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Admin. Office: **Contaminated Land Unit, Southern Region**

Project No: 335964 40809

Client No: 635201

EMR/CLR ID No: 2692
2693

Permit No: CLEA00039809

Ecoaccess Customer Service Unit

CROW No. 11307

Application for Assessment of a Site Investigation Report (Contaminated Land) Checklist

Date Received:

25/8/09

Date Application Deemed Valid:

25/8/09 7/9/09

Due Date (20 Business Days
After Application Deemed
Valid):

22/9/09 6/10/09

Due Date for report that has had
a Third Party Review (5 Business
Days after received): This applies
to sites requesting removal from
the Register.

1/1/09
(If TPR recommends an SMP refer
to Contam Land ASAP!)

Due Date for Decision of IPA Application
(20 Business Days):

1/1/09

Third Party Reviewer:

Applicant Name: Philip Usher Construction P/L

Contact: Glen Flew

Location: 320-324 Vulture St, Kangaroo

Coordinator: Nathan Sivil

Receipt details: Fees correct ☒ N/A ☐

Receipt No: IN214630 Date: 25/8 /2009

Amount Paid \$ 2096.00

Receipt sent to client Yes ☐ No ☐

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Cheque No:

Drawer (if other than the applicant):

COST CENTRE/CODE:

Record of consultation

Applicant name:

Date	Person Contacted:		Phone No:	
	Information Requested:			
	Response:			
	Ecoaccess CSU Staff:			

Date	Person Contacted:		Phone No:	
	Information Requested:			
	Response:			
	Ecoaccess CSU Staff:			

Date	Person Contacted:		Phone No:	
	Information Requested:			
	Response:			
	Ecoaccess CSU Staff:			

Date	Person Contacted:		Phone No:	
	Information Requested:			
	Response:			
	Ecoaccess CSU Staff:			

ASSESSMENT REPORT- SUMMARY

Decision: : **Assessment of an Investigation Report**
Section: : **s.384, Environmental Protection Act 1994**
Applicant : **Gary Gough**
Site Owner : **Phillip Usher Constructions Pty Ltd**
Property details : **Lots 9 & 10 RP 114612 and Lot 1 RP 11190**
Site Location : **320-324 Vulture Street**
54 Mark Lane, Kangaroo Point
Consultant : **Australis Contract Engineering Pty Ltd**
FILE : **BNE 8920**

Background:

Garry Gough of Australis Contract Engineering Pty Ltd has lodged an application and a site investigation report in relation to a site bounded by Vulture Street, Lahey Lane and Mark Lane in Kangaroo Point, Brisbane. The site consists of the following properties;

Lots 9 & 10 on RP 114612; and
Lot 1 on RP 11190

The land is proposed for a high density (high rise) residential development.

Site History:

The site consists of three parcels of land and has been used in the past for;

- A service station including two workshops
- A limited industrial use including a bus garage, a furniture production business, salt lick distribution business, for an upholstery business and metal finishing activity

Due to the past activities some parcels are listed on the EMR as follows;

- Lot 9 RP 114612 listed on EMR due to notifiable activity, service station
- Lot 10 RP 114612 listed on EMR due to notifiable activity service station, metal treatment and coating
- Lot 1 on RP 11190 is not listed on EMR

Investigations

The preliminary investigation carried out by Australis Contract Engineering Pty Ltd has found that the site has been used for a service station and other medium industry activities as listed above.

The area is zoned 'Light industrial' and the surrounding land uses are residential and commercial. The investigation included limited soil tests at target locations. Soil samples have been taken from eleven locations.

The site consists (for the main part) of fill material containing ash and gravel and is underlain by bedrock at the average depth of 4m below ground level. No groundwater has been encountered during drilling for soil samples.

It appears that some of the structures (fuel storage tanks) have been removed. However, buildings, other storage tanks and bowzers still exist on the site.

Contamination:

The summary of site investigation is;

- TPH contaminated soil is confined to the vicinity of the tank farm and bowser area (south and south eastern section of the property).
- There were minor exceedences of the EIL for copper and zinc.
- There was one high lead value (1450 mg/kg) near the former service station.
- Groundwater was not encountered during drilling for soil samples up to the depths of 4m. It is estimated that the depth to water level is around 9m BGL.

The report recommends that a second study be conducted to delineate the extent of hydrocarbon and lead contamination, and the site is suitable for the proposed level D (high rise residential) development.

Conclusions and recommendations:

Based on the investigation results, the report titled "*Environmental Site Assessment for 320-324 Vulture Street and 54 Mark Lane, Kangaroo Point*" prepared by Australis Contract Engineering Pty Ltd dated 29 November 2002, recommends that the site is suitable for high rise multi unit residential development (Level D). The above recommendations are supported. However, conditions will need to be imposed on the development so that the USTs, pipe works and other structures are removed from the site and further testing is carried out once the site is cleared. A SMP and a RAP are also needed for the site.

It is recommended that the attached notice be issued to the applicant and the owner informing of the above decision under s. 384 of the *EPAct*.

sch 4 - signature

Kapila R Bogoda
Principal Environmental Officer
Contaminated Land Unit

ENVIRONMENTAL SITE ASSESSMENT

for

**320-324 VULTURE STREET
and
54 MARK LANE
KANGAROO POINT**

Report Prepared For:

Phillip Usher Constructions Pty Ltd

Date: 29 November 2002

Australis Contract Engineering Pty Ltd



DOCUMENT CONTROL SHEET

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PROJECT DETAILS

Title:	Environmental Site Assessment for 320-324 Vulture Street and 54 Mark Lane, Kangaroo Point
Client:	Philip Usher Constructions Pty Ltd
Client Contact:	Mr George Turner
Synopsis:	A study was undertaken to assess the environmental integrity of the site with respect to potential contaminants identified during the site history investigation.

REVISION/CHECKING HISTORY

REVISION NUMBER	DATE	PRODUCED BY	APPROVED BY
PR004	28/11/02		G Gough
PR005	13/12/02		G Gough

DISTRIBUTION

DESTINATION	COPIES		
Revision Number	PR004	PR005	
Philip Usher Constructions Pty Ltd	1 (electronic)	1	
File	1	1	
EPA		1	

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List of Abbreviations Commonly Used in Environmental Site Assessment Reports

Acronym	Definition
ANZECC	Australia New Zealand Environment Conservation Council
AST	Aboveground Storage Tank
BH	Bore Hole
BTEX	Benzene, Toluene, Ethyl-benzene and Xylene
CSR	Contaminated Sites Register
EPA	Environmental Protection Agency
EMR	Environmental Management Register
ESA	Environmental Site Assessment
HRA	Health Risk Assessment
MAH	Monocyclic Aromatic Hydrocarbon
mBGL	metres Below Ground Level
MW	Monitoring Well
NEHF/SAHC	National Environmental Health Forum/South Australian Health Commission
PAH	Polycyclic Aromatic Hydrocarbon
PID	Photoionisation Detector
PULP	Premium Unleaded Petrol
SMP	Site Management Plan
TIT	Triple Interceptor Trap
TP	Test Pit
TPH	Total Petroleum Hydrocarbon
UST	Underground Storage Tank
VOC	Volatile Organic Compound

Executive Summary

Australis Contract Engineering Pty Ltd (Australis) was commissioned by Philip Usher Constructions Pty Ltd (Philip Usher) to undertake an Environmental Site Assessment (ESA) of the properties located at 320-324 Vulture Street and 54 Mark Lane, Kangaroo Point, Brisbane. The purpose of these works was to assess the environmental integrity of the site with respect to potential petroleum hydrocarbons, metals and cyanide contamination. It is proposed to develop the site for high-density (high rise) residential use. Site investigation works were conducted on 31 October 2002.

The site infrastructure currently consists of:

- a service station building including two workshops, one bowser, six USTs and associated underground pipework;
- a shed which historically has been used for limited industrial purposes including a (two) bus garage, a furniture production business, and salt lick distribution business;
- a second shed which historically housed an upholstery business, and later an above-ground 0.5m³ metal finishing bath reportedly used for the brass plating of small objects; and
- a two story building previously used as an office and later for an upholstery business.

Two of the three site properties intended for development ie Lots 9 and 10 on RP 114612 are currently on the Environmental Protection Agency's Environmental Management Register due to notifiable activities (metal finishing and service station activities respectively) having been conducted on site.

Based on the investigation data and on the premise that the site is to be used for high rise residential purposes with minimal exposure to soils, the following conclusions can be made with respect to the ESA:

- petroleum hydrocarbon impacts to soil in excess of EPA Environmental Investigation Levels (EIL's) and Health Investigation Levels (HIL's) were reported in soil sampled from S7 and S8A (eastern UST area). For S7 the results were 149 mg/kg (C₆-C₉) and 303 mg/kg (C₁₀-C₁₄), 120 mg/kg (C₁₀-C₁₄) for S8A.
- soil impact from TPH is confined to the vicinity of the tankfarm and bowser area and at depths of around 1 to 2 mBGL;
- there were no exceedences for:
 - benzene or total BTEX EIL's;
 - Benzo(a)pyrene or total PAH's at ash (fill) sites tested.
- there were minor exceedences of:
 - the copper EIL (60 mg/kg) at boreholes S1, S7 and S11 of 112, 82 and 60 mg/kg respectively.
 - the zinc EIL (200 mg/kg) at boreholes S1, S3 and S9 of 297, 331 and 257mg/kg respectively;
- There was one exceedence for the lead HIL (300 mg/kg) at borehole S11 of 1450mg/kg.

