2.5	70.3	86	78.2	20.1	0 - 35
Anthracene-d10	69.9%	2.5	70.1	84.1	77.1	18.2	0 - 35
4-Terphenyl-d14	68.5%	2.5	66.5	84.2	75.4	23.5	0 - 35

COMMENTS:

1) The RPD control limits are fixed.

2) *: Recoveries or RPD's fall outside the specified limits.

maunsell

Soil and Groundwater Investigation
Central West Precinct

Franklin Street Bus Station and Car Parks

Adelaide City Council

November 2004

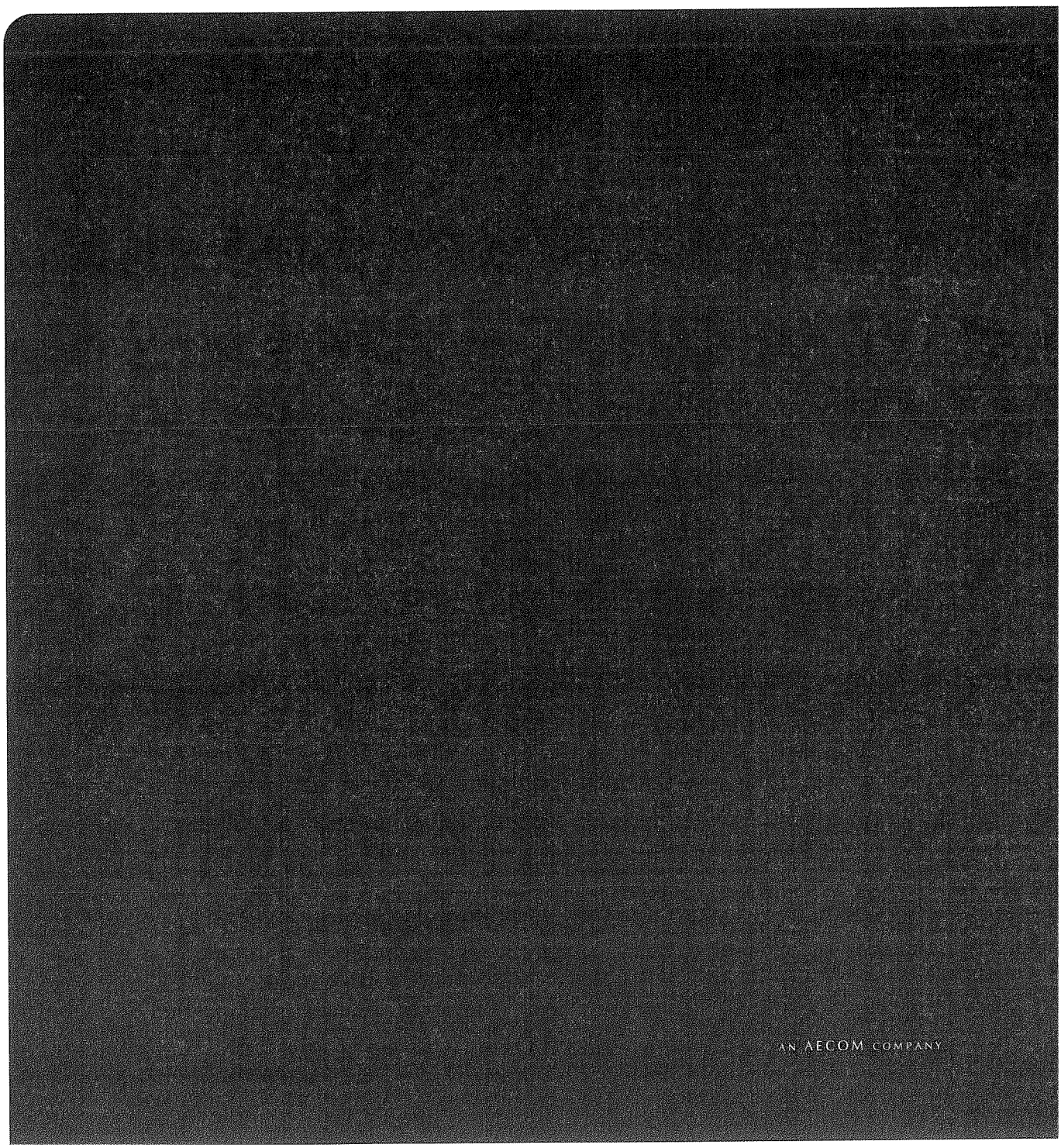

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Table of Contents

1.0	Introduction		1
	1.1	General	1
	1.2	Investigation Program	1
2.0	Available Information		3
	2.1	Site Characteristics	3
	2.2	Previous Reports	3
	2.3	Site History Summary	4
	2.4	Geology	4
	2.5	Topography	5
	2.6	Groundwater	5
3.0	Scope of Work		6
	3.1	Site Inspection	6
	3.2	Soil Investigation	6
		3.2.1 Soil Sampling	6
		3.2.2 Analytical Testing	8
	3.3	Groundwater Investigation	10
		3.3.1 Groundwater Sampling	10
		3.3.2 Analytical Testing	13
4.0	Quality		15
	4.1	General	15
	4.2	Field QA/QC Procedures	16
	4.3	Laboratory QA/QC Procedures	16
	4.4	Analytical Procedures	16
		4.4.1 Duplicates	16
	4.5	QA/QC Discussion	17
5.0	Results		18
	5.1	General	18
	5.2	Assessment Criteria	18
		5.2.1 Soil	18
		5.2.2 Groundwater	18
		5.2.3 Statistics	19
	5.3	Log Findings	19
		5.3.1 Soil	19
		5.3.2 Groundwater	21
	5.4	Monocyclic Aromatic Hydrocarbons	22
		5.4.1 Soil	22
		5.4.2 Groundwater	22
	5.5	Phenols and Cresols	22
		5.5.1 Soil	22
		5.5.2 Groundwater	22

	5.6	Chlorinated Hydrocarbons	22
		5.6.1 Soil	22
		5.6.2 Groundwater	22
	5.7	Organochlorine Pesticides	23
		5.7.1 Soil	23
		5.7.2 Groundwater	23
	5.8	Polychlorinated Biphenyls	23
		5.8.1 Soil	23
		5.8.2 Groundwater	23
	5.9	Cyanide	23
		5.9.1 Soil	23
		5.9.2 Groundwater	24
	5.10	pH	24
		5.10.1 Soil	24
		5.10.2 Groundwater	24
	5.11	Total Recoverable Petroleum Hydrocarbons	24
		5.11.1 Soil	24
		5.11.2 Groundwater	24
	5.12	Metals	24
		5.12.1 Soil	24
		5.12.2 Groundwater	25
	5.13	Polynuclear Aromatic Hydrocarbons	26
		5.13.1 Soil	26
		5.13.2 Groundwater	28
6.0	Conclusions		29
	6.1	General	29
	6.2	Summary	29
		6.2.1 Soil	29
		6.2.2 Groundwater	30
		6.2.3 Conclusion	30
7.0	Limitations of Use		31

Appendices

Appendix A Figures
Appendix B Soil and Groundwater Bore Logs
Appendix C Summary of Analytical and Quality Sampling Spreadsheet
Appendix D Groundwater Purging & Development Records
Appendix E Photographs
Appendix F Quality Assessment Data
Appendix G Summary Results

Accompanying Document

Franklin Street Bus Station Laboratory Reports

1.0 Introduction

1.1 General

This report has been prepared by Maunsell Australia Pty Ltd (Maunsell) for the Adelaide City Council. It provides the results of soil and groundwater investigations performed at the Franklin Street Bus Station and associated car parks between July and September 2004.

This site, together with the Balfours site, is known as the Central West Precinct, which the Adelaide City Council plans to redevelop. It is Maunsell's understanding that the bus station site and car parks are to be redeveloped for high density residential use, commercial developments and a bus terminal. As a result an investigation to characterise the quality of the soil and groundwater was required.

A previous soil investigation, undertaken in 1997 by Rust PPK, found areas of contamination and recommended that if the site was to be redeveloped into a more sensitive land use, further investigations should be undertaken to characterise the soil in more detail. On the basis of information available it appears that the contamination is generally limited to fill materials and the natural soil in close proximity to this material. The scope of this investigation was designed to compliment the previous investigation and was reviewed by the Environmental Auditor appointed for this site by the Adelaide City Council.

The site under investigation contains the Franklin Street Bus Station and associated car parks, herein referred to as the Franklin Street Bus Station.

1.2 Investigation Program

This investigation program was aimed at adequately assessing the quality of the site to a point where an acceptable understanding of soil and groundwater quality is achieved.

It was assumed that the materials (natural and fill) are suitable to remain on site. The excavation and replacement of the material would result in a more homogenous quality, relative consistency and higher compaction. The final nature of the site was considered when designing the scope of the investigation, which was to provide an understanding of the quality of the material over the entire site with an emphasis on average conditions. The investigation program involved a theoretical grid formation of sampling sites, however sampling locations were limited by the existing infrastructure on the sites. The sampling sites were designated so as to not overlap the sampling sites from previous investigations, in order to provide greater coverage of the site. It was known from the previous investigation that the fill material was generally confined to the top 1m hence the sampling was generally limited to 3 meters in depth.

The scope of this investigation involved:

- further investigation of soil quality generally in accordance with Australian Standard AS4482
- establishment of groundwater bores and sampling of groundwater

The investigation was designed to compliment and augment the data previously collected by Rust PPK in 1997 by positioning sampling sites in areas not previously tested, greater emphasis on the affect of fill on underlying materials and the application of a broad screen analysis.

The Environmental Auditor assigned to this project agreed to the scope of the investigation.

A site inspection was undertaken on 19 July 2004, the soil investigation was undertaken on the 18-19 August 2004, the groundwater bores were constructed on 23-26 August and groundwater sampling undertaken on 24 September 2004.

2.0 Available Information

2.1 Site Characteristics

The Franklin Street bus station is located in the Adelaide CBD. The site consists of two irregular shaped parcels of land located on the eastern and western sides of Bowen Street, the former is 0.9 hectares in size and the latter 0.5 hectares (refer to Appendix A for a site map). The site is bounded to the north by Franklin Street and to the south by Grote Street. The site consists of a number of terminals, infrastructure supporting the bus station and a number of car parks, both private and public. The site is surrounded by various commercial and light industrial activities.

The site is currently owned by the Adelaide City Council (ACC) and is utilised by a number of passenger and freight companies including Premier Stateline, Coachfreight, Greyhound Pioneer Australia, McCafferty's Express Coaches, The Adelaide Central Mission and two public car parks.

In detail the site under investigation at Franklin Street currently contains:

- Premier Stateline bus terminal and canopy on the north-west of the site
- Coachfreight parcel collection and drop off point in the western side of the site
- A bitumen-sealed private car park in the south-west of the site
- Greyhound and McCaffertey's Express bus terminal and canopy on the north-east of Bowen Street
- A single storey house, a private car park, a toilet block and a two-storey building previously utilised by the Adelaide Central Mission on the south-east of Bowen Street
- Two bitumen sealed public car parks in the east of the site

Appendix A contains a layout of the site.

2.2 Previous Reports

An inspection undertaken by Rust PPK in May 1997 involved 20 sampling sites (boreholes) in a grid pattern across the site. The bores were generally drilled to no more than 2.3m deep. The materials encountered during drilling include:

- Surface layer of yellow silty sand with some gravel overlying dark brown silty clays to depths ranging from 0.5 to 1.2m
- Brick fragments and cinders in 13 out of the 20 boreholes, and fragments of vesicular slag were identified in one of the boreholes
- Natural sediments were calcareous silty clays with some calcareous gravel to about 2m
- At some boreholes the soil became greenish brown at around 2m as it became Hindmarsh Clay

The field observations concluded that there was no visible or olfactory evidence of hydrocarbon contamination recorded at the surface or subsurface soils at any of the boreholes. The visible contamination was ash and cinders.

The soil samples were analysed for a broad spectrum of analytes. The conclusions of the site assessment were that elevated levels of metals (lead, zinc and copper) and PAHs were encountered and total fluoride was also identified. These elevated levels were considered to be associated with the fragments of ash, cinders and/or slag which were observed within the sub-surface soils profile. The soil was also found to be moderately alkaline.

2.3 Site History Summary

A site history was undertaken by Rust PPK in 1997. A summary of conclusions is as follows:

- From 1850 to early 1900's the site was generally used for residential purposes however there were also a number of commercial activities on site including a garage, forge, workshop, bakehouse, and a private road.
- From the 1920's a number of small light industries were established on the site, including a factory, garages, forges, stables, printing works, workshops, shops and offices, for business such as plumbers, radio and electrical companies.
- During the 1960's a large proportion of the residential land in the western part of the site was cleared and used as an open lot car park.
- By 1972 the Corporation of the City of Adelaide (now the ACC) had acquired most of the land comprising the site, except for 104 Grote Street. The land was then cleared, and by 1979 the majority of the existing bus terminals and car parks had been constructed.
- The residences on the 104 Grote Street site were acquired by the Corporation of the City of Adelaide (now the ACC) in the early 1990's and are currently used by the Adelaide Central Mission. The front part of the buildings at 104 Grote Street have been condemned by the Council due to problems with rust and cracking.
- Between 1989 and 1995 a new terminal building was constructed on the eastern side of Bowen Street on what was previously either car or bus parking space.

The site history concluded that it was likely that contaminants were present on site due to a number of past activities.

2.4 Geology

Previous reports suggest that the top one meter of material consists of reworked soils and building rubble, underlying this layer is a Brown Solonised Soil type BS classification. This classification consists of brown sandy to clayey soils with abundant earthy lime and calcrete in the subsoil. Such soils vary from a thin layer to up to 3 meters thick and this layer overlies Hindmarsh Clay.

2.5 Topography

The site is flat and is surrounded by flat land. Any stormwater would run off and enter the municipal stormwater system or soak into the garden beds.

2.6 Groundwater

Previous reports noted that groundwater was expected to be at depths ranging from 6 to 40 meters and no groundwater was encountered when drilling to a depth of 2.3 meters in previous investigations. The aquifers are expected to be in Hallett Cove Sandstone.

3.0 Scope of Work

3.1 Site Inspection

An experienced environmental scientist conducted a site inspection on 19 July 2004 primarily to determine accessibility for drill rigs to various areas within the site. The inspection also confirmed that, as expected, the site is predominantly covered with buildings, concrete and asphalt, as car parks and roadways. Furthermore, the inspection revealed the presence of an underground fuel storage tank (UST) on an adjacent site, situated next to the coach freight car park. An underground services clearance was undertaken by Suresearch on 16 August 2004.

3.2 Soil Investigation

Maunsell, following discussions with the Auditor, decided to undertake a grid based sampling with a view to increasing the accuracy of information relating to the average quality of materials over the site. As a result of this, it was decided that the establishment of 22 grid based boreholes, in conjunction with previous investigation results, would provide sufficient information for this purpose. Fieldwork was carried out by experienced environmental professionals, in accordance with Maunsell's Environmental Investigation Manual.

3.2.1 Soil Sampling

Soil sampling was undertaken on 18 and 19 August 2004 and involved the following activities:

- **Sampling locations.** The sampling locations were laid out in a grid formation across the areas that were accessible, ie. not occupied by buildings. The sampling sites were also chosen not to overlap those sites already tested by Rust PPK in 1997.

- **Borehole establishment.** Twenty-one boreholes were successfully established for logging and sampling purposes, of those originally planned one location was inaccessible (Bus 18). Each borehole was allocated a unique number, "Bus X" where X is the sampling location, (refer to Figure 1 Appendix A for a site map depicting the sampling locations). The boreholes were established using pushtubes, which were forced by a drill rig, with the resultant soil cores extracted into soil core trays. Photographs were taken of soil cores for 19 out of 21 of the boreholes and are presented in Appendix E. Where pushtubes encountered refusal, or were expected to encounter refusal, (which occurred regularly near the surface in gravelly material), relief augering was undertaken, generally to a depth of no more than 500mm. In such instances, the auger cuttings were used to represent material in these sections.

  The majority of boreholes extended to a depth of 2m to 2.5m below ground surface. This depth was extended to 3m in the vicinity of an underground fuel storage tank (UST) (locations Bus 6 & Bus 7), which was identified on an adjacent site during the site inspection, to ensure samples would be obtained from the soil strata near the base of the tank pit. In addition the first two

boreholes Bus 16 & Bus 17 were established to 3m and 3.3m respectively to determine the approximate depth to natural and types of materials likely to be encountered.

All pushtubes and core trays were cleaned with environmental cleaning equipment prior to use for each borehole.

Borehole locations were measured by hand using surrounding landmarks and buildings as reference points, with locations chosen to compliment, not overlap, previous investigations.

- **Soil logging.** During soil core extraction, the material was logged. Logs were only kept for failed bores that met refusal at a depth of 0.5m or greater. Specific characteristics of the materials, such as moisture content, colour and particle size were observed and noted on the log sheets, in addition to the type of material being extracted. Additional information recorded on the borelogs included sampling intervals, sample and duplicate numbers, field observations, comments relating to the material and approximate location of natural material. The log sheets are presented in Appendix B.

- **Sampling preparation.** The sample jars were labelled in the field prior to beginning each borehole. Sample jars were labelled as follows:

  BusX-#
  - BusX denotes the sampling location (described above)
  - '#' is the sample designation and is either A, B or C
  - If a duplicate sample was collected the letter 'A' was added immediately after the '#'

  In general, from each borehole, a sample (the A sample) was taken from material identified as being fill material, and a second sample (the B sample) was taken containing natural material immediately underlying the fill. Additionally, a third sample (the C sample) was taken from boreholes Bus 6 & 7 to investigate the quality of soil strata assumed to be at the base of the adjacent UST.

- **Sampling.** Drill rig mounted pushtubes were used to extract soil cores. Where pushtubes encountered refusal, relief augering was undertaken as described above. Soil cores were then placed in a soil core tray. The sampling interval was determined and the section representing the interval separated from the rest of the core. The section was then hand-mixed in the tray and sampled. Sample jars were kept in an esky with ice until transportation to the laboratory.

  Samples were collected by hand. Clean gloves were used for each sample to avoid cross-contamination. In addition, natural materials were handled first to reduce the risk of any cross-contamination involving materials from fill sections mixing with samples containing natural

material prior to sampling. It was considered less likely that false-positive results would occur as a result of natural material in fill samples.

- **Quality sampling.** Quality sampling was undertaken at or above the rates indicated in Table 1.

Table 1 – Quality Sampling

Quality Sampling	Rate
Intra Laboratory Duplicate	1 per 20 regular samples
Inter Laboratory Duplicate	1 per 20 regular samples

The procedure for collecting the quality sample was the same as for normal samples, but the mixed material was sequentially added to each jar to ensure the samples were as analogous as possible.

- **On-site screening.** Material from the soil core was screened at half metre intervals for volatile organic carbon using a MiniRae 2000 Photo-ionisation Detector (PID). Material was collected separately from any laboratory samples. Material from each interval was placed in a separate sealed plastic bag and stored in an esky. At the completion of each borehole, these bags of soil were tested using the PID with readings recorded on borelogs, presented in Appendix B.

- **Tracking of samples.** Tracking of samples was undertaken using a summary spreadsheet developed for the purpose of creating Chain of Custody (COC) documentation. All sample numbers and duplicates were listed in the spreadsheet.

  The spreadsheet allows for the allocation of laboratory testing for all samples and calculates the total number of original and duplicate samples, the percentage of duplicates to original samples and the percentage of natural material containing samples tested to those collected. In addition, sample hold times, tests undertaken on each sample, and laboratory report numbers are recorded on this spreadsheet. The spreadsheet is provided in Appendix C.

  COCs were sent to the laboratory with the instructions of the analysis required. The laboratory checked the condition and number of samples, and signed and returned by fax a copy of the COC to confirm receipt of samples.

3.2.2 Analytical Testing

The following scope of analytical testing was undertaken:

- Analysis of all A (ie fill) samples for Victorian EPA (VIC EPA) Screen and pH
- Analysis of 50% of randomly selected B (ie containing natural material) samples for VIC EPA Screen and pH

- Analysis of all C (ie near assumed base of UST) samples for VIC EPA Screen and pH
- PID field analysis of material for Volatile Organic Carbon at half metre intervals in every borehole
- Collection and analysis of duplicate samples at rates indicated in Table 1, with duplicates being of fill material only, to reduce the likelihood of original and duplicate analytes all returning results less than the limits of reporting, thus voiding the usefulness of duplicate analysis.

Analyses of soil samples were conducted by MGT Environmental Consulting Pty Ltd. The laboratory holds National Association of Testing Authorities (NATA) registration for the parameters listed in Table 2.

Table 2 - Analytical Methods and Limits of Reporting

Parameter	Analytical Method	Limits of Reporting	Number of Samples Tested
pH (unitless)	US EPA SW846 or APHA Standard Methods 19th Edition 1995	0.1	34 + 4 quality
Metals Screen	US EPA 6010B (ICP), 7470/1 (CVAA)	Various	34 + 4 quality
MAH	US EPA SW846 Methods 8021B, 8260B, 5030 & MGT 350A	0.05	34 + 4 quality
PAH	US EPA SW846 Method 8310(HPLC) & 8270C(GC/MS)	Various (0.1-2)	37 + 4 quality
TRH	MGT Method 100A-GC	Various (20-500)	34 + 4 quality
Phenols & Cresols	HPLC – JRNL. CHROM 464(1989) 405-410	0.1, 0.2 or 0.5	34 + 4 quality
Cyanide	US EPA SW846 Method 9010B	5	34 + 4 quality
Chlorinated Hydrocarbons	US EPA SW846 Method 8021B	0.05, 0.1 or 0.2	34 + 4 quality
Organochlorine Pesticides	US EPA SW846 Method 8081A	0.05, 0.1 or 0.2	34 + 4 quality
Polychlorinated Biphenyls	US EPA SW846 Method 8082	Various (0.1-2)	34 + 4 quality

Note – Units are in mg/kg unless otherwise stated.

Interlaboratory duplicates were analysed by ALS Environmental. The laboratory holds NATA registration for the parameters listed in Table 3.

Table 3 – Analytical Methods and Limits of Reporting for ALS Environmental

Parameter	Analytical Method	Limits of Reporting	Number of Samples Tested
pH (unitless)	APHA 4500-H^+B	0.1	3
Metals Screen	ICP/AES	0.1 or 1	3
MAH	USEPA8260 P&T/GC	0.2	3
PAH	GC/MS – SIM	0.5 or 1	3
TRH	P&T/GC/MS/FID & GC/FID	Various (2-100)	3

Parameter	Analytical Method	Limits of Reporting	Number of Samples Tested
Phenols & Cresols	APHA 5530 B&D	0.5 or 1	3
Cyanide	APHA 4500-CN^- C&N	1	3
Chlorinated Hydrocarbons	USEPA8270 GC/MS	1,3 or 0.5	3
Organochlorine Pesticides	GC/ECD/ECD/MS	0.2, 0.1 or 0.05	3
Polychlorinated Biphenyls	GC/ECD/ECD/MS	0.1	3

Note - Units are in mg/kg unless otherwise stated.

In addition to laboratory testing, field analysis for volatile organic carbon was undertaken using a PID meter. These results are presented on the environmental logs in Appendix B.

3.3 Groundwater Investigation

Following on-site discussions with the Auditor, it was decided to establish 5 groundwater wells positioning one in each corner of the site and one in the approximate centre of the site. The number and position of the wells allows for water quality monitoring at the site boundaries as well as the interior, and provides sufficient information to determine hydraulic gradients and groundwater contours that assist interpretation of results. Fieldwork was carried out by experienced environmental professionals, in accordance with Maunsell's Environmental Investigation Manual.