Groundwater was not encountered during drilling works down to 4 mBGL. DNRM advised that there were no known water bores recorded on the Groundwater Database anywhere close to this area. It was further stated that no bores had been sighted anywhere close to this area and that it was estimated that groundwater may be present at around 9 mBGL.

Recommendations

Based upon the outcome of the site assessment, the following recommendations are made:

1. Conduct a second limited study to delineate:
 - the extent of the hydrocarbon contamination at the eastern UST area.
 - the extent of the lead impact at S11.
2. Based upon the level D development proposed, that no action be taken regarding the remaining EIL exceedences given their minor nature.

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1. Introduction

Australis Contract Engineering Pty Ltd (Australis) was commissioned by Philip Usher Constructions Pty Ltd (Philip Usher) to undertake an Environmental Site Assessment (ESA) at the site located at 320-324 Vulture Street and 54 Mark Lane, Kangaroo Point, Brisbane (the site).

1.1 Project Purpose

The purpose of these works was to assess the environmental integrity of the site with respect to potential contaminants identified during the site history investigation.

1.2 Project Objectives

The objective of this work was to provide the current environmental condition of soil and groundwater (where encountered) by targeting potential contaminant source areas across the site, specifically with respect to hydrocarbons, metals and cyanide.

1.3 Scope of Works

Specifically the scope consisted of the following:

- Conducting a preliminary meeting with the EPA to discuss the site history and accordingly negotiate a sampling plan and general project approach;
- contacting the Brisbane City Council to ascertain tank locations and details where available;
- drilling of six soil boreholes (on-site) to a maximum depth of 4 metres below ground level (mBGL) within the service station area of the site;
- drilling of five soil boreholes (on-site) to depths of up to 1.1 mBGL in non service station areas of the site;
- undertaking selected sampling of soils for laboratory analysis for total petroleum hydrocarbons (TPH), benzene, toluene, ethyl benzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), heavy metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc and mercury), and cyanide; and
- preparation of an ESA report suitable for submission to the EPA.

2. Site Description

Information regarding the site was gained through on-site observations made by Australis personnel, plans of the service station supplied by the Brisbane City Council, the site history report,¹ and the client.

2.1 Site Location

The project site is located at Lots 9 and 10 on RP 114612 and Lot 1 on RP 11190. The registered owner of the former two properties is Philip Usher (Title References 14249067, 13465072). The property on Lot 1 on RP11190 is owned by the Brisbane City Council and is currently being purchased by Philip Usher.

The local area map is presented as Figure 1. The locations of the properties are shown in Figure 2.

2.2 Site Title & Zoning

The relevant certificates of title are shown in Appendix A. The site is zoned for light industrial.

2.3 Surrounding Land Uses

The project site is located in an area that is characterised by residential and commercial property uses. The following land uses were noted to border the site:

- Mark Lane to the north with St Joseph's Catholic Primary School lying further to the north;
- a residential property located east of Lot 1 on RP 11190;
- a property belonging to the Russian Orthodox Church (property currently used for car parking) to the east of Lot 9 on RP114612;
- Vulture Street to the south with the Goprint government offices lying further to the south; and
- Lahey Lane to the west with the Commonwealth Bank Clearing House located further west of Lahey Lane.

No evidence of visual impacts to the neighbouring area from subject site activities was observed.

In terms of natural drainage, the land has a moderate slope towards the south ie towards Vulture Street with a slight slope running from west to east towards Main Street.

2.4 Site layout

The site layout is also shown in Figure 2. As can be seen, there exists:

- a service station building including two workshops (referred to here as the northern and eastern workshops) and sales office, one bowser, six USTs and associated underground pipework;
- a shed which historically has been used for limited industrial purposes including a (two) bus garage area, a furniture production business, and salt lick distribution business;
- a second shed which historically housed an upholstery business, and later an above ground 0.5m³ metal finishing bath reportedly used for the brass plating of small objects; and
- a two story building previously used as an office and later for an upholstery business.

Photos of the site buildings are shown in Appendix B (refer Photos 1 to 5).

2.5 Site Infrastructure

2.5.1 Site Water Management System

A plan of the on-site water management system is also shown in Figure 2. As can be seen, drain 1, an open cement-lined drain, collects roof stormwater from building 1 as well as stormwater from drains located on the western sides of the building. In the event of any loss of containment, this drain would collect any spillages. Drain 1 flows in an easterly direction where it discharges into a collection drain. This drain is shown in Photo 6, Appendix B.

Drain 2, also an open cement lined drain, similarly picks up roof stormwater from building 4 and any losses of containment from this building (although the floor is essentially bunded). Drain 2 also collects stormwater and wastewater from the western side of the garage's northern workshop. It should be noted that a portable interceptor operated in this workshop prior to site closure. Drain 2 also flows in an easterly direction where it discharges into a collection drain as per drain 1.

A large diameter stormwater pipe or sewer line, running north to south on properties Lot 1 on RP11190 and Lot 2 on RP11190, was reported in the site history to pick up the drains 1 and 2 where it is assumed to direct flow to a tie-in point on Vulture Street.

No interception drains were observed to exist at the southern boundaries of the service station site. A stormwater collection pit is located at the extreme south eastern corner of the site as shown in Figure 2. A bitumen bund exists along the southern boundary which directs stormwater and any spill materials to this drain.

2.5.2 Site Service Station

At the time of the field works the site was non-operational. Information supplied by the Brisbane City Council's Department of Development and Regulatory Services was used to help establish the service station infrastructure. The only available plan of the site infrastructure was dated to sometime between 1970 and 1975 (based upon the site history report) when Solo Oil Australia Pty Ltd occupied the site. Reportedly², no other

plans of this site exist on file. The plan (refer Appendix C), however, is consistent with site observations for the eastern UST's (refer Figure 3) but not for the western UST's where two UST's have been present but have subsequently been removed (the plan only indicates one proposed tank).

Accordingly, the following infrastructure has been identified:

- six USTs and one product pump (bowser) ie the eastern UST's;
- two UST's subsequently removed from the western UST area. It appears that approximately two bowser have been present at some stage. The supply line valving is still visibly present, indicating that the pipework has not been fully removed;
- a sales office which houses two (northern and eastern) workshops. A hoist was historically located in the eastern workshop, later removed and resealed with concrete. The extent of removal is unknown.

Limited tank inventory information is provided in Table 2.1 below.

Table 2.1: Tank Inventory

Tank No.	Tank Type	Capacity (L)	Product	Operational	Approximate Age (years)
1	UST	Unknown#	Super	X	Unknown
2	UST	Unknown#	Super	X	Unknown
3	UST	Unknown#	Unknown**	X ⁺	Unknown
4	UST	Unknown#	Super	X	Unknown
5	UST	Unknown#	Super	X	Unknown
6	UST	Unknown#	ULP	✓	Unknown
7	UST	55,000*	Unknown#	X	Unknown

- ✓ Denotes operational storage tanks with bowser until site closure
 X□ Denotes abandoned storage tank without bowser
 * Based on plans provided by BCC – 'proposed' only was noted on the plan
 + Based on plans provided by BCC – plan noted 'not in use'
 # No details on BCC plan listed
 ** Product not indicated on UST fill cover

A site walkover identified that the external area of the service station site was sealed with bitumen in some locations and concrete (predominantly around the bowser areas – both western and eastern areas) in others. The concrete pavement was generally in good condition. The bitumen pavement condition varied from poor to good with some earthen areas exposed particularly in the area up-gradient of the western bowser area and to a lesser extent down gradient of this area (however the condition of the bitumen at the time when the western bowser(s) operated is unknown). The internal floor area of the northern and eastern workshops was in very good condition with no obvious cracks present.

2.5.3 Other Site Buildings

Details of the previous uses of these buildings are discussed in the site history report¹. It was also indicated here that a UST for diesel may be present (the site owner interviewed was uncertain) in the western end of Building 4. Discussions with the Department of Development and Regulatory Services indicated no record of such a

tank and the historical plan in Appendix B did not indicate such a tank. The site inspection did not indicate any obvious tank infrastructure.

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3. Site Topography, Geology and Hydrogeology

3.1 Topography and Surface Runoff

The site level is greater than 5m Australian Height Datum (AHD) and is rated as possessing a negligible probability of having acid sulphate soils present (Acid Sulphate Soils Tweed Heads to Redcliffe) Map1 Scale 1:100000 DNR 1999).

Site surface run-off will generally flow towards the south/south east following the natural gradient of the site. The site infrastructure which directs surface water flows has been discussed in Section 2.5.1. Potential contamination arising from surface spills would therefore follow the natural site gradient ie to the south/south-east.

3.2 Local Geology

The subject site is situated on the Ipswich coal measures of the Late Triassic Carnian Sub-group of the Mesozoic Group, which mainly consist of ignimbrite, stratified and massive rhyolitic tuff, conglomerate, sandstone, scree breccia. (Department of Mines Brisbane Geological Series, 1985, Brisbane 1:100,000 Sheet 9543)³.

Soil bores undertaken extended to a depth of up to 1.1 mBGL for non service station bores (dependant upon depth of ash where encountered) and up to 4 mBGL for service station bores depending on depth of bedrock present. The near surface lithology encountered during the drilling works varied across the site depending on the location. However, the lithology generally consisted of fill material (consisting of either ash or gravel), and sandy silt or sandy clay up to an approximate depth of 1 mBGL. This material was underlain by brown/orange/grey high plasticity clay to a depth of around 3.5 mBGL. This sequence was underlain by weathered (Brisbane Tuffs) bedrock. A generalised stratigraphic log is presented in Table 3.1. Soil bore logs are presented in Appendix D.

Table 3.1: Generalised Stratigraphic Log

Depth (mBGL)	Lithology
0 – 1.0	FILL: sand, clayey silt, various amounts of gravel. Some ash, black.
1.0 – 3.5	CLAY: brown/orange/grey, moist to dry, very stiff, high plasticity.
3.5 – 4.0	CLAY-WEATHERED ROCK: white/grey.

3.3 Site Hydrology and Hydrogeology

The Groundwater Resources Map of Queensland (1:2,500,00 Hydrological Series, 1987)⁴ indicates that the aquifer-depth is likely to possess a salinity of less than 500-1500mg/L which is suitable for most purposes. The aquifer is expected to be associated with sedimentary strata such as sandstone, shale and conglomerate and yield flows of <5 L/s. However, no groundwater was encountered during site drilling

works up to 4 mBGL. Soils were either dry or moist at these depths but not wet. Discussions were held with the Department of Natural Resources (DNRM)⁵ to ascertain the likelihood of discovering groundwater at the investigation site and the contamination of any groundwater present. DNRM advised that there were no known water bores recorded on the Groundwater Database anywhere close to this area. It was further stated that on numerous visits to various locations within this suburb, that no bores had been sighted by the DNRM. It was further stated that the depth of soil in the project area was low with bedrock (Brisbane Tuffs as seen at Kangaroo Point lookout above the Brisbane River) likely to be encountered at shallow depths. This was verified during this investigation where bedrock was encountered at depths as low as 2.7 mBGL. This sub-surface rock was reported by the DNRM as having very low permeability and porosity properties. Groundwater was indicated to perhaps be present at around 9 mBGL. As discussed later in Chapter 8 of this report, the levels of soil contamination with respect to hydrocarbons is confined to shallow levels of less than 2 mBGL with concentrations of light ends (C₆-C₁₄) less than 303 ppm. Given the nature of the rock ie low porosity and permeability, and the indicative depth of the groundwater, it is unlikely that significant groundwater contamination would have occurred.

As Figure 1 indicates, there are no obvious sensitive groundwater receptors present down-gradient of this immediate area.

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4. Contamination Criteria

To assess the significance of any contamination detected in soil or groundwater during an investigation, it is necessary to define the contaminant criteria used for comparison.

Laboratory analysis results are compared with commonly applied regulatory requirements/criteria for the site's present land use. The contaminant acceptance criteria are usually threshold concentrations of specific contaminants that, if exceeded in a particular soil sample, may pose a health and/or environmental risk and warrant further site specific investigation or risk analysis.

Australis understand the site is to be developed for high-density residential apartments⁶ where the site will be essentially sealed. Therefore it is necessary to ensure that the site assessment criteria for contaminant levels are set in line with the proposed future use of the site.

For all analytes except TPH and BTEX in soil samples where unpublished EPA guidelines are used⁷, Health Based Soil Investigation Levels (HIL's) have been adopted from the National Environmental Protection Measures (NEPM)⁸ as the assessment criteria. Environmental Investigation Levels (EIL's) have been adopted from the EPA Draft Guidelines 1998⁹.

A summary of the assessment criteria for soil is presented in Table 4.1.

Table 4.1: Assessment Criteria for Soil

Analyte	Environmental Investigation Levels (mg/kg)*	Health-Based Investigation Levels (mg/kg) +
TPH C ₆ -C ₉	100 [#]	100 [#]
TPH C ₁₀ -C ₁₄	100 [#]	100 [#]
TPH C ₁₅ -C ₂₈	1000 [#]	1,000 [#]
TPH C ₂₉ -C ₃₆	1000 [#]	1,000 [#]
Total TPH	1000 [#]	1,000 [#]
Benzene	1	1 [#]
Toluene	-	-
Ethyl Benzene	-	-
Xylenes	-	-
Total BTEX	7 [#]	7 [#]
Benzo(a)pyrene	-	4
Naphthalene	-	-
Pyrene	-	-
Total PAHs	-	80
Arsenic	20	400
Cadmium	3	80
Chromium(iii)	50	48%
Copper	60	4,000
Nickel	60	2,400
Lead	300	1,200
Zinc	200	28,000
Mercury	1	60
Cyanide(total)	-	3000

Notes:

- # EPA unpublished guidelines
- + NEPM Health-Based Investigation Levels (HIL level D) unless otherwise stated
- * Draft EPA Guidelines, 1998 unless otherwise stated

5. Site Investigation Works

Site investigation works were conducted on the 31 October 2002 and consisted of:

- an initial site walkover;
- drilling and sampling of soil from eleven soil bores (on-site) to a maximum depth of 4 mBGL;
- establishing borehole logs; and
- conducting a vapour survey for VOC's in soil bores where hydrocarbons may be present.

Bores locations were selected to:

- target possible contaminant areas (i.e. adjacent to product pumps/dispensers and USTs); and
- evaluate the environmental integrity of potential 'hot spot' contaminant areas.

Bore locations are presented in Figure 3.

All field activities were supervised by an environmental engineer responsible for the compilation of the bore logs, and the collection of soil samples. The small amount of cuttings that were generated remained on site.

5.1 Soil Sampling

Drilling was conducted using a solid stem auger with soil samples collected directly from auger bit. Immediately after collection, samples were transferred to a chilled insulated container and transported directly to the analytical laboratories following the completion of a Chain of Custody.

5.1.1 Service Station

Samples from the service station site were obtained from depths of 0.25 mBGL, 0.5 mBGL, 1.0 mBGL and then at 1-metre intervals and/or at areas of visual contamination from each soil bore to a depth of around 4 mBGL where bedrock was encountered. All soil samples were screened for volatile organic compounds (VOCs) using a hand held photo-ionisation detector (PID). A summary of maximum PID readings from headspace analysis and their respective depths recorded during drilling is presented in Table 5.1. All VOC readings for site bores are recorded on the borehole logs shown in Appendix D.

Two soil samples were selected from each bore (based on VOC readings and field observations) and analysed for BTEX and TPH (C₆-C₃₆). Soil samples were also analysed for metals (arsenic, cadmium, chromium, copper, nickel, zinc and mercury).

Table 5.1: Maximum VOC Results for Service Station Site Boreholes S4-S9

Location	Depth (mBGL)	Lithology	PID reading (ppm VOC)
S4	All	Silty clay	0
S5	2.0	Grey-brown clay	20
S5A	1.0	Silty Clay	35.6
S6	0.5	Clay	201
S7	1.0	Clay	32.0
S8	2.0	Fill-ash	12.8
S8A	2.0	Clay	525
S9	All	Clay	0

5.1.2 Non-Service Station Sites

Samples from the remainder of the site were generally obtained from depths up to 0.4 mBGL, or at areas of visual contamination (eg from ash) from each soil bore up to 1.1 mBGL.

5.1.3 Site - General

Two samples from S7-0.1 and S12 300-400 were analysed for PAH's following the identification of ash at these locations. Locations and depths of ash (where observed) are indicated in the borehole logs.

5.2 Groundwater Sampling

The site soil investigation work did not detect the presence of groundwater. Soil samples taken at 4 mBGL (at the lowest AHD point sampled on site at S6 and S8A) were observed to be essentially dry which is consistent with the DNRM advice.

5.3 Analytical Laboratories Used

Primary and duplicate analyses were performed by Australian Laboratory Services (ALS). NATA certified methodologies were used for all analyses and laboratory QA/QC procedures and are described within the laboratory reports.

The ALS laboratories used by Australis are NATA registered.

6. Summary of Results

6.1 Soil Analytical Results

A summary of the soil analytical results with respect to boreholes and assessment criteria is presented in Tables 6.1 (TPH BTEX and PAH's) and 6.2 (selected metals and cyanide). Laboratory reports and chain of custody documentation are presented in Appendix E. Analytical testing of soil samples submitted for laboratory testing reported the following outcomes:

Hydrocarbons

- TPH C₆-C₉ and C₁₀-C₁₄ concentrations of 149 and 303 mg/kg respectively were in excess of both the EPA environmental investigation and health investigation levels of 100mg/kg in soil sampled at borehole S7-1.0 mBGL. The results fall to 4 mg/kg for the C₆-C₉ fraction and < 50 mg/kg for the C₁₀-C₁₄ fraction at 2 mBGL;
- the TPH C₁₀-C₁₄ concentration at bore S8A of 129 mg/kg was in excess of both the EPA environmental investigation and health investigation levels of 100mg/kg in soil sampled at 2.0 mBGL. The concentration fell to 66 mg/kg at 3 mBGL;
- TPH concentrations including total TPH were less than EPA environmental investigation and health investigation levels in all other samples submitted for laboratory testing;
- benzene concentrations were all less than EPA environmental investigation level of 1 mg/kg;
- the total BTEX concentrations were all less than the EPA environmental investigation level of 7 mg/kg;
- Benzo(a)pyrene concentrations were less than the EPA health investigation level of 4mg/kg for all soil samples submitted; and
- total PAH concentrations were well less than the EPA environmental investigation threshold level of 80 mg/kg.