3.3.1 Groundwater Sampling

The groundwater wells were established between 23 and 26 August 2004. Sampling was undertaken on 24 September 2004. These activities involved the following:

- **Sampling locations.** Five groundwater wells were established, one in each corner of the site and one in the approximate centre of the site.

- **Groundwater well establishment.** Five groundwater wells were established (refer to Figure 2, Appendix A for a site map indicating the locations of groundwater wells). Each monitoring well was allocated a unique number, "MWX[1]" where X is the monitoring well location.

  According to PIRSA, it was expected that groundwater would be reached at a depth of not more than 15m. This proved inaccurate, and final depths of wells were determined on the basis of wet auger cuttings and the difficulty of drilling experienced at depth, assumed to be due to sandstone. The final depths and materials encountered suggested this was a Tertiary aquifer

[1] With regards to labelling, it should be noted that the groundwater wells at the Balfours site, the other site in the Central West Precinct project, also have wells labelled 'MW' as was noted in reports forwarded to Maunsell post well establishment at the bus station site. Maunsell have not changed the well labels from the bus station site as laboratory reports had already been created using the originally developed labelling scheme.

located in Hallett Cove Sandstone. Drilling depths ranged from approximately 19.5m to 22m, with collapses reducing the actual depth of wells.

The bores were drilled using 110mm solid augers. Upon withdrawal of the augers, PVC pipe was inserted into the borehole and forced into collapsed materials using the drill rig. The wells were constructed using 50mm diameter PVC pipe, with a 3m machine slotted section, across the water bearing interval, at the base of each. Additionally 100mm long conical end pieces were attached to assist pushing through collapsed materials. Approximately 1.4m to 2.4m of water was present in each well.

Upon verbal instruction from PIRSA, the annulus required construction as follows:

- Sand pack was to be in place to at least 0.5m above screen
- At least 1m of bentonite seal above the sand pack
- Several metres (approximately 5m) of concrete above bentonite to ensure the aquifer reached was not able to be infiltrated by water from any aquifers above, perched or otherwise, none of which were encountered in the field
- Bentonite seal to surface

Detailed well construction information is provided on environmental logs in Appendix B

Additionally, gatic covers were installed over the capped pipes and casing, the PVC pipe was cut just below ground surface and a thin concrete layer placed over bentonite around the capped well. The locations and tops of casing (TOC) level were surveyed for all wells. The TOC level to mAHD is recorded on the logs.

An initial attempt to establish MW6 (north west corner of site in a private carpark) was abandoned due to substantial water being encountered at less than 3m in depth, with standing water existing at a depth of approximately 1.8m. The water intercepted was sitting on firm, slightly moist clay. Due to the depth and quantity, it was not possible to continue drilling in this area and the bore was backfilled and abandoned. It was assumed this water was the result of localised leaking underground water infrastructure and not directly relevant to the investigation of groundwater. The eventual position of this well was moved east several meters, as it was known that a borehole previously drilled in the area, Bus 1, was not affected by subsurface water. The environmental log relating to the failed attempt is labelled MW6(a) and is provided in Appendix B.

- **Soil logging.** During well establishment, material derived from auger cuttings extracted from the borehole was logged at approximately 1m intervals. Specific characteristics of the materials, such as moisture content, colour and particle size were observed and noted on the log sheets,

in addition to the type of material being extracted. Observations were recorded at 1m intervals with depths of material being approximate as a reflection of the difficulty of depth estimation using auger cuttings, particularly in situations where borehole collapse may have occurred. The log sheets are presented in Appendix B.

- **Bore Development.** Wells were developed on 30 and 31 August 2004 using disposable bailers to remove soil fines and water disturbed or introduced during drilling. Approximately five well volumes of groundwater were extracted from four of the wells. Monitoring well MW8 had the equivalent of approximately 2.5 well volumes of groundwater removed as the water level dropped significantly to the point where extraction with a bailer was no longer possible. The recharge rate in this well appears low. The water obtained prior to this point indicated that the groundwater had become reasonably clear and that, to achieve the purposes of development, sufficient groundwater had been extracted. Records of development are provided in Appendix D.

- **Sampling preparation.** The sample bottles were labelled prior to going on site. Sample bottles for a particular well were removed from the site vehicle immediately prior to sampling and after purging. Sample bottles were labelled with the groundwater well designation (ie MWX as described above) as only one sample was to be taken from each well.

- **Sampling.** Groundwater sampling was undertaken on 23 September 2004. Depths to water were measured prior to sampling, on the day of sampling, from the highest point on the pipe.

  All wells were purged prior to sampling until conductivity, pH and temperature readings, measured in the field using a TPS WP81 multi-parameter meter, had stabilised and at least 3 bore volumes were removed or until purged dry. Purging was undertaken using bailers. Groundwater well summary records for purging prior to sampling of each well are provided in Appendix D.

  Following determination that stabilisation had occurred, samples were then taken from the well using a disposable bailer. One sample was collected from each well. Appropriate sampling bottles were used and all samples were stored in an esky with ice prior to transportation to the laboratory to ensure that optimal storage conditions were achieved relating to the type of analysis to be undertaken.

  A new disposable bailer was used for each individual well. The bailer was used for both purging and sampling.

- **Quality sampling.** It was originally envisaged that the investigations undertaken at Franklin Street Bus Station and at the Balfours site would be reported together. As a result of this, quality sampling objectives were to be achieved over the investigation as a whole. A decision

was made prior to going into the field, that the quality groundwater sample would come from the Balfours site. Franklin Street Bus Station wells were sampled first and due to unforeseen circumstances the quality sample was not collected at the Balfours site, therefore there are no quality samples for groundwater in this report.

- **On site screening.** Conductivity, pH and temperature of the groundwater were measured in the field using a TPS WP81 multi-parameter meter to ensure stabilisation of water during purging prior to sampling. This data is provided in the developing and purging records in Appendix D.

- **Tracking of samples.** Tracking of samples was undertaken using a summary spreadsheet developed for the purpose of creating Chain of Custody (COC) documentation. All sample numbers were listed in the spreadsheet.

  The spreadsheet allows for the allocation of laboratory testing for all samples. In addition, sample hold times, tests undertaken on each sample, and laboratory report numbers are recorded on this spreadsheet. The spreadsheet is provided in Appendix C.

  COCs were sent to the laboratory with the instructions of the analysis required. The laboratory checked the condition and number of samples, and signed and returned by fax a copy of the COC to confirm receipt of samples.

3.3.2 Analytical Testing

The following scope of analytical testing was undertaken:

- Analysis of all samples for Victorian EPA (VIC EPA) Screen and pH
- Field analysis of samples for conductivity, pH and temperature

Analyses of groundwater samples were conducted by MGT Environmental Consulting Pty Ltd. The laboratory holds National Association of Testing Authorities (NATA) registration for the parameters listed in Table 4.

Table 4 - Analytical Methods and Limits of Reporting - Groundwater

Parameter	Analytical Method	Limits of Reporting	Number of Samples Tested
pH (unitless)	US EPA SW846 or APHA Standard Methods 19th Edition 1995	-	5
Metals Screen	US EPA 6010B (ICP), 7470/1 (CVAA)	Various	5
MAH	US EPA SW846 Methods 8021B, 8260B, 5030 & MGT 350A	0.001	5
PAH	US EPA SW846 Method 8310(HPLC) & 8270C(GC/MS)	0.002, 0.005, 0.0001, or 0.0002	5

Parameter	Analytical Method	Limits of Reporting	Number of Samples Tested
TRH	MGT Method 100A-GC	0.02, 0.05, 0.1	5
Phenols & Cresols	HPLC – JRNL. CHROM 464(1989) 405-410	0.0001, 0.0002 or 0.0005	5
Cyanide	US EPA SW846 Method 9010B	0.005	5
Chlorinated Hydrocarbons	US EPA SW846 Method 8021B	0.0001 or 0.0005	5
Organochlorine Pesticides	US EPA SW846 Method 8081A	0.001 or 0.0001	5
Polychlorinated Biphenyls	US EPA SW846 Method 8082	0.001 or 0.01	5

Note – Units are in mg/l unless otherwise stated.

4.0 Quality

4.1 General

Maunsell conducts investigations in accordance with a quality assurance/control system (QA/QC). The 'National Environment Protection (Assessment of Site Contamination) Measure, 1999', states that a quality assurance system is 'actions, procedures, checks and decisions to ensure representativeness and integrity of samples and accuracy and reliability of analysis results'. It goes on to say that the system involves 'selection of appropriate sampling and presentation methods, documentation and sample storage, cleaning of tools before sampling and between samples, cleaning of containers, maintenance of sample environment to minimise sample contamination and analyte losses, delivery to the laboratory in good condition and within timeframes required for the particular analytes'.

Maunsell has developed an Environmental Investigation Manual, which provides the basis for undertaking environmental investigations and the QA/QC procedure.

The Maunsell QA/QC procedures include:

- Application of a third party accredited quality system in accordance with the ISO9000 series
- Use of established procedures and suitably qualified field personnel for environmental sampling
- Documentation of chain-of-custody and sample handling and storage
- Use of NATA registered laboratories as preselected subconsultants performing interlaboratory quality control checks
- Use of field duplicates and field blank samples

Quality of project outputs is maintained by:

- Ensuring all staff are appropriately trained
- Safety standards are defined and implemented
- Good housekeeping practices are adopted during all phases of the project
- Complete records of fieldwork, samples and data are maintained

Specific quality control procedures conducted for this project include:

- The use of appropriate sample collection and handling procedures
- The use of appropriately skilled and experienced personnel
- The application of decontamination procedures where appropriate to minimise cross contamination
- The extraction and analysis within appropriate handling times
- The use of an independent, NATA accredited laboratory for analysis
- The collection and analysis of blind duplicates, split duplicates, and internal laboratory duplicates and matrix spike/matrix spike duplicates

4.2 Field QA/QC Procedures

The laboratory supplied clean jars for soil samples and clean bottles for water samples. The jars were labelled in the field prior to borehole establishment based on the predetermined sampling program. The bottles were labelled in the office prior to sample collection based on the predetermined sampling program. On site the jars and bottles were filled with a soil sample or water sample respectively and stored in an esky with ice. At the end of each day samples were stored in a refrigerator if not sent to the laboratory. During transportation to the laboratory the samples were packed in an esky with ice and packaging to avoid damage.

Blind (intralaboratory) and split (interlaboratory) duplicate samples were collected in the field at the rates specified in Table 1. No water quality samples were collected for the reasons stated in Section 3.3.1.

4.3 Laboratory QA/QC Procedures

During the analysis of samples, the analytical laboratory conducted internal QA/QC procedures including the analysis of laboratory duplicates, laboratory spiked samples and method blank samples. All percentage recoveries for laboratory spiked sample analyses were between the acceptance criteria of 70-130%.

Method blank results are of an acceptable quality. Method blank and spiked sample results are presented on analytical reports in the accompanying document 'Franklin Street Bus Station Laboratory Reports'.

4.4 Analytical Procedures

4.4.1 Duplicates

Duplicate samples were collected to provide an indication of the sampling and analysis process. Duplicate soil samples were analysed for the full range of parameters. The duplicate soil sample results are presented on analytical reports in the accompanying document 'Franklin Street Bus Station Laboratory Reports' and in the quality assessment data provided in Appendix F.

Relative Percentage Differences (RPDs) for intra- and inter-laboratory duplicate samples were calculated and are presented in Appendix F. It was noted that several elevated RPDs were observed for samples where results were relatively low, close to the limits of laboratory reporting, or where limits of reporting differed between laboratories.

Based on a qualitative assessment of the data, it appears that neither laboratory is consistently over or underestimating and that the difference in the reported results is not a reflection of laboratory procedures, but rather the inherent heterogeneity of soil, particularly fill material.

4.5 QA/QC Discussion

Quality assurance and quality control was conducted in accordance with Maunsell's Environmental Investigation Manual to ensure that data of known quality is reported.