Selected Heavy Metals

- The copper level of 112 mg/kg exceeded the environmental investigation level of 60 mg/kg at S1 0-100mm and at S7-1.0 mBGL (82 mg/kg). The concentrations fell to 16 mg/kg at 300 to 400 mm BGL and 2 mg/kg at 2 mBGL respectively. A value of 60 mg/kg was recorded at S11 0-200 mm. All exceedences were well less than the required health investigation level of 4000 mg/kg for level D development.
- The lead level of 1450 mg/kg exceeded the health investigation level of 300ppm at S11 0-200mm. No further delineation was undertaken in this investigation; and
- Zinc levels exceeded the environmental investigation level of 200ppm at S1 0-100 mm (297mg/kg), S3 0-100mm (331ppm), and at S9-0.5 mBGL (257mg/kg). The

concentrations fell to 26mg/kg at 300 to 400 mm BGL, 107 mg/kg at 300 to 400 mm BGL and 7mg/kg at 2 mBGL respectively. These levels were well less than the 28,000 mg/kg health investigation level.

Cyanide

The cyanide levels recorded were less than or equal to 1 mg/kg LOR. These results are considerably less than health investigation level of 3000 mg/kg (total) required for level D development.

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7. Quality Assurance/Quality Control

Field sampling procedures conformed to Australis QA/QC protocols to prevent cross contamination and preserve the sample integrity.

Soil Sampling and Analysis.

- soil samples were collected in sampling containers appropriate for the selected analyses and provided by the laboratory;
- QA/QC soil analyses equivalent to 10% of the total number of primary analyses were undertaken; and
- field duplicate soil samples (QC3, QC4, and QC5) reported consistent results when compared to the primary samples (S5A-1.0, S2 0-100, and S7-0.1) taking into account variations within the soil profile.

Laboratory Quality Control Results

- all laboratory QA/QC procedures are detailed within the laboratory reports; and
- laboratory QA/QC analyses were within acceptance criteria.

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8. Discussion of Results

Results obtained from the laboratory testing indicate that low level petroleum hydrocarbon impacts have occurred to the soil in the vicinity of the eastern UST area.

Results also indicate a lead hot spot in excess of the HIL near the eastern entrance to northern garage. Metal EIL exceedences were also measured at five locations.

8.1 TPH

TPH (C₆-C₉) and (C₁₀-C₁₄) concentrations of 149 and 303 mg/kg respectively were found to be in excess of both the EPA environmental investigation level (EIL) and health investigation level (HIL) of 100mg/kg at 1.0 mBGL at S7. The concentrations quickly reduced to 4 mg/kg for the C₆-C₉ fraction and <50 mg/kg for the C₁₀-C₁₄ fraction at 2 mBGL. Also the TPH (C₁₀-C₁₄) concentration at S8A of 129mg/kg was found to be in excess of the EIL and HIL of 100mg/kg in soil sampled at 2.0 mBGL. This concentration reduced to 66 mg/kg at 3 mBGL. Boreholes S5A and S6, although concentrations measured were below EPA EIL/HIL levels, also exhibited similar behaviours ie similar elevated fractions at around 0.5 to 1 m BGL reducing to lower levels over 0.5 metres (refer Table 6.1). The above results thus indicate that the impacted area exists approximately in the top 2 m of soil down gradient of the eastern UST's.

As seen from the borehole locations shown in Figure 3, these bores are directly down gradient of the eastern UST and bowser area. The light volatile ends would indicate the presence of petrol as opposed to heavier hydrocarbons such as oils. The presence of light-end petrol fractions may have originated from leaking pipework/tank(s) or spill material which has permeated the soil at some stage. Regarding the latter, the hardstand area around S7 is paved with concrete, currently in very good condition, however the concrete appears reasonably new. The hard-stand area around S8A is bitumen based, and is in fair condition. Again the age of the bitumen appears relatively new. Infiltration may have occurred historically through the hard-stand if it has not been well maintained in the past.

Sampling was also undertaken around the western UST area at site S5A. While sampling indicates the presence of low level C₆-C₉ and C₁₀-C₁₄ concentrations of 30 and 51 mg/kg respectively, levels were less than EIL/HIL values of 100 mg/kg. As discussed earlier, the bowser(s) and fuel storage tanks appear to have been removed some time ago (the concrete has been cut to the shape of a UST and the ground is open) , however the supporting pipework does not appear to have been removed as an isolation valve is still visibly present. Depending upon the date of removal, natural attenuation may have acted to reduce hydrocarbons in the soil to some extent.

Sampling was also undertaken at S6 where spills and underground leakages could have impacted from either the western or eastern UST areas. TPH (C₆-C₉ and C₁₀-C₁₄) concentrations of 80 and 87 mg/kg respectively were measured at this location both of which are less than the EIL/HIL value. Again, the hydrocarbons may have originated from leaking infrastructure or from historical infiltration.

Sampling was also undertaken at S4 (the down gradient area outside of the western entrance to the northern workshop) and S9 (a down gradient location from the hoist historically located in the eastern workshop). Neither bore indicated any elevated levels of TPH or BTEX with all results less than the level of reporting (LOR). Sampling was undertaken to 2 mBGL at S9 (due to ceiling height limitations), with no significant oil or grease concentrations noted in the samples. It should be noted that the concrete around the hoist was in very good condition and is the original concrete (based on the site history) hence any hydrocarbon reading would most likely be attributable to leakage of the piston seals. Following removal of the hoist, the area was backfilled with concrete and is still in very good condition. As discussed earlier, the level of removal is unknown.

All benzene concentrations were less the LOR of 0.2 mg/kg, less than the EIL of 1.0 mg/kg. Total BTEX concentrations were all well less than the EPA EIL/HIL of 7 mg/kg.

Due to the presence of ash on site, sampling for PAH's was undertaken at S7 and S12 where ash was observed. Benzo(a)pyrene concentrations were less than the EIL of 4mg/kg with a maximum value of 0.8 mg/kg reported. Total PAH concentrations were well less than the EIL of 80 mg/kg for all soil samples submitted for laboratory testing.

8.2 Metals

The copper level of 112 mg/kg exceeded the EIL of 60 mg/kg at S1 0-100mm and at S7-1.0 mBGL (82 mg/kg). The concentrations fell to 16 mg/kg at 300 to 400 mm BGL and 2 mg/kg at 2 mBGL respectively. A value of 60 mg/kg was recorded at S11 0-200 mm with no further delineation measured. All exceedences were well less than the required HIL of 4000 mg/kg for level D development. Given the type of development proposed, it is unlikely that these exceedences will pose a serious environmental problem.

The lead level of 1450 mg/kg at S11 0-200mm exceeded the health investigation level of 300ppm. The source of this material may have originated from the northern workshop or may be just a hotspot eg flashing used on roofing, corroded lead piping given the age of the building.

Zinc levels exceeded the EIL of 200ppm at three locations viz S1 0-100 mm (297mg/kg), S3 0-100mm (331ppm), and at S9 0.5 mBGL (257mg/kg) but were all well less than the 28,000 mg/kg HIL for a level D development. The elevated zinc levels may be due to the large quantities of galvanised metal sheeting historically used (and still present) on site. The concentrations fell to 26mg/kg at 300 to 400 mm BGL, 107 mg/kg at 300 to 400 mm BGL, and 7mg/kg at 2 mBGL respectively indicating that the exceedences are generally confined to the 0.7 mBGL soils. Again, given the proposed development, it is unlikely that these exceedences will pose any serious problems to the environment.

8.3 Cyanide

Cyanide levels were assessed due to the metal finishing operation identified in the site history report¹. The cyanide levels recorded were very low at less than/equal to 1 mg/kg (LOR). These results are considerably less than health investigation level of 3000 mg/kg (total cyanide) required for level D development.

9. Conclusions

The following conclusions can be made with respect to the site works carried out:

- the subsurface lithology encountered fill (ash and gravel) in some locations;
- subsurface soils were underlain by bedrock (Brisbane Tuffs) present at depths ranging from 2.7 to 4 mBGL in boreholes drilled;
- petroleum hydrocarbon impacts to soil in excess of the EIL were reported in soil sampled from S7 and S8A. Laboratory data indicates the soil impacts are confined to near surface soils;
- soil impacted by TPH in excess of EIL/HIL's is confined to the vicinity of the eastern tankfarm and bowser area;
- no exceedences for benzene or total BTEX EIL's were observed in laboratory analysis;
- no exceedences were observed for Benzo(a) pyrene or total PAH EIL's.
- minor EIL exceedences for copper occurred at S1, S7 and S11 with exceedences falling below EIL levels in immediate subsoils.
- the HIL for lead was exceeded at S11; and
- minor EIL exceedences for zinc occurred at S1, S3 and S9 with exceedences falling below EIL levels in immediate subsoils.