The required scope of samples collected, analytical testing, and quality testing was achieved for soil samples. The required scope of samples collected and analytical testing was achieved for groundwater samples. Ideally, given that the Franklin Street Bus Station investigation is now being presented separately to the Balfours site investigation, a ground water quality sample should have been collected and analysed for the same range of analytes as the original sample. This was not undertaken. However it is considered that due to the similarity of the results from each of the five wells this does not unduly affect the level of confidence in the accuracy of the results obtained.

Specific aspects of the project used to maintain QA/QC were:

- Field Procedures – the design of the investigation, including the collection of duplicates, is of a standard that provides confidence in the quality of the samples collected
- Analytical Procedures – The laboratory's internal QA/QC results indicate that analytical information provided by the laboratory is reliable
- Inter- and Intra-Laboratory Duplicate Samples – the results indicate that there was no bias in the analysis as a consequence of the selection of the laboratory

Three B samples were analysed for PAHs outside of recommended holding times. These samples were not originally selected for analysis but were later chosen to undergo testing due to the elevated levels of PAHs in the A samples from these boreholes. It is considered that these results may still be valid as the analytes of interest are PAHs, and in particular the less volatile PAHs, which are not likely to significantly decline over time through volatilisation. A table comparing the volatility of PAHs to water (a non volatile substance) is presented in Appendix F and forms the basis for this reasoning.

Based on the QA/QC information available for this project, the results are of an appropriate standard and can be used as part of a basis of interpretation of site conditions.

5.0 Results

5.1 General

The current investigation was designed to complement the previous Rust PPK investigation of 1997, in part by decreasing the effective grid size of soil testing and undertaking, for the first time, groundwater monitoring. By doing so, confidence in the accuracy of all findings regarding the site conditions at the Franklin Street Bus station was to be increased. As a result of the complementary nature of investigations, undertaken by independent consultancies, results and statistical analysis performed on results from both reports are presented in combined and individual formats in Appendix G. Only the metals, PAH and pH results from the Rust PPK investigation have been presented in this report, as a reflection of the concerns highlighted in their report. The assessment criteria being used in this report are the currently accepted guidelines as presented in the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM). It is recognised that these criteria differ to those applicable at the time of the previous investigation by Rust PPK in 1997.

5.2 Assessment Criteria

5.2.1 Soil

The laboratory analysis results for soil have been assessed against the appropriate NEPM Health Investigation Levels (HILs) as presented in Table 5-A of that document. The proposed use of the site as high-rise residential and commercial/industrial suggest NEPM HILs 'D' and 'F' respectively are the most appropriate guidelines. Initial comparison is made with the more conservative NEPM HIL 'D', based on an exposure setting of residential with minimal opportunities for soil access. Where analytical results conform to NEPM 'D' guidelines, it is therefore inferred that the results also satisfy NEPM 'F' guidelines. The NEPM states "investigation levels provide a trigger to assist in judging whether a detailed investigation of a site is necessary". Consequently, NEPM HIL 'D' is herein referred to as preliminary acceptance criteria as, if not exceeded, Auditor appointed site specific criteria may not be required. However, comparison is also made with interim urban ecological investigation levels (EILs) where data and guidelines exist. Triggered EILs give an indication of the potential for toxicological effects should sensitive receiving environments exist.

5.2.2 Groundwater

All waters in South Australia are to be considered as being suitable for potable use and are to be assessed against the South Australian Environment Protection (Water Quality) Policy 2003 (SAEPP) potable water criteria. The field measurements of total dissolved solids suggest the groundwater is too saline for potable use. The Australian Water Quality Guidelines for Fresh and Marine Waters November 1992 suggest the salinity of the groundwater classifies it as high-salinity water not suitable for irrigation water under ordinary conditions. As a consequence of this classification, groundwater results are compared to SAEPP Irrigation criteria.

5.2.3 Statistics

The statistical analysis performed on results are the same for both groundwater and soil investigations.

Statistical calculations such as the mean, standard deviation and 95% upper confidence level of the arithmetic mean (95%UCL) were undertaken for each analyte detected at concentrations above the limit of reporting. The confidence statistic provides a measure of the uncertainty of the estimate of the population proportion, that is there is a 95% confidence that the true unknown mean of the population portion is in the computed interval. The standard deviation and 95%UCL were only calculated where there were three or more samples in the data set. The 95%UCLs were initially calculated based on the assumption of normal data distribution. For analytes identified as potentially being of concern (benzo(a)pyrene and total PAHs), reassessment of data distribution and recalculation of 95%UCL values was undertaken using a computer program ProUCL 3.0, developed for the US EPA. These recalculations are presented in Appendix G.

It is acknowledged that some individual samples may exceed guideline levels, however the focus of this report are the 95%UCL values relating to the average quality of material over the entire Bus Station site. For reference, summary results are provided in Appendix G and original laboratory reports are provided in the accompanying document to this report, "Franklin Street Bus Station Laboratory Reports".

The 95%UCL of sample sets was assessed against the appropriate guidelines described above.

In the data summaries provided in Appendix G, half of the limits of reporting (LOR) were used for the purposes of statistics and are known as proxy values. The italics and blue text indicate these results. As a result the total PAH was re-calculated by Maunsell using half the limits of reporting, which is different to the methodology used by the laboratory.

In the discussion of the results, the statement "all samples returned results less than the limits of reporting" implies that all samples, A, B and C, are below the specified criteria.

5.3 Log Findings

5.3.1 Soil

The borehole logs for the soil investigations can be found in Appendix B. Summaries of these logs are presented in Table 5.

Table 5 – Soil Borehole Log Findings

Sample Location	Total Depth (m)	Fill/Natural Interface Depth (m)	Description of Natural Substrate	Description of Fill
Bus1	2.4	0.8	Sandy clay, sandy silty clay, minor gravel	Surface asphalt, gravelly sand, clay
Bus2	2.4	1.45	Sandy silty clay, clay	Surface asphalt, gravelly sand, sand, crushed masonry, minor wood
Bus3	2.25	0.6	Sandy silty clay, clay	Surface asphalt, gravelly sand, clay
Bus4	2.1	0.75	Sandy clay, sandy silty clay	Surface asphalt, gravelly sand, sand clay, minor organic matter
Bus5	2.4	0.5	Clay	Surface asphalt, gravelly sand, clay
Bus6	3.0	0.75	Clay, sandy silty clay	Surface asphalt, gravelly cobbly sand, clay
Bus7	3.0	0.75	Clay, sandy silty clay	Surface asphalt, gravelly cobbly sand, clay
Bus8	2.4	0.65	Clay, sandy clay, sandy silty clay	Surface asphalt, gravelly sand, clay
Bus9	2.1	0.3	Clay	Sand, gravelly sandy clay
Bus10	2.4	0.7	Sandy silty clay, clay	Surface asphalt, gravelly sand, gravelly sandy clay
Bus11	2.1	0.7	Sandy silty clay, clay	Surface asphalt, gravelly sand, gravelly sandy clay
Bus12	2.4	0.7	Clay, sandy silty clay	Surface asphalt, gravelly sand, gravelly sandy clay, clay
Bus13	2.4	1.05	Sandy silty clay, clay, minor gravel	Surface asphalt, gravelly sand, gravelly sandy clay, clay
Bus14	2.1	0.75	Silty clay, clay	Surface asphalt, gravelly sand
Bus15	2.4	0.55	Sandy silty clay, clay	Surface asphalt, gravelly sand, gravelly sandy clay
Bus16	3.0	1.15	Clay, sandy silty clay	Surface asphalt, gravelly sand, gravelly sandy clay, rock
Bus17	3.3	1.0	Clay, sandy silty clay	Surface asphalt, gravelly sand, gravelly sandy clay, clay
Bus19	2.4	0.55	Clay, gravelly sandy clay, sandy silty clay	Surface asphalt, gravelly sand, gravelly sandy clay
Bus20	2.4	0.55	Clay	Surface asphalt, gravelly sand, gravelly sandy clay
Bus21	2.1	0.55	Calcrete, sandy clay, clay, minor root material	Surface asphalt, gravelly sand, gravelly sandy clay
Bus22	2.1	0.65	Silty sandy clay, clay	Surface asphalt, sand, concrete, gravelly sand
Bus22 (failed)	0.5	-	-	Surface asphalt, gravelly sand, sandy gravelly clay

It was noted during the investigation that the fill/natural interface often showed signs of a layer of reworked natural material, mixed with above fill materials. This was classified as fill material for the purpose of this investigation.

5.3.2 Groundwater

The borehole logs for the groundwater investigations can be found in Appendix B. Summaries of these logs are presented in Table 6.

Table 6 – Groundwater Borehole Log Findings

Sample Location	Total Depth (m)	Fill/Natural Interface Depth (m)*	Description of Natural Substrate	Description of Fill
MW5	20.3	1	Sandy silty clay, clay, sandy clay, sand, hard drilling suggests sandstone	Surface asphalt, gravelly cobbly sand, clay
MW6 (a)	5.0	1	Sandy clay, clay	Surface asphalt, gravelly sand, clay
MW6 (b)	22.0	1	Sandy clay, sandy silty clay, clay, gravelly clayey sand, gravel is crushed sandstone	Surface asphalt, gravelly sand, clay
MW7	21.8	1	Clay, sandy silty clay, sand, hard drilling suggests sandstone	Surface asphalt, gravelly sand, gravelly sandy clay, clay
MW8	19.6	0.5	Sandy silty clay, clay, sandy clay, clayey sand, sand, hard drilling suggests sandstone	Surface asphalt, gravelly sand, gravelly sandy clay
MW9	19.3	1	Sandy silty clay, clay, sand, rock, presume sandstone based on hard drilling and gravel fragments	Surface asphalt, gravelly sand

*Approximate as generally only logged at 1m intervals

Groundwater was generally found at a depth of between 26.3mAHD and 25.7mAHD. A groundwater contour map, provided as Figure 2 in Appendix A, indicates the groundwater flow to be toward the northwest.

5.4 Monocyclic Aromatic Hydrocarbons

5.4.1 Soil

There were no preliminary acceptance criteria specified for MAHs. All samples returned results less than the limits of reporting with the exception of Bus2-A and Bus6-C, in which xylenes were detected at a level of 0.62mg/kg and 0.14mg/kg respectively.

5.4.2 Groundwater

There were no irrigation acceptance criteria specified for MAHs. All samples returned results less than the limits of reporting.

5.5 Phenols and Cresols

5.5.1 Soil

The NEPM D HIL specified for phenol was 34,000mg/kg. There were no acceptance criteria specified for cresols. All samples returned results less than the limits of reporting.

5.5.2 Groundwater

There were no irrigation acceptance criteria specified for phenols and cresols. All samples returned results less than the limits of reporting.

5.6 Chlorinated Hydrocarbons

5.6.1 Soil

There were no preliminary acceptance criteria specified for chlorinated hydrocarbons. All samples returned results less than the limits of reporting.

5.6.2 Groundwater

There were no irrigation acceptance criteria specified for chlorinated hydrocarbons. All samples returned results less than the limits of reporting.

5.7 Organochlorine Pesticides

5.7.1 Soil

The preliminary acceptance criteria specified for organochlorine pesticides are presented below in Table 7.

Table 7 – Acceptance Criteria for Organochlorine Pesticides

Analyte	NEPM 'D' HIL (mg/kg)
Aldrin + Dieldrin	40
Chlordane	200
DDT + DDD + DDE	800
Heptachlor	40

All samples returned results less than the limits of reporting with the exception of two A samples, BUS2-A and Bus9-A, in which DDT was detected at levels well below the acceptance criteria. The mean and 95%UCL value were also well below acceptance criteria for this analyte.

5.7.2 Groundwater

The acceptance criteria for organochlorine pesticides states that it must not be detectable when measured by a method approved by the Authority. All samples returned results less than the limits of reporting.

5.8 Polychlorinated Biphenyls

5.8.1 Soil

The NEPM D HIL specified for total PCBs was 40mg/kg. All samples returned results less than the limits of reporting.

5.8.2 Groundwater

There were no irrigation acceptance criteria specified for PCBs. All samples returned results less than the limits of reporting.

5.9 Cyanide

5.9.1 Soil

The NEPM D HIL specified for free cyanide was 1000mg/kg. All samples returned results less than the limits of reporting with the exception of Bus9-A and Bus13-B in which cyanide was detected at levels well below the acceptance criteria. The mean and 95%UCL values were also well below acceptance criteria for this analyte.

5.9.2 Groundwater

There were no irrigation acceptance criteria specified for cyanide. All samples returned results less than the limits of reporting.

5.10 pH

5.10.1 Soil

There was no preliminary acceptance criteria specified for this analyte. The values of pH ranged from 8.3 to 11.

5.10.2 Groundwater

The criteria for pH were 4.5 to 9 for irrigation water. The values of pH ranged from 7 to 7.3, which were within the criteria range.

5.11 Total Recoverable Petroleum Hydrocarbons

5.11.1 Soil

There were no preliminary acceptance criteria specified for TRHs as analysis for classification as aromatic or aliphatic was not undertaken. TRH fractions C_{29}-C_{36} were detected in samples Bus5-A (160mg/kg), Bus16-A (310mg/kg) and Bus20-A (110mg/kg). TRH fractions C_{15}-C_{28} were detected in samples Bus3-A (110mg/kg) and Bus9-A (110mg/kg). All other samples returned values less than the limits of reporting. Detected levels are considered low as most are just above the limit of reporting.

5.11.2 Groundwater

There were no irrigation acceptance criteria specified for TRHs. All samples returned results less than the limits of reporting.

5.12 Metals

5.12.1 Soil

The preliminary acceptance criteria and EILs specified for metals analysed are presented below in Table 8. References are made to PPK results as discussed in Section 5.1, above.

Table 8 – Preliminary Acceptance Criteria for Metals

Analyte	NEPM 'D' HIL (mg/kg)	NEPM Interim Urban EIL (mg/kg)
Arsenic	400	20
Beryllium	80	Not specified
Cadmium	80	3
Chromium (III)	480,000	400
Chromium (VI)	400	1
Cobalt	400	Not specified
Copper	4,000	100
Lead	1,200	600
Manganese	6,000	500
Methyl Mercury	40	1 (inorganic mercury)
Nickel	2,400	60
Zinc	28,000	200

Several analytes were detected in a number of samples, including A, B and C samples, with all analytes returning mean and 95%UCL values well within the preliminary acceptance criteria, where specified. Combined results from the two investigations show several analytes were detected in a number of samples, both those designated as fill and natural, with all analytes returning mean and 95%UCL values well within the preliminary acceptance criteria, where specified.

Comparing the results from the Rust PPK investigation to the currently applicable criteria indicates that although several analytes were detected in a number of samples, from fill and natural, all analytes returned mean and 95%UCL values within preliminary acceptance criteria, where specified.

With regard to EILs, the 95%UCL values for copper in Maunsell A samples and zinc in Maunsell A and PPK Fill samples combined exceed these guidelines, although not substantially. The 95%UCL value for copper in Maunsell A and PPK Fill samples is close to the guideline level. Total chromium levels from Maunsell A, B, Maunsell A and PPK Fill combined, and Maunsell B and PPK natural combined are within the Chromium (III) EIL. All other 95%UCL values for analytes are within EIL guidelines, where specified.

5.12.2 Groundwater

The irrigation acceptance criteria for metals are presented in Table 9.

Table 9 - Criteria for Metals

Analyte	Irrigation
Antimony	Not specified
Arsenic	0.1
Beryllium	0.1
Cadmium	0.01
Chromium (total)	1
Cobalt	0.05
Copper	0.2
Lead	0.2
Mercury	0.002
Molybdenum	0.01
Nickel	0.2
Selenium	0.02
Tin	Not specified
Zinc	2

Criteria specified in mg/L

Several analytes were detected in a number of samples, with all samples returning mean and 95%UCL values within the criteria where specified.

5.13 Polynuclear Aromatic Hydrocarbons

5.13.1 Soil

The NEPM D HIL specified for Total PAHs is 80mg/kg. The NEPM D HIL specified for Benzo(a)Pyrene is 4mg/kg. Remaining PAHs do not have individual guideline levels specified in the NEPM. References to PPK results are made as discussed in Section 5.1, above. Several analytes were detected in a number of A samples although the majority of samples returned results less than the limits of reporting for all PAHs. Samples Bus3-A, Bus9-A and Bus16-A returned results indicating elevated levels of PAHs. The lower samples (B samples) from these boreholes were then tested with two of the three returning values lower than the limits of reporting for all PAHs and one (Bus16-B) indicating the presence of several PAHs at levels just above the limit of reporting, and well below preliminary acceptance criteria, where specified.

The remainder of all B samples tested, and all C samples tested, returned results lower than the limits of reporting for all PAHs. The means and 95%UCLs calculated for analytes from all B samples were within preliminary acceptance criteria, where specified. This is also true of combined Maunsell B and PPK natural samples. Only one PPK natural sample was tested for PAHs with all samples returning results lower than the limits of detection. No calculations were done on C samples as only two samples were tested (see Section 5.2.3).

A qualitative and semi-quantitative (based on interquartile range) assessment of data sets for Benzo(a)pyrene and Total PAHs for A samples indicates that both will be skewed due to the presence of one outlying result (sample Bus16-A). As such, the data distributions were reassessed, and the 95%UCLs were recalculated using mathematical methods appropriate for the determined data distribution type. The recalculations are presented in Appendix G. Tables 10 and 11 below compare 95%UCL values calculated based on normal distribution and reassessed data distributions, both with and without the outlying result, for Benzo(a)pyrene and Total PAHs respectively.

Table 10 – Statistics of Benzo(a)pyrene results against NEPM D HIL (A samples)

Sample Set	Mean	Maximum	Standard Deviation	95% UCL	HIL NEPM D	Compliance Value*[1]
Maunsell A	0.73	12	2.59	1.83	4	0.46
Maunsell A (recalculated)*[2]				6.35	4	1.59
Maunsell A (outlier removed-recalculated) *[2]				0.36	4	0.09
Maunsell A and PPK Fill	0.6	12	2.20	1.40	4	0.35
Maunsell A and PPK Fill (recalculated) *[2]				4.56	4	1.14
Maunsell A and PPK Fill (outlier removed-recalculated) *[2]				0.85	4	0.21

All results specified as mg/kg

*[1]Compliance value is 95% UCL/Criteria - thus values of 1 or less indicate compliance with preliminary acceptance criteria

*[2]Data distribution is non-parametric

Table 11 – Statistics of Total PAH results against NEPM D HIL (A samples)

Sample Set	Mean	Maximum	Standard Deviation	95% UCL	HIL NEPM D	Compliance Value*[1]
Maunsell A	7.25	113.5	24.4	17.7	80	0.22
Maunsell A (recalculated)*[2]				60.3	80	0.75
Maunsell A (outlier removed-recalculated) *[2]				4.2	80	0.05
Maunsell A and PPK Fill	6.0	113.5	20.6	13.3	80	0.16
Maunsell A and PPK Fill (recalculated) *[2]				43.3	80	0.54
Maunsell A and PPK Fill (outlier removed-recalculated) *[2]				4.9	80	0.06

All results specified as mg/kg

*[1]Compliance value is 95% UCL/Criteria - thus values of 1 or less indicate compliance with preliminary acceptance criteria

*[2]Data distribution is non-parametric

5.13.2 Groundwater

There were no irrigation acceptance criteria specified for PAHs. All samples returned results less than the limits of reporting.

6.0 Conclusions

6.1 General

This investigation was designed to expand on the previous study undertaken at the Franklin Street Bus Station by Rust PPK in 1997. It is worth noting that the Rust PPK report indicated that a number of samples returned levels of concern for metals or PAHs. This is considered to be a reflection of the criteria applied at the time, which is different to the criteria applicable to this investigation.

6.2 Summary

6.2.1 Soil

The monitoring results indicate that the majority of soil samples returned results below the limits of detection or within the relevant preliminary acceptance criteria (NEPM HIL 'E'). This is the case for both the Maunsell and Rust PPK investigations.

In summary, the following results were obtained from the Maunsell soil investigation:

Nature and location of fill materials	Fill materials were generally confined in the region 0-1m in depth and consisted of gravelly sand and gravelly sandy clay. Occasional rock, crushed masonry and organic matter were noted but no evidence of ash or cinders was found. Based on a visual assessment the materials appear to be geotechnically suitable for use in the redevelopment although this would need to be analytically confirmed.
Sampling density	The sampling density meets the satisfaction of the Environmental Auditor. The combination of the two investigations provides sufficient grid based sampling to provide confidence in the average quality of material across the site at this stage. Further limited testing may be required for areas inaccessible during this investigation (eg Bus 18) and for areas currently covered with structures.
Data quality	Generally acceptable (although three samples were tested for PAHs outside recommended holding times) as determined in Section 4.
Concentration of chemicals in fill	Fill generally complies with preliminary acceptance criteria. Mean and 95%UCL values comply with these criteria, with the exception of recalculated 95%UCLs for benzo(a)pyrene. No significant volatile organic carbon was detected during field PID measurements.

Concentration of chemicals in natural material	All individual, mean and 95% UCL values comply with preliminary acceptance criteria. Overlying fill material has not significantly negatively impacted the natural materials.

Statistical analysis of Rust PPK's data indicates that the mean and 95% UCL values for all analytes measured during their investigation comply with the preliminary acceptance criteria applicable to the current investigation, for both fill and natural materials. This is also the case for the combined results of Maunsell and PPK's investigations, with the exception of recalculated 95%UCLs for Benzo(a)pyrene.

It is considered that recalculated 95%UCLs for Benzo(a)pyrene for Maunsell A samples and for Maunsell A samples combined with PPK fill samples, are due to a skewed data set resulting from one outlying result and a substantial number (greater than 60%) of proxy values, and are unrealistically high (see Appendix G for further information). Effectively, all but one sample (over both investigations) were well below the preliminary acceptance criteria for this project, with more than 60% being non-detects.

Whilst copper and zinc 95%UCL values exceeded NEPM interim urban EILs in certain data sets, it is considered that, at the levels detected, phytotoxic effects are unlikely as a result of this material and that a sensitive receiving environment does not exist in proximity to the site. Additionally it is considered, given the consistent low level of total chromium detected across the entire site, over both investigations, in fill and natural material, that these levels are likely to represent background levels of chromium (III) rather than chromium (VI).

6.2.2 Groundwater

The monitoring results indicate that all samples returned results lower than the limits of reporting or equal to or below the relevant preliminary acceptance criteria, designated as SAEPP 2003 Irrigation Criteria due to salinity. All mean and 95% UCL values are below the relevant preliminary acceptance criteria.

6.2.3 Conclusion

Based upon the currently available information and combined results of both soil investigations, it is considered that the fill is generally of an acceptable quality to be utilised during the redevelopment although geotechnical testing would be required to confirm this. Additionally, further soil testing will be required once the site has been cleared of structures. Should the fill be deemed suitable for use during the redevelopment, it would be utilised for construction purposes and would therefore generally be present under sealed surfaces. As such, the material would be contained and inaccessible to residents. Reuse would involve the removal, stockpiling, and return of material, consequently involving some mixing which is the basis for consideration of average quality rather than concentration on individual samples.

Groundwater is considered to be too saline for potable use. Its quality does not appear to have been affected by activities or fill materials at the Bus Station site and meets SAEPP 2003 Irrigation criteria.