10. Statement of Limitations

This assessment was restricted to the agreed-upon Scope of Services. No representations or warranties are made concerning the nature or quality of the soil and water, or any other substance on the Property, other than the visual observations and analytical data as stated in this report.

On all sites varying degrees of non-uniformity of the vertical and horizontal soil or groundwater conditions are encountered. Hence no sampling technique can completely eliminate the possibility that samples are not totally representative of soil and/or groundwater conditions encountered. The sampling can only reduce this possibility to an acceptable level.

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

In preparing this report, Australis has relied upon certain verbal information and documentation provided by or through the client or government bodies. Except as discussed, Australis did not attempt to independently verify the accuracy or completeness of that information, but did not detect any inconsistency or omission of a nature that might call into question the validity of any of it. To the extent that the conclusions in this report are based in whole or in part on such information, they are contingent on its validity. Australis assume no responsibility for any consequences arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Australis.

Within the limitations of the agreed-upon Scope of Services, this assessment has been undertaken and performed in a professional manner, in accordance with generally accepted practices, using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, express or implied, is made.

This report is based upon the Scope of Services, and is subject to the Limitations and Restrictions, defined herein. It has been prepared on behalf of Philip Usher for the benefit of Philip Usher. No person or organisation other than Philip Usher is entitled to rely upon any part of it without the prior written consent of Australis, and such third party in using or relying on this report shall have no legal recourse against Australis, and shall indemnify and defend Australis against all claims arising out of, or in conjunction with, such use or reliance.

11. References

1. Australis Environment and Engineering (2001), Preliminary Site Assessment for the Proposed Development at Vulture Street and Mark Lane, Woolloongabba.
2. Personal Communication, Brisbane City Council, Development and Regulatory Services, Saeed Asker, Development Officer – Dangerous Goods.
3. Department of Mines Brisbane Geological Series, 1985, Brisbane 1:100,000 Sheet 9543).
4. Queensland Water Resources Commission (1987), Groundwater Resources of Queensland 1:2,500,000 Map.
5. Personal Communication, Department of Mines & Energy, Woolloongabba Office, South- East Region, Brisbane, Robert Ellis, Senior Hydrologist.
6. Philip Usher (February 2002), Site Development Drawing Specifications.
7. Personal Communication, Environmental Protection Agency, 26 November 2002.
8. National Environment Protection (Assessment of Site Contamination) Measure 1999, Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater.
9. Queensland Environmental Protection Agency (formerly Department of Environment), May 1998, Draft Guidelines for Assessment and Management of Contaminated Land in Queensland.

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Tables

TABLE OF RESULTS - METALS AND CYANIDE

SAMPLE				S1	S1	S2	S2	S3	S3	S4	S4	S5A	S5A	S6	S6	S7	S7	S7	S8A	S8A	S9	S9	S11	S12	QC4	QC5
DEPTH (mm)				0-100	300-400	0-100	300-400	0-100	300-400	0-100	300-400	1	1.5	0.5	1	0.1	1	2	2	3	0.5	2	0-200	300-400	S2 0-100	S7 - 0.1
DATE SAMPLE				31/10/2002																						
Analyte	Units	EIA	HIL																							
Arsenic - Total	mg/kg	20	400	13	2	8	4	5	2	6	8	5	11	4	2	N/A	3	4	5	5	13	6	11	N/A	8	N/A
Cadmium - Total	mg/kg	3	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	N/A	<1	<1	<1	<1	<1	<1	2	N/A	<1	N/A
Chromium - Total	mg/kg	50	48%	11	<1	2	3	9	<1	4	3	4	4	<1	2	N/A	<1	3	5	4	2	4	31	N/A	2	N/A
Copper - Total	mg/kg	60	4000	112	16	5	3	17	6	11	18	1	<1	8	<1	N/A	82	2	1	6	46	<1	60	N/A	7	N/A
Nickel - Total	mg/kg	60	2400	29	2	<1	<1	2	<1	3	4	<1	<1	3	<1	N/A	1	<1	1	2	13	1	12	N/A	<1	N/A
Lead - Total	mg/kg	300	1200	266	41	39	21	72	48	105	223	22	15	57	11	N/A	58	13	19	29	239	16	1450	N/A	39	N/A
Zinc - Total	mg/kg	200	28000	297	26	62	33	331	107	108	135	10	5	48	3	N/A	30	4	6	16	257	7	731	N/A	68	N/A
Mercury - Total	mg/kg	1	60	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.2	<0.1	N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	N/A	<0.1	N/A
Cyanide - Total	mg/kg	NE	3000	<1	<1	1	<1	----	----	----	----	----	----	----	----	N/A	----	----	----	----	----	----	----	N/A	<1	N/A

LEGEND

1 NE = Not Established

2 Exceeds EIL

3 Exceeds HIL

TABLE 6.1 Laboratory Soil Results - Selected heavy Metals & Cyanide

TABLE OF RESULTS - HYDROCARBONS

SAMPLE				S1	S1	S2	S2	S3	S3	S4	S4	S5A	S5A	S6	S6	S7	S7	S7	S8A	S8A	S9	S9	S11	S12	QC3	QC4	QC5
DEPTH				0-100	300-400	0-100	300-400	0-100	300-400	0-100	300-400	1	1.5	0.5	1	0.1	1	2	2	3	0.5	2	0-200	300-400			
DATE OF SAMPLE	31/10/2002																										
Analyte	UNITS	EIL	HIL																								
TPH																											
C6 - C9 Fraction	mg/kg	100	100	N/A	N/A	N/A	N/A	<2	<2	<2	<2	30	3	80	<2	N/A	140	4	37	6	<2	<2	<2	N/A	77	N/A	N/A
C10 - C14 Fraction	mg/kg	100	100	N/A	N/A	N/A	N/A	<50	<50	<50	<50	51	<50	87	<50	N/A	275	<50	129	66	<50	<50	<50	N/A	<50	N/A	N/A
C15 - C28 Fraction	mg/kg	1000	1000	N/A	N/A	N/A	N/A	<100	<100	<100	<100	<100	<100	<100	<100	N/A	<100	<100	<100	<100	102	<100	280	N/A	<100	N/A	N/A
C29 - C36 Fraction	mg/kg	1000	1000	N/A	N/A	N/A	N/A	<100	<100	<100	<100	<100	<100	<100	<100	N/A	120	<100	<100	<100	<100	<100	348	N/A	<100	N/A	N/A
Total TPH	mg/kg	1000	1000																								
BTEX																											
Benzene	mg/kg	1	1	N/A	N/A	N/A	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	N/A	N/A
Toluene	mg/kg	-	-	N/A	N/A	N/A	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	N/A	N/A
Chlorobenzene	mg/kg	-	-	N/A	N/A	N/A	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	N/A	N/A
Ethylbenzene	mg/kg	-	-	N/A	N/A	N/A	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	N/A	N/A
meta- & para-Xylene	mg/kg	-	-	N/A	N/A	N/A	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	N/A	N/A
ortho-Xylene	mg/kg	-	-	N/A	N/A	N/A	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	N/A	<0.2	N/A	N/A
Total BTEX	mg/kg	7	7																								
PAH																											
Naphthalene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
2-Methylnaphthalene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
2-Chloronaphthalene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
Acenaphthylene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
Acenaphthene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
Fluorene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
Phenanthrene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
Anthracene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
Fluoranthene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.3	N/A	N/A	0.7
Pyrene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.3	N/A	N/A	0.7
N-2-Fluorenylacetylamide	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
Benz(a)anthracene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.7	N/A	N/A	<0.5
Chrysene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	N/A	N/A	<0.5
Benzo(b) & (k)fluoranthene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	N/A	<1
7,12-Dimethylbenz(a)anthracene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
Benzo(a)pyrene	mg/kg		4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.8	N/A	N/A	<0.5
3-Methylcholanthrene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
Indeno(1,2,3-cd)pyrene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.5	N/A	N/A	<0.5
Dibenz(a,h)anthracene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	<0.5
Benzo(g,h,i)perylene	mg/kg			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.6	N/A	N/A	<0.5
Total PAH	mg/kg		80																								