7.0 Limitations of Use

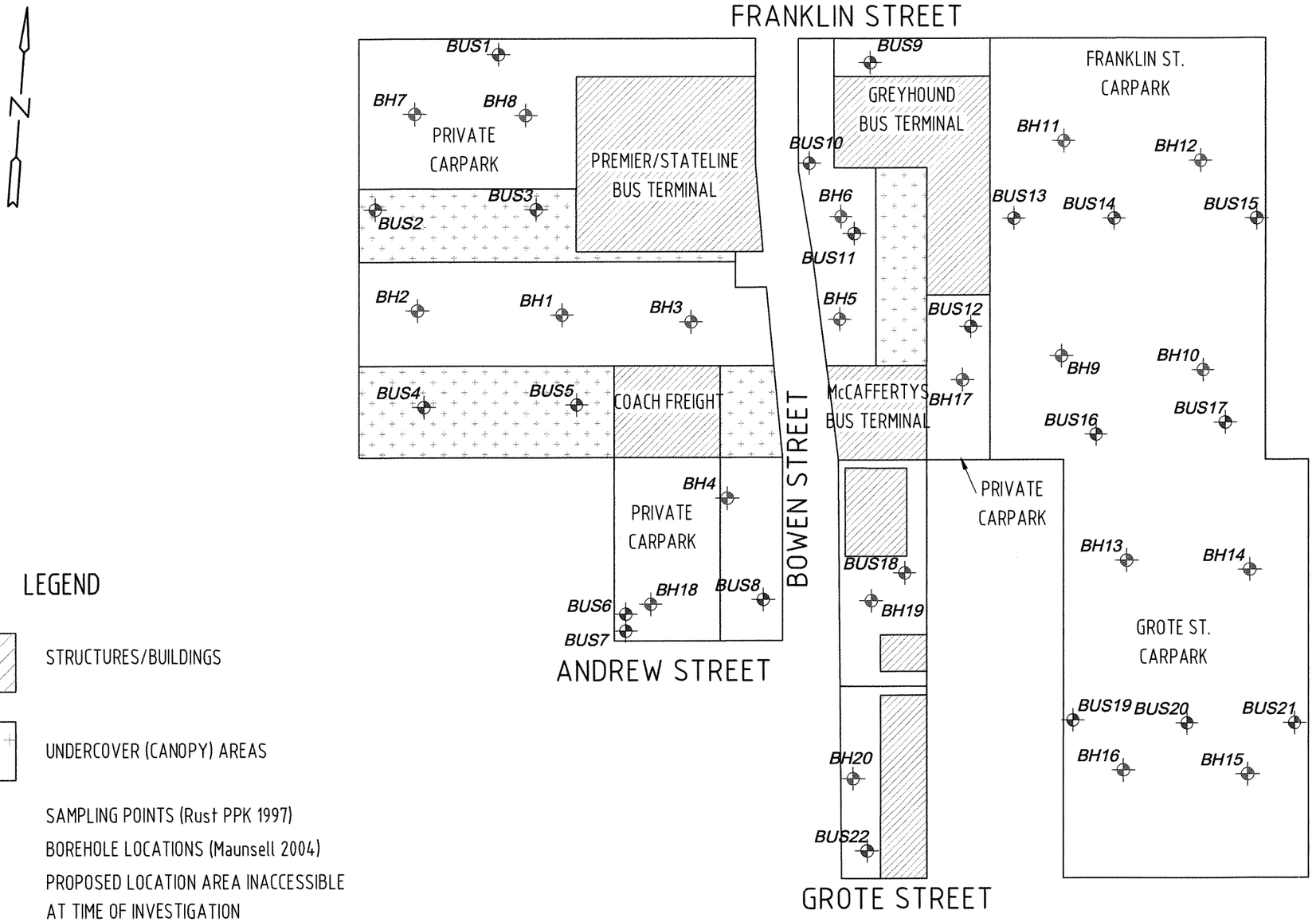
Site contamination is generally a produce of man-made processes and therefore exhibits characteristics and properties that vary from place to place and can change with time. Contamination assessments involve gathering and assimilating limited facts about these characteristics and properties in order to better understand or predict the status of contamination on a particular site under certain conditions.

The facts reported and utilised in this document may have been obtained by inspection, excavation, probing, sampling, testing, other means of investigation or from the client. They are directly relevant only to the ground at the place where and time when the investigation was carried out. Any interpretation or recommendation given in this report is based on judgment and experience and not on greater knowledge of the facts than the sources of information indicate. The interpretations and recommendations are opinions provided for the sole use by the Client identified on the cover sheet and in accordance with a specific brief. Maunsell Australia does not represent that the information or interpretation contained in this document addresses completely existing features such as surface and subsurface contamination, groundwater and geotechnical conditions or ground or contamination behavior on the subject site.

The responsibility of Maunsell Australia Pty Ltd is solely to its Client. It is not intended that this document be relied upon by any third party, other than an environmental auditor engaged by the client for the purpose of a contaminated land audit. Maunsell Australia does not undertake any duty to or accept any responsibility to any other parties who may rely upon this document.

Appendix A - Figures

maunsell



LEGEND

STRUCTURES/BUILDINGS

UNDERCOVER (CANOPY) AREAS

BH1 SAMPLING POINTS (Rust PPK 1997)

BUS1 BOREHOLE LOCATIONS (Maunsell 2004)

BUS18 PROPOSED LOCATION AREA INACCESSIBLE AT TIME OF INVESTIGATION

NOTE

STRUCTURES AND SITE LAYOUT WERE OBTAINED FROM Rust PPK's "Environmental Site Assessment" 1997 AND SHOULD BE CONSIDERED APPROXIMATE.

12/11/2004

FIGURE No. 1

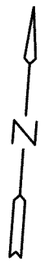
CENTRAL WEST PRECINCT
FRANKLIN STREET BUS STATION
SOIL BORE LOCATIONS

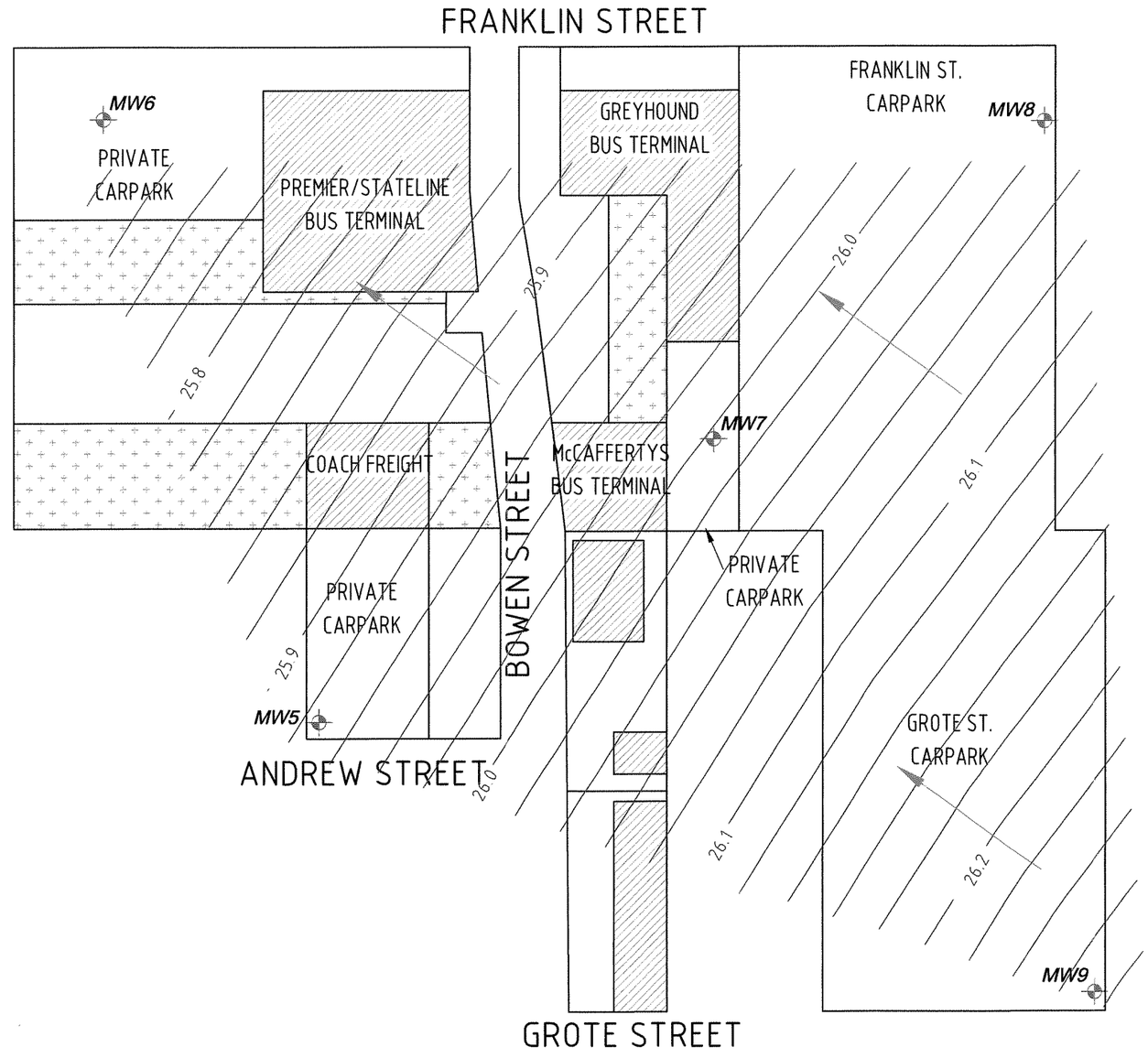
CENTRAL WEST PRECINCT
FRANKLIN STREET BUS STATION
40032004.01.dwg

APPROXIMATE SCALE 0 7.5 15 22.5 30 37.5m

Revision: A
Date: September 2004

maunsell





LEGEND

STRUCTURES/BUILDINGS

UNDERCOVER (CANOPY) AREAS

MW1 — GROUNDWATER MONITORING WELLS

25.9 — GROUNDWATER CONTOURS (m AHD)

IMPLIED DIRECTION OF GROUNDWATER FLOW

NOTES

1. STRUCTURES AND SITE LAYOUT WERE OBTAINED FROM Rust PPK's "Environmental Site Assessment" 1997 AND SHOULD BE CONSIDERED APPROXIMATE.
2. GROUNDWATER CONTOURS BASED ON LEVELS OBTAINED ON 6th OCTOBER 2004.

28/10/2004

FIGURE No. 2

CENTRAL WEST PRECINCT
FRANKLIN STREET BUS STATION
GROUNDWATER MONITORING WELL LOCATIONS AND GROUNDWATER CONTOURS

CENTRAL WEST PRECINCT
FRANKLIN STREET BUS STATION
40032004.01.dwg

APPROXIMATE SCALE 0 7.5 15 22.5 30 37.5m

Revision: A
Date: September 2004

Appendix B – Soil and Groundwater Bore Logs

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 1

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole **Length:** 2.4 m

Equipment: Pushtube/Relief Auger **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
	0.3				Gravelly SAND, light grey cream, slightly moist, gravel angular to 15mm, sand variable fine to very coarse colour change tan
	BUS1-A	0.6	0.5		
	0.7				
					CLAY, brown, slightly moist, firm, mixed with above material at this level
	BUS1-B				Natural, Sandy CLAY, slightly moist, tan, minor gravel rounded to 5mm
	1.0	0.1	1.0		
		0.0	1.5		
		0.8	2.0		Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, orange and brown flecks sand content decreasing down section
			2.5		END OF HOLE
			3.0		

Remarks:

Auger to 400mm

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 2

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole **Length:** 2.4 m

Equipment: Pushtube/Relief Auger **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
					Gravelly SAND, light grey cream, slightly moist, gravel angular to 15mm, sand variable fine to very coarse
					colour change tan
	0.45	1.1	0.5		clayey layer
					colour change grey/green
	BUS2-A				slate in layer
	0.85				
					Crushed masonry (bricks and slate)
		0.7	1.0		
					SAND, moist, grey/green, sand is medium to coarse
	1.45				
		1.2	1.5		Natural, Sandy Silty CLAY, cream tan, slightly moist, minor gravel, rounded to 5mm
	BUS2-B				
					sand decreasing down section
	1.85				
		0.5	2.0		
					CLAY, light grey green, moist, stiff, black specks
		0.4			
					END OF HOLE
			2.5		
			3.0		

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES MASONRY
- INDICATES CLAY
- INDICATES GRAVEL

Auger to 500mm

Minor wood in layer

Remarks:

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 3

maunsell

Job no: 40032004.00

Date: 19/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole — **Length:** 2.25 m

Equipment: Pushtube/Relief Auger — **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
	0.2				Gravelly SAND, light grey cream, slightly moist, gravel to angular to 15mm, sand variable fine to very coarse
					colour change cream tan
	BUS3-A	1.3	0.5		CLAY, brown, slightly moist, mixed with above material at this level
	0.6				
	BUS3-B				Natural, Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, brown flecks
	0.9	0.6	1.0		
		0.6	1.5		
		0.7	2.0		CLAY, light grey green, moist, stiff, black specks
			2.5		END OF HOLE
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Auger to 500mm then pushtube

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 4

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole **Length:** 2.1 m

Equipment: Pushtube/Relief Auger **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
	0.3				Gravelly SAND, cream, gravel angular to 15mm, sand variable fine to very coarse colour change tan
	BUS4-A 0.7	0.9	0.5		Sandy CLAY, dark brown, slightly moist Minor organic matter in layer
	BUS4-B 1.0	1.1	1.0		Natural, Sandy CLAY, tan, slightly moist, minor gravel, rounded to 5mm sand content decreasing colour change cream
		0	1.5		Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse
		0.4	2.0		END OF HOLE
			2.5		
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Auger surface to 400mm

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 5

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole — **Length:** 2.4 m

Equipment: Pushtube/Relief Auger — **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
	0.05				ASPHALT
	BUS5-A				Gravelly SAND, pink tan, gravel angular to 15mm, sand variable fine to very coarse
					sand and gravel not as coarse, cream
					colour change tan
	0.45	3.2	0.5		CLAY, brown, slightly moist, firm
	BUS5-B				
					colour change orange brown
	0.80	0.6	1.0		
					colour change tan
		2.0	1.5		
					CLAY, light grey / green, moist, stiff, black specks
		1.7	2.0		
		0.4			
			2.5		END OF HOLE
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Pushtube refusal
Relief auger to 400mm

Natural, above material in this section is reworked with overlying sand

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 6

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole — **Length:** 3.0 m

Equipment: Pushtube/Relief Auger — **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:	Remarks:
					ASPHALT	
	0.15				Gravelly Cobbly SAND, light grey and tan, slightly moist, gravel is subangular to 30mm, cobbles are subangular to 50mm	
	BUS6-A BUS6-AA				CLAY, brown, slightly moist, firm	
	0.55	1.7	0.5			
	BUS6-B				colour change tan, moist	Natural
	0.85				becoming sandy clay	
		0.4	1.0			
		0.4	1.5		Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse grained	
					CLAY, light grey/green, moist, stiff, black specks	Thin layer sand rich clay
		0.7	2.0			Thin layer sand rich clay
	2.05					
	BUS6 C	0.7	2.5			
	2.50					
		0.2	3.0			

END OF HOLE

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 7

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole — **Length:** 3.0 m

Equipment: Pushtube/Relief Auger — **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
	0.25				Gravelly Cobbly SAND, light grey and tan, slightly moist, gravel is subangular to 30mm, cobbles are subangular to 50mm
	BUS7-A BUS7-AA BUS7-AA	2.2	0.5		CLAY, brown, slightly moist, firm
	0.6				
	BUS7-B				colour change tan, moist becoming Sandy CLAY
	1.0	0.5	1.0		
		0.8	1.5		Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse grained
		0.4	2.0		CLAY, light grey/green, moist, stiff, black specks
	2.2				
	BUS7-C	0.4	2.5		
	2.6				
		1.6	3.0		

END OF HOLE

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Pushtube refusal
Relief auger to 500mm

Natural, above in section appears to be reworked natural

Layer sand rich material to 2.4

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 8

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole — **Length:** 2.4 m

Equipment: Pushtube/Relief Auger — **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
	0.05				ASPHALT
	BUS8-A				Gravelly SAND, orange tan, slightly moist, gravel subangular to 15mm, sand variable fine to coarse
	0.5	1.3	0.5		
	BUS8-B				CLAY, brown, slightly moist, firm
	0.75				
		0.6	1.0		Sandy CLAY, cream tan, slightly moist
		0.3	1.5		Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse grained
		0.7	2.0		CLAY, light grey/green, moist, stiff, black specks
		1.9	2.5		END OF HOLE
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Reworked natural
Natural
0.75m limestone layer

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 9

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole — **Length:** 2.1 m

Equipment: Pushtube/Relief Auger — **Width:** mm

Remarks:

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
	0				Topsoil, SAND, dark brown, moist, bark chips throughout
	BUS9-A 0.3				Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
	BUS9-B 0.6	0.4	0.5		Natural, CLAY, orange brown, slightly moist colour change tan, minor gravel
		0.6	1.0		colour change grey green silt and gravel in layer
		0.1	1.5		CLAY, light grey green with orange brown patches, stiff, slightly moist
		0.0	2.0		
					END OF HOLE
			2.5		
			3.0		

END OF HOLE

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 10

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole **Length:** 2.4 m

Equipment: Pushtube/Relief Auger **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
	0.15				ASPHALT
	BUS10-A	3.0	0.5		Gravelly SAND, pink tan, slightly moist, sand variable fine to very coarse, gravel subangular to 15mm colour change to tan
	0.65				Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
	BUS10-B	0.8	1.0		Natural, Sandy Silty CLAY, cream, dry, sand medium to coarse grained sand content and grain size decreasing down section
	1.1	0.9	1.5		CLAY, light green grey with black specks, moist, stiff
		0.6	2.0		
			2.5		END OF HOLE
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INOICATES ROCK
- INDICATES CLAY
- INOICATES GRAVEL

Pushtube refusal @ 200mm
Relief auger to 350mm

END OF HOLE

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 11

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole **Length:** 2.1 m

Equipment: Pushtube/Relief Auger **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
					Gravelly SAND, dark grey and tan, slightly moist, gravel subangular to 30mm, sand variable fine to very coarse
					colour change tan
					colour change tan / pink
	0.4				
		1.5	0.5		Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
	BUS11-A				
	0.75				
					Natural, Sandy Silty CLAY, cream tan, dry, sand medium to coarse grained
	BUS11-B	0.7	1.0		colour change light cream tan
					sand content and grain size decreasing down section
	1.15				
					colour change light cream tan with brown patches
		0.7	1.5		
					CLAY, light green grey with black specks, moist, stiff
		0.7	2.0		
					END OF HOLE
			2.5		
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Push tube refusal @ 300mm
Auger relief drilling to 400mm

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 12

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole **Length:** 2.4 m

Equipment: Pushtube/Relief Auger **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
	0.05				ASPHALT
	BUS12-A BUS12-AA BUS12-AA				Gravelly SAND, light grey / cream tan, slightly moist, sand variable fine to very coarse, gravel subangular to 15mm colour change tan
		0.2	0.5		Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
	0.65				CLAY, orange brown, slightly moist
	BUS12-B				colour change tan
	1.0	0.0	1.0		dry
		0.6	1.5		Sandy Silty CLAY, cream tan, orange brown flecks, dry, sand medium to coarse grained
		0.0	2.0		
		0.0	2.5		END OF HOLE
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Auger to 400mm

Natural @ 0.7m - material above in this section appears to be reworked natural material

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 13

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole **Length:** 2.4 m

Equipment: Pushtube/Relief Auger **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
					Gravelly SAND, tan, slightly moist, sand variable fine to very coarse, gravel subangular to 15mm
	0.35				
		0.6	0.5		colour change orange / tan
	BUS13-A				
					colour change yellow / cream
	0.75				
					Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
	BUS13-B	0.7	1.0		CLAY, tan, dry, firm, minor fine grained sand, minor gravel to 20mm
	1.15				Natural, Sandy Silty CLAY, cream tan, dry, sand fine to medium
		1.0	1.5		sand content and grain size decreasing down section
		0.6	2.0		CLAY, light green grey with black specks, moist, stiff
		0.4			END OF HOLE
			2.5		
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Minor gravel layer subangular to 8mm

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No.
BUS 14

maunsell

Job no: 40032004.00
Date: 18/8/2004
Logged: SDG
RL Surface:
Datum:

Excav. Type: Borehole — **Length:** 2.1 m
Equipment: Pushtube/Relief Auger — **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
					Gravelly SAND, cream, slightly moist, sand variable fine to very coarse, gravel subangular to 15mm
	BUS14-A	1.0	0.5		
	BUS14-B	1.2	1.0		Natural, Silty CLAY, cream tan, dry, minor fine grained sand
		0.3	1.5		
		0.9	2.0		CLAY, light green grey with black specks, moist, stiff
			2.5		END OF HOLE
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Sand fine to medium predominantly

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No.
BUS 15

maunsell

Job no: 40032004.00
Date: 18/8/2004
Logged: SDG
RL Surface:
Datum:

Excav. Type: Borehole — **Length:** 2.4 m
Equipment: Pushtube/Relief Auger — **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
	BUS15-A				Gravelly SAND, tan, slightly moist, sand variable fine to very coarse, gravel subangular to 15mm colour change cream tan
		0.4	0.5		Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
					Natural, Sandy Silty CLAY, orange tan, dry, sand medium to coarse, minor gravel subrounded to 4mm
	BUS15-B				
		0.8	1.0		CLAY, light green cream, dry
					colour change light green grey moist, hard
		0.10	1.5		
		1.1	2.0		
			2.5		END OF HOLE
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INOICATES SAND
- INOICATES ASPHALT/CONCRETE
- INOICATES ROCK
- INOICATES CLAY
- INOICATES GRAVEL

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 16

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole **Length:** 3.00 m

Equipment: Pushtube/Relief Auger **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
					Gravelly SAND, tan, slightly moist, sand variable fine to very coarse, gravel subangular to 15mm
					colour change cream
					colour change tan
		0.8	0.5		
					colour change light pink cream
		0.8	1.0		
	BUS16-A				Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
					ROCK, schist, black
					Natural, CLAY, tan, dry, firm, minor fine grained sand, minor gravel to 20mm
	BUS16-B				Sandy Silty CLAY, cream tan, dry, sand medium to coarse grained
		1.1	1.5		sand content and grain size decreasing down section
					colour change cream
		0.9	2.0		
					CLAY, light green grey with black specks, moist, stiff
		0.0	2.5		
		0.0	3.0		

END OF HOLE

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 17

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole **Length:** 3.3 m

Equipment: Pushtube/Relief Auger **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
					Gravelly SAND, tan, slightly moist, sand variable fine to very coarse, gravel subangular to 15mm
		0.8	0.5		Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
	BUS17-A				CLAY, brown, dry, firm, minor fine grained sand, minor gravel to 20mm
					Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
		0.9	1.0		CLAY, brown, dry, firm, minor fine grained sand, minor gravel to 20mm colour change tan
	BUS17-B				Sandy Silty CLAY, cream tan, dry, sand medium to coarse grained
		1.2	1.5		sand content and grain size decreasing down section
		0.0	2.0		colour change light cream tan
		0.0	2.5		CLAY, light green grey with black specks, moist, stiff
		0.0	3.0		

END OF HOLE

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Possibly reworked natural

Natural

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 19

maunsell

Job no: 40032004.00

Date: 18/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole — **Length:** 2.4 m

Equipment: Pushtube/Relief Auger — **Width:** mm

Remarks:

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
					Gravelly SAND, tan, slightly moist, sand variable fine to very coarse, gravel subangular to 15mm
	BUS19-A	0.6	0.5		Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
	BUS19-B				Natural, CLAY, orange brown, slightly moist
		0.0	1.0		colour change tan
					Gravelly Sandy CLAY, cream tan, slightly moist, gravel is subangular to 10mm, sand is fine to medium grained
		0.4	1.5		Sandy Silty CLAY, cream tan, moist, sand medium to coarse grained
		0.0	2.0		sand decreasing through layer
		0.0			
			2.5		END OF HOLE
			3.0		