LEGEND

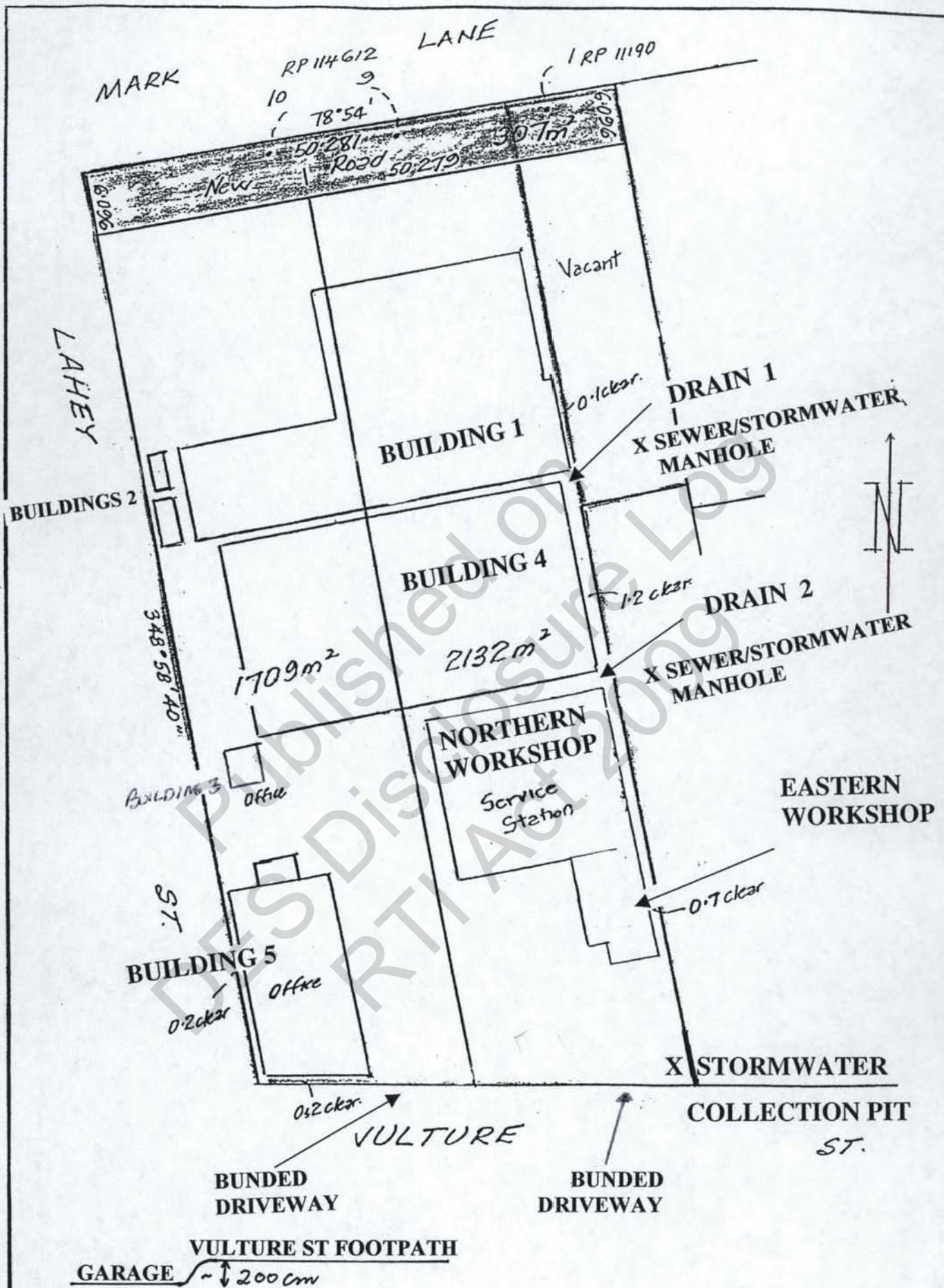
1 NE = Not Established

2 Exceeds Environmental Investigation Levels

3 Exceeds HIL

TABLE 6.2 Laboratory Soil Results - TPH BTEX and PAH's

Figures



T.H. Jensen & Bowers Pty. Ltd.
Consulting Surveyors

SCALE 1:500

FIGURE 2 WATER MANAGEMENT SYSTEM

STATUTORY DECLARATION

(INVESTIGATOR and REPORT PREPARER)

Address of Site Investigated: 302-320 Vulture St and 54 Mark Lane
Real Property Description: Lots 9 and 10 on RP114612 and Lot 1 on RP11190
Title of Report: Environmental Site Assessment for 320-324 Vulture Street and 54 Mark Lane Kangaroo Point.

I, Garry Gough of Australis Contract Engineering, in the State of Queensland, do solemnly and sincerely declare that;

- I assisted the investigator, and prepared the report described above;
was prepared of
- I am a member of the Environmental Institute of Australia and my qualifications and experience Batchelor of Chemical Engineering are relevant to this investigation. I am a registered contaminated land investigator with the EPA.
- I have not knowingly included any false, misleading or incomplete information in the report;
- I have not knowingly failed to reveal any relevant information or document to the administering authority; and

I certify that:

- The desk top and field inspection investigation activities were performed by Ivan Neralic under the direction of Garry Gough.
- The report addresses the relevant matters for the investigation and is factually correct; and
- The opinions expressed in it are honestly and reasonably held.

And I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the *Oaths Act 1867*

Signature

sch 4 - signature

Name

GARRY GOUGH

Taken and Declared before me at *Brisbane* this *17* day of *December* 20*02*

Witness (Justice of the Peace/Commissioner for Declarations)

Signature

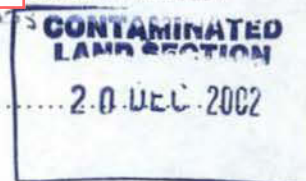
sch 4 - signature

**alteration witnessed by*
J.P. (C dec)

sch 4 - signature

Name (& JP Number if applicable)

Shary Therese Gough



Golder Associates Pty Ltd
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REPORT ON
STAGE 1 AND STAGE 2 SITE INVESTIGATION
320-324 VULTURE STREET AND 54 MARK LANE
KANGAROO POINT, QUEENSLAND

Submitted to :

Philip Usher Constructions Pty Ltd
PO BOX 2146
Crestmead, Queensland. 4132



DISTRIBUTION:

2 Copies (1 Electronic and 1 Hard Copy)	Philip Usher Constructions Pty Ltd
3 Copies (1 Electronic and 2 Hard Copies)	Third Party Reviewer (Robin Wagland)
1 Copy -	Golder Associates

March, 2008

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RP18-548

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1.0 INTRODUCTION

Philip Usher Constructions Pty Ltd (Philip Usher) commissioned Golder Associates Pty Ltd (Golder) on the 29th October 2007 to undertake a Stage 1 and Stage 2 Site Investigation of a site located at 320-324 Vulture Street, Kangaroo Point, Queensland and herein referred to as "the Site". The Site is to be redeveloped for high density housing including the excavation of a seventeen metre deep car park.

The investigation included a detailed review of 'Site History' and an intrusive sampling program to assess current contaminant levels on the site. Philip Usher have provided Golder with an Environmental Site Assessment report undertaken by Australis Contract Engineering Pty Ltd (Australis), in November 2002 and the information is summarised in this report for comparison of contaminants identified by Golder with previous contamination identified on the site.

This Site Investigation was undertaken to assess the current status of contamination at the site and to enable sufficient data to be collected to produce a Site Management Plan (SMP) and Remediation Action Plan (RAP). Based on the assessment undertaken to date, contaminated areas have been identified. Further discussion regarding the volumes and areas to be remediated are presented in the RAP.

The SMP and RAP will be submitted to the EPA to allow progress of a Development Application (DA) for the site. Following redevelopment of the site under the SMP/RAP, the site is to be removed from the EPA Environmental Management Register (EMR) given that all contaminated materials will have been removed as part of the redevelopment.

Review of environmental documents is being undertaken by a Third Party Reviewer; Robin Wagland of WSP Environmental.

The investigation has been undertaken in general accordance with Section 7.2 of the *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* (1998), National Environment Protection Council (1999), *National Environment Protection (Assessment of Site Contamination) Measure (NEPM)* and AS4482.1 – 2005 *Guide to the investigation and sampling of sites with potentially contaminated soil*.

2.0 SITE INFORMATION

2.1 Site Location and Setting

The site is situated at 320-324 Vulture Street, Kangaroo Point (see Figure 1). An easement was identified as 54 Mark Lane located on the north-western side of the site was included as part of the Australis investigation, however as it is Crown/Council land, information regarding this lot has not been investigated further by Golder and as such does not constitute part of the environmental assessment.

The Site is rectangular in shape and bound by Mark Lane to the north and Lahey Lane to the west. Beyond Mark Lane to the north-west is residential housing and a school (St Joseph's Catholic Primary School). An office building is located across Lahey Street to the west. Vulture Street is located along the southern boundary and a sewer easement bounds the site directly to the east. This area is currently used for parking including the Russian Orthodox Church and child care centre located east of the Site. Go Print and the Department of Natural Resources and Water are located across Vulture Street to the south. The site occupies Lots 9 and 10 on RP114612 and is approximately 0.37 ha in size.

2.2 Property Descriptions

Table 1: Site Identification Details

IDENTIFICATION	PROPERTY DETAILS
Property Description	Lots 9 and 10 on RP114612
Site Location	320-324 Vulture Street, Kangaroo Point, QLD
Area	0.37 ha (excluding Lot 1)
Parish	South Brisbane
County	Stanley
Zone	Light Industry Area
Certificate of Title	Philip Usher Constructions Pty Ltd
Title Reference	14249067
Local Govt. Authority	Brisbane Council
Current Occupant/Lease	Philip Usher Constructions Pty Ltd
Current Use	Vacant land (formerly industrial use)
Proposed Use	Medium density housing

A copy of the historical title certificates is attached in Appendix C.

2.3 Environmental Protection Agency (EPA) Records

The EPA's registry was searched and the results are listed below:

- Lot 9 on RP114612 is currently listed on the Environmental Management Register (EMR) for the notifiable activity – **Service Station** (EMR Site ID: 2692). The site is not listed on the Contaminated Land Register (CLR).
- Lot 10 on RP114612 is currently listed on the Environmental Management Register (EMR) for the notifiable activity – **Metal Treatment or Coating and Service Station** (EMR Site ID: 2693). The site is not listed on the Contaminated Land Register (CLR).

Search results are attached in Appendix B.

2.4 Brisbane City Council (BCC) Records

A search by the Brisbane City Council (BCC) indicated that there were no Flammable or Combustible Goods Licences available for Lots 9 and 10.

An environmental authority (No. 8030000221) was granted to Costas Constantinou Body Shop on the 16th of June 1995 for the following environmentally relevant activities:

- Motor Vehicle Workshop; and
- Metal Finishing.

There were no Council records to indicate recorded and notified spills at the Site during its operational period as a service station and vehicle workshop.

The site is in an area zoned as Light Industry (LI) Area which includes businesses selling heavy machinery, motor vehicles, boats, timber or other building materials. The LI Area accommodates a range of light industries and warehouses that are of low environmental impact (Brisbane City Plan, 2000).

BCC search records are included in Appendix B

3.0 SITE DESCRIPTION

3.1 Topography

The site is terraced and slopes from north to south. The Site is approximately 16 metres above sea level at the northern end and 13 metres above sea level at the southern end (Google Earth, 2007).

3.2 Geology

Reference to the Geological Series Map of Queensland 1:250,000 Brisbane, Sheet SG 56-I5, indicates that the site is underlain by Triassic aged Brisbane Tuff comprising rhyolitic tuff, ignimbrite, agglomerate, conglomerate sandstone and shale. A geotechnical investigation was undertaken by Douglas Partners in 2007. The report indicates that 'the rock was encountered at shallow depths of 0.4m and 2.67m in the north of the site, and at 4.5m in the south of the site. These findings were consistent with the results of the environmental investigation by Golder which observed between 0.1 and 0.8 metres of silty, sandy fill overlying natural firm to stiff medium plasticity clay to the maximum drilling depth of 4 metres. Rock was generally encountered between 2 to 3m below ground level.

3.3 Hydrology

The nearest surface water body is the Brisbane River approximately 300m northwest of the site.

Surface runoff is likely to flow in a southerly direction towards Vulture Street.

3.4 Hydrogeology

A search of the Department of Natural Resources and Water (DNRW) records of groundwater bores indicated that there are no Groundwater bores registered within a 2 km radius of the site. The nearest groundwater bore is number 133301, approximately 3.5km east of the site, followed by 124313 and 124312, approximately 4km west-south-west of the site. A summary of these three DNRW registered groundwater bores is given in the table below.

Table 2: DNRW Registered Groundwater Bores within 4km of the Site

Reg'n Number	Dist/ Direction	Depth bgl m	Aquifer	Aquifer Depth (top) m	Screen depth m	Yield l/s	EC µS/cm
133301	3.5km/E	98.0	Salty	51.57	6-98	0.3	5,000
124313	4km/WSW	10.5	NR	8.5m	1.5-10.5	NR	NR
124312	4km/WSW	7.0	NR	5.2m	1-7	NR	NR

Note: bgl = below ground level

NR = Not Recorded

Based on the information within the registered water bores, groundwater on the site is expected to be between 40 and 50 metres depth. Electrical conductivity of groundwater within the area (5,000 $\mu\text{S}/\text{cm}$) indicates that the water is brackish and is unsuitable for drinking water but could potentially be used for livestock watering.

The information from Douglas Partners (2007) indicates that 'rock was encountered at shallow depths of 0.4m and 2.67m in the north of the site, and at 4.5m in the south of the site'. The investigation reported that 'no free groundwater was encountered in any of the test bores during auger drilling'. There may be some perched water present at the southern end of the Site in the vicinity of the tank farm due to the presence of fill.

4.0 SITE HISTORY INFORMATION

4.1 Methodology

The following sources of information were accessed to assess the history of the site and the surrounding area:

Table 3: Site History Information Sources

Information Reviewed	Source of Information	Years or Date of Information Source
Aerial Photographs	Department of Natural Resources and Water (DNRW)	2004, 1994, 1987, 1982, 1974, 1978, 1969, 1964, 1951 and 1946.
Historical Titles	DNRW	2002, 1968, 1962, 1902, 1899, 1881 and 1854
EMR/CLR Search	EPA	1 November, 2007

As the Site was demolished in 2003, anecdotal evidence from previous tenants was unable to be obtained. No contact details have been provided by Philip Usher.

4.2 Title History of the Site

Current and Historical Titles were obtained from the Department of Natural Resources and Water (DNRW).

Copies of the historical title documents for the Site are provided in Appendix C.

The current site owner is Philip Usher Constructions Pty Ltd.

A summary of previous owners of the Site, based on a review of titles information, is provided below.

Table 4: Summary of Historical Titles

Historical Title Details			Details of Ownership	
Vol/Folio	Title Ref.	Issue date	Owner	Transfers of title and Lease Arrangements
Lot 9 on RP 114612				
	14249067	15/11/2002	Philip Usher Constructions	
4249/67	14249067	18/12/1968	Laheys Joinery Proprietary Limited	Part leased to Olssons Industries Pty Ltd from 1967 to 1970
996/230	10996230	13/04/1902	Lahey family	Became Laheys Limited in 1908. Part leased to Ampol Petroleum QLD Pty Ltd in 1953 for 15 years Part leased to Olssons Industries Pty Ltd from 1966 to 1969
Undivided Moiey	10948070	20/6/1899	Ellen Margaret Holman	Transferred to Lahey family in 1902
948/70	10948071	20/6/1899	Katherine Fraser Howitt	Transferred to Lahey family in 1902
948/71				
9553/201	19553201	11/5/1854	William Keur	
Lot 10 on RP 114612				
	13465072	15/11/2002	Philip Usher Constructions	
3465/72	13465072	26/2/1962	Laheys Joinery Proprietary Limited	Part leased to Ampol Petroleum QLD Pty Ltd in 1953 for 15 years Part leased to Olssons Industries Pty Ltd from 1967 to 1970
412/188	10412188	6/12/1881	Francis Walker	Transferred to Lahey family in 1886 Part leased to Ampol Petroleum QLD Pty Ltd in 1953 for 15 years
	19553201			As above

The available information shows that the Site was originally one parcel in the Deed of Grant issued in 1854. Ownership of the Site transferred to Philip Usher in 2002.

The Site was owned by the Lahey family between 1886 and 1902 and then by the Lahey family company, Laheys Joinery Proprietary Limited, from the 1960's to 2002. The Lahey family were carpenters and operated a furniture manufacturing business at the Site. Part of the Site was leased to Olssons Industries Pty Ltd for storage and distribution of salt licks. The southern portion of the Site was leased by Ampol Petroleum QLD Pty Ltd in 1953. It is likely that the service station began operation at this time.

4.3 Aerial Photograph Review

Ten aerial photographs were reviewed and details of the aerial photographs are outlined in the table below.

Table 5: Historical Aerial Photography Details

Photograph Name	Date	Film No.	Run No.	Frame #	Scale
Enviro Protection Agency Tweed Heads-Urangan	13/6/2004	QAP6078	102	029	1:12000
Brisbane Skymap Controlled	7/11/1994	QAP5334	9	027	1:20000
Transport Department Brisbane Central	5/8/1987	QAP4687	2	93	1:9900
MRD Road No U12A & U12B South East Arterial	20/6/1982	QAP4042	1	204	1:3000
Brisbane Flood 74	29/1/1974	QAP2757	5	9958	1:4900
Brisbane East 77	9/2/1978	QAP3458	2	9780	1:9400
Birkdale-Sandgate Road 69	20/4/1969	QAP1939	9A	97	1:11900
Brisbane Transportation Study 64	16/8/1964	QAP1590	18	7394	1:12000
Greater Brisbane Area 51	23/8/1951	BCC0	9	39368	1:16000
Brisbane City Council Series 46	1/5/1946	QAP0	19	35210	1:15900

Copies of the aerial photographs are provided in Appendix D. A summary of observations made during the aerial photographs review is provided below.