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 20

maunsell

Job no: 40032004.00

Date: 19/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole **Length:** 2.4 m

Equipment: Pushtube/Relief Auger **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
	BUS20-A BUS20-AA BUS20-AA				Gravelly SAND, tan, slightly moist, sand variable fine to very coarse, gravel subangular to 15mm
		0.6	0.5		Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse
	BUS20-B				Natural, CLAY, orange brown, slightly moist
		0.5	1.0		dry
		1.1	1.5		colour change, lightening
		1.4	2.0		CLAY, light grey / green, dry, red flecks, moist, stiff
		0.6	2.5		END OF HOLE
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Augered to 500mm then pushtube

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. BUS 21

maunsell

Job no: 40032004.00

Date: 19/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole — **Length:** 2.1 m

Equipment: Pushtube/Relief Auger — **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
					Gravelly SAND, tan, slightly moist, sand variable fine to very coarse, gravel subangular to 15mm
	BUS21-A	1.1	0.5		Gravelly Sandy CLAY, brown, slightly moist, gravel subangular to 5mm, sand variable fine to coarse, brick and glass fragments
					Natural, Calcrete in layer, hard, pink
	BUS21-B				Sandy CLAY, cream orange, dry, sand is medium to coarse
		1.2	1.0		colour grading to light grey, brown
		1.1	1.5		CLAY, light grey / green, slightly moist
					root material in layer
		0.9	2.0		
					END OF HOLE
			2.5		
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES CALCRETE

Auger to 400mm

Grading into CLAY

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No.
BUS 22

maunsell

Job no: 40032004.00
Date: 19/8/2004
Logged: SDG
RL Surface:
Datum:

Excav. Type: Borehole — **Length:** 2.1 m
Equipment: Pushtube/Relief Auger — **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					15mm ASPHALT 10mm SAND
					CONCRETE, crushed by auger
	BUS22-A	1.0	0.5		Gravelly SAND, crushed brick, gravel is brick and subrounded stone
	BUS22-B				Natural, Silty Sandy CLAY, grey / green, slightly moist
		0.6	1.0		sand decreasing
		0.3	1.5		CLAY, grey green, moist, red tan specks
		0.5	2.0		
			2.5		END OF HOLE
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Auger to 600mm

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. **BUS 22 (failed)**

maunsell

Job no: 40032004.00

Date: 19/8/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Borehole — **Length:** 0.5 m

Equipment: Pushtube/Relief Auger — **Width:** mm

Water	Samples/ Tests	PID Tests (ppm)	Depth (m)	Graphic Log	Material Description:
					ASPHALT
					Gravelly SAND, grey green, slightly moist, gravel subangular to 10mm, sand variable fine to coarse
					Sandy Gravelly CLAY, slightly moist, grey brown, gravel is crushed rock and brick, variable form, sand medium to coarse
		1.1	0.5		
					REFUSAL
			1.0		
			1.5		
			2.0		
			2.5		
			3.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INOICATES CLAY
- INDICATES GRAVEL

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. MW 5

maunsell

Job no: 40032004.00

Date: 23/8 & 25/8/2004

Logged: SDG

RL TOC: 43.171 m

Datum: AHD

Excav. Type: Bore Hole — **Length:** 20.3 m

Equipment: Solid Auger — **Width:** mm

Water	Samples/ Tests	GW Bore	Depth (m)	Graphic Log	Material Description:	Remarks:
			Concrete		ASPHALT	
					Gravelly Cobbly SAND, light grey and tan, slightly moist, gravel subangular to 30mm, cobbles subangular to 50mm	
			Bentonite			
			1.0		CLAY, brown, slightly moist, firm	
			2.0		Sandy Silty CLAY, slightly moist, cream, sand is fine to medium	
			3.0		CLAY, light grey / green slightly moist, stiff, red streaks, minor very fine sand	Drilling under own weight
			4.0		CLAY, light grey / green slightly moist, stiff, red streaks, minor very fine sand	
			5.0		CLAY, light grey / green slightly moist, stiff, red streaks, minor very fine sand	
			6.0		CLAY, light grey / green slightly moist, stiff, tan and red streaks, minor very fine sand	

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Note: original in colour

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. MW 5 cont.

maunsell

Job no: 40032004.00

Date: 23/8 & 25/8/2004

Logged: SDG

RL Surface: 43.171 m

Datum: AHD

Excav. Type: Bore Hole — **Length:** 20.3 m

Equipment: Solid Auger — **Width:** mm

Water	Samples/ Tests	GW Bore	Depth (m)	Graphic Log	Material Description:
			Bentonite		
			7.0		CLAY, light grey / green slightly moist, stiff, red streaks, minor very fine sand
			8.0		CLAY, light grey / green slightly moist, stiff, increasing red streaks, minor very fine sand
			9.0		Sandy CLAY, red brown, sand medium to coarse, slightly moist, stiff
			Concrete		
			10.0		Sandy CLAY, red brown, sand medium to coarse, slightly moist, stiff
			11.0		CLAY, red brown, slightly moist, slightly softer
			12.0		CLAY, red brown, slightly moist, slightly softer, red decreasing to light grey / green

Remarks:

Key To Graphic Log

- INOICATES SILT
- INDICATES SAND
- INOICATES ASPHALT/CONCRETE
- INOICATES ROCK
- INOICATES CLAY
- INOICATES GRAVEL

Note: original in colour

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. MW 5 cont.

maunsell

Job no: 40032004.00

Date: 23/8 & 25/8/2004

Logged: SDG

RL Surface: 43.171 m

Datum: AHD

Excav. Type: Bore Hole **Length:** 20.3 m

Equipment: Solid Auger **Width:** mm

Water	Samples/ Tests	GW Bore	Depth (m)	Graphic Log	Material Description:	Remarks:
		Concrete				
			13.0		CLAY, light grey / green predominates over red, slightly moist, very slightly softer	
			14.0		CLAY, light grey / green, slightly dryer	
		Bentonite				
			15.0		SAND, grey tan, slightly moist, sticky, sand medium to coarse	Very soft drilling
		Added Sand				
			16.0		Clayey SAND, grey tan, slightly moist, sand medium to coarse grained	
		Screen			grading into SAND, grey tan, wet, medium to coarse grained	Drilling suspended 23/8 continued 25/8
▼ Standing		Collapsed Sand	17.0			
			18.0		grading into SAND, grey tan, wet, medium to coarse grained	Evidence of collapse

Key To Graphic Log

- INDICATES SILT
- INOICATES SAND
- INDICATES ASPHALT/CONCRETE
- INOICATES ROCK
- INOICATES CLAY
- INOICATES GRAVEL

Note: original in colour

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. MW 5 cont.

maunsell

Job no: 40032004.00

Date: 23/8 & 25/8/2004

Logged: SDG

RL Surface: 43.171 m

Datum: AHD

Excav. Type: Bore Hole

Equipment: Solid Auger

Length: 20.3 m

Width: mm

Water	Samples/ Tests	GW Bore	Depth (m)	Graphic Log	Material Description:
		Collapsed Sand			
		Screen	19.0		grading into SAND, grey tan, wet, medium to coarse grained
		End Cap			
			20.0		grading into SAND, grey tan, wet, medium to coarse grained hard drilling - end of hole presume sandstone
					END OF HOLE
			21.0		
			22.0		
			23.0		
			24.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Note: original in colour

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. MW 6 (A)

maunsell

Job no: 40032004.00

Date: 24/08/2004

Logged: SDG

RL Surface:

Datum:

Excav. Type: Bore Hole — **Length:** m

Equipment: Solid Auger — **Width:** mm

Water	Samples/ Tests	GW Bore	Depth (m)	Graphic Log	Material Description:
			0.0		ASPHALT
					Gravelly SAND, light grey cream, slightly moist, gravel angular to 15mm, sand variable fine to very coarse
			1.0		Sandy CLAY, tan / brown, very soft, sand fine, moist
			2.0		Sandy CLAY, tan / brown, very soft, sand fine, wet
			3.0		CLAY, olive grey, slightly moist, firm
			4.0		
			5.0		
			6.0		

Remarks:

Key To Graphic Log

- INDICATES SILT
- INOICATES SAND
- INOICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Water intercepted, sitting on firm clay
Final depth of hole was 5.01m
Standing water level 1.82m

Hole abandoned

Note: original in colour

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. MW 6 (B)

maunsell

Excav. Type: Bore Hole | **Length:** 22.0 m

Equipment: Solid Auger | **Width:** mm

Job no: 40032004.00

Date: 24/08/2004

Logged: SDG

RL TOC: 43.151 m

Datum: AHD

Water	Samples/ Tests	GW Bore	Depth (m)	Graphic Log	Material Description:
			Concrete		ASPHALT
					Gravelly SAND, light grey cream, slightly moist, gravel angular to 15mm, sand variable fine to very coarse
			Bentonite		
			1.0		Sandy CLAY, slightly moist, tan, minor gravel rounded to 5mm
			2.0		Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, orange and brown flecks
			3.0		Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks
			4.0		Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red and tan streaks
			5.0		CLAY, light grey / green, slightly moist, stiff, no streaks
			6.0		CLAY, light grey / green, slightly moist, stiff, tan and red streaks

Remarks:

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Sample from auger

Note: original in colour

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. MW 6 (B) cont.

maunsell

Job no: 40032004.00

Date: 24/08/2004

Logged: SDG

RL Surface: 43.151 m

Datum: AHD

Excav. Type: Bore Hole — **Length:** 22.0 m

Equipment: Solid Auger — **Width:** mm

Water	Samples/ Tests	GW Bore	Depth (m)	Graphic Log	Material Description:
					Bentonite
			7.0		CLAY, light grey / green, slightly moist, stiff, tan and red streaks
			8.0		CLAY, light grey / green, slightly moist, stiff, tan and red streaks, appears to have small damp pocket but is believed to have orginiated from auger
			9.0		CLAY, light grey / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets
					Concrete
			10.0		Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained
			11.0		CLAY, light grey / green, stiff, slightly moist
			12.0		CLAY, tan, light grey / green, stiff, slightly moist

Remarks:

Key To Graphic Log

- INOICATES SILT
- INDICATES SANO
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Note: original in colour

ENVIRONMENTAL LOG

Maunsell Australia Pty Ltd
Level 6, 100 Pirie Street
Adelaide, S.A. , 5000

Client: Adelaide City Council

Project: Central West Precinct

Location: Franklin St Bus Station and Carparks

Bore No. MW 6 (B) cont.

maunsell

Job no: 40032004.00

Date: 24/08/2004

Logged: SDG

RL Surface: 43.151 m

Datum: AHD

Excav. Type: Bore Hole | **Length:** 22.0 m

Equipment: Solid Auger | **Width:** mm

Water	Samples/ Tests	GW Bore	Depth (m)	Graphic Log	Material Description:	Remarks:
		Concrete				
			13.0		CLAY, tan, light grey / green, stiff, slightly moist	
			14.0		CLAY, tan, light grey / green, stiff, slightly moist	
		Bentonite				
			15.0		Sandy CLAY, olive (consistent colour), slightly moist, sand medium grained	Minimal recovery from here on
			16.0		Clayey SAND, yellow tan, slightly moist, sticky, sand medium to coarse	
		Added Sand				
			17.0		grading into SAND, cream, wet, medium to very coarse sand, evidence on auger suggests near 17 - 17.5	
		Screen				
Standing						
		Collapsed Sand			Hole collapsed approximately 1m on extraction at this point	
			18.0			

Key To Graphic Log

- INDICATES SILT
- INDICATES SAND
- INDICATES ASPHALT/CONCRETE
- INDICATES ROCK
- INDICATES CLAY
- INDICATES GRAVEL

Note: original in colour