Table 6: Aerial Photograph Summary

Photograph Date	Description of Immediate Site	Description of Surrounding Area
1946	The Site has been cleared and appears to be sealed. There are three buildings located on the site, One towards the rear of the site on the corner of Mark and Lahey Lane, one approximately half way along the western boundary of the Site and one taller building on the corner of Lahey Lane and Vulture Street. The sewer easement area remains undeveloped.	The area directly north of the Site appears to be largely residential with the primary school to the north-west. East of the Site appears to be a combination of unoccupied land and residential. The area directly south of the Site appears to be a tram interchange and maintenance yard. The area to the west of the Site is occupied by two large buildings.
1951	No apparent changes have occurred to the Site.	No apparent changes have occurred in the surrounding areas of the Site with the exception of a small building present on Lot 1.
1964	The two original buildings on the corner of Lahey Lane remain. A number of vehicles are parked in the vicinity of the north western building. Two buildings are present in the centre of the Site and span the entire width of Lots 9 and 10. The front of the Site appears to be in use as a service station with the dispensers clearly concreted into the forecourt. A building is located to the north-east of the dispensers presumed to be the sales building and workshops identified in the Australis report (2002).	No apparent changes have occurred in the surrounding areas of the Site with the exception of the church adjacent to the south-eastern corner boundary with the Site.
1969	No apparent changes have occurred to the Site.	The buildings on the adjacent Lot to the west have been demolished. The tram yards to the south do not appear to be in use.
1974	The southern two thirds of the Site appear to be unchanged since the previous photograph, with the buildings and dispensers being clearly visible. The building on the corner of Mark Lane and Lahey street has been demolished and this area now appears to be used as storage with what appears to be three smaller sheds around the centre of this area. The rest of the easement to the south-east has remained vacant.	The former tram yards to the south have been cleared and appear to be undergoing development for a busway. The Captain Cook Bridge has been constructed as well as the off ramp onto Vulture Street coming up in front of the GoPrint building, visible on the corner of Vulture and Main Street and the rest of the Site appears to be vacant. The block west of the Site appears to be used for bulk materials storage and handling. The building on Lot 1 has been demolished.
1978	No apparent changes have occurred to the Site since the previous photograph.	The remaining areas appear to be unchanged. The Lot across Lahey Street to the west has undergone significant development with a large building on the corner of Vulture Street and Lahey lane and car parking at the rear of the building. The remaining surrounds have remained largely the same since the previous photograph.
1982	The limit of the available photograph prevents being able to see the northern half of the Site, however the visible portion is unchanged since the previous photograph.	The area south of the Site is being developed with the foundations for a large building clearly visible (GoPrint). The visible portion of the remaining areas appears to be unchanged since the previous photograph.
1987	The southern two thirds of the Site appear to be unchanged. In the northern portion of the site there is a shed along Mark Lane. The remaining area appears to be in use as a carpark or storage facility.	The GoPrint building is situated to the south of the Site. The surrounding area remains residential, with the school including playing fields to the north-west.
1994	No apparent changes have occurred to the Site since the previous photograph.	No apparent changes have occurred in the surrounding areas of the Site since the previous photograph.
2004	The Site buildings have been demolished and the Site is vacant. The building footings are still visible. The Site appears as it does today.	No apparent changes have occurred in the surrounding areas of the Site since the previous photograph.

4.4 Historical Use of the Site

According to the 2002 Australis report, the Site has been previously used for a number of purposes including, a service station, bus storage, salt lick distribution business, furniture and upholstery business and a metal finishing workshop. These findings are generally consistent with both the title searches and aerial photographs.

4.5 Previous Environmental Investigations

Philip Usher provided Golder with a site investigation report for this site:

Environmental Site Assessment, Vulture Street, Australis Contract Engineering Pty Ltd (Australis), November 2002.

Information from the Australis report (2002) indicates that a service station building with two workshops, a sales office, dispenser and six Underground Storage Tanks (USTs) were present at the site during their investigation in 2002. Additional infrastructure identified at the time included;

- A shed housing the former furniture business (Lahey's Joinery), salt lick distribution business (Olsson's Industries) and a building used for storage of two buses;
- A second shed which housed an upholstery business and later an above ground 0.5m³ metal finishing bath used for brass plating small objects; and
- A two storey office building used for an upholstery business.

The findings of this report indicated elevated hydrocarbon fractions in shallow soils at depths of 1 m and 2 m at S7 and S8A in the vicinity of the eastern UST area. Elevated levels of copper were identified in surface soils at S1 in the northern portion of the Site and at a depth of 1m in borehole S7 located in the eastern UST area. An elevated lead concentration was identified in surface soils at location S11 located on the eastern end of the northern workshop on the easement boundary. Elevated levels of zinc were identified in surface soils at S1 (located in the northern portion of the Site) and S3 (adjacent to the western site boundary in the middle portion of the Site) and at a depth of 0.5m in borehole S9 (located in the eastern workshop area).

Sampling locations undertaken during this investigation are presented on the Site Map (Figure 2) and results included in Table 8.

5.0 SITE INVESTIGATION

5.1 Fieldwork Program

Fieldwork was undertaken on the 16th of November and between the 20th and 21st of November 2007. A site walkover and service location was conducted on the 16th of November. Drilling was undertaken using a solid flight drill rig (100mm). Undisturbed samples were obtained where possible, using a push tube sampler with a disposable internal plastic sleeves to minimise cross contamination between samples and minimise volatilization of volatile organic compounds. Borehole reports are included in Appendix E.

An additional three samples were collected at the request of the Third Party Reviewer (TPR). Locations TPR1, TPR2 and TPR3 were sampled using a hand auger. The hand auger was decontaminated between holes by washing with phosphate free detergent and rinsing with deionised water.

5.2 Groundwater

Following review of groundwater data from the DNRW (see Section 3.4), groundwater was not expected to be encountered during the course of the investigation. Additionally:

- No hydrocarbon spills have been reported to regulatory authorities during the period when the Site was operational;
- Information from DNRW indicates that the regional aquifer is expected to be at depths of greater than 40m with a high salinity level making the groundwater unsuitable for human consumption;
- The metals contaminant sources on the Site were previously above ground sources (i.e. brass plating bath) therefore if spills large enough to impact soils and groundwater had occurred these would have been noted;
- The in-ground sources (UST's), have not been in use and empty for some time (>5 years) and both the Australis (2002) and this investigation found no evidence of gross hydrocarbon impact resulting from leaks in the underground tanks into the soil;
- Contamination identified in the Australis and this investigation was limited to the top 2m of the soil profile;
- The soil type is clay dominated with shallow weathered rock and as such leaks and spills would tend to move laterally as well as vertically (i.e. moving laterally down gradient over the bedrock beneath UST's) and any contamination associated from the UST's would typically be identified in boreholes advanced within the vicinity of the tanks;

- Information supplied by Philip Usher Constructions Pty Ltd from a Geotechnical Investigation undertaken by Douglas Partners 2007, indicated that 'no free groundwater was encountered in any of the test bores during auger drilling';
- The underlying geology is Brisbane Tuff which is a hard massive formation with generally few fractures. The information from Douglas Partners (2007), indicates that 'The rock was encountered at shallow depths of 0.4m and 2.67m in the north of the site, and at 4.5m in the south of the site. The rock was initially very low to low strength, grading medium strength and up to very high strength at shallow depth in the north of the site and very low to high strength with some very high strength zones in the south of the site.' The maximum depth of drilling for the geotechnical investigation was 17.02m. It is therefore unlikely for contamination to move through this material to a depth which could potentially impact the regional aquifer; and
- Given the brackish nature of the water (5,000µS/cm) it is unlikely that groundwater in the area is used either for beneficial use including human consumption.

Based on this information the risk of contamination to groundwater is considered to be very low and therefore groundwater was not assessed in this investigation.

5.3 Visual Observations

The Photograph Log is included as Appendix F.

At the time of the first site visit on 16th October, the site was observed to be in use by members of the public as a commuter car park. Anecdotal evidence from passers by indicated that this practice had been going on for some time (likely since building demolition on the site - 2002-2003).

The Site is terraced and largely sealed with concrete and bitumen with the exception of the northern portion which is largely bare earth. The main site features included the footings of the former buildings and the dip and fill points for six Underground Storage Tanks (USTs) in the south-eastern portion of the site and the dispenser islands which had been removed and concreted over (See Photographs 1 and 2). The USTs appeared to be in a north south orientation. The tank on the western side of the UST cluster was able to be opened and was found to contain 0.5m of water with a strong hydrocarbon odour. The remaining tanks in this area were unable to be opened. Tank No. 4 (in the middle of the tank farm) had product in the fill point and a strong hydrocarbon odour. The size of all tanks and the contents is unknown; however diesel and unleaded petrol are known to have been stored at the Site during its use as a service station, based on information presented in the Australis (2002) report. The former dispenser locations in both the eastern and western UST areas have been concreted over.

The service station and eastern workshop building footings were in an "L" type arrangement. Some areas of the footings indicated that they had been previously tiled and upon closer

inspection, the wastewater clay pipes were located indicating the former amenities (See Photograph 3).

Two long narrow sections of concrete were identified in an area identified in the Australis report as the western UST area. At the time of the inspection there were no dip/fill points visible. There appeared to be two former dispenser points within this area (See photograph 4).

Within the area previously identified as the northern workshop, there appeared to be two sections of concrete more recently installed compared to the remainder of the concrete slab. It is presumed that these sections were formerly an interceptor pit and waste oil pit. A series of bolts along the centre alignment of the slab suggested that this may have been the location of a former above ground hoist.

The lower portion of the sewer easement to the east of the main Site is used by the Russian Orthodox Church for parking. The northern part of the easement (Lot 1) is currently vacant.

Potential contaminant sources identified on the Site from the site history and site walkover were as follows:

- Current and former fuel infrastructure including USTs, fill/dip points, dispenser locations and underground pipe work. (Photograph 1);
- Former northern and eastern workshops (Photographs 2 & 5); and
- Former above ground metal finishing bath used by upholstery business for brass plating.

The bus depot as mentioned in the Australis report, was in fact a shed used for parking two buses. No Council record of a workshop or fuel storage facility for the purpose of maintaining the buses was available.

5.4 Field Screening

Samples were obtained from the push tube or directly from the auger (where fill and gravels were present or refusal with the push tube occurred). Samples were collected using disposable nitrile gloves and immediately placed in laboratory prepared glass jars (Teflon lined lids) and stored in a cooler with ice. A portion of the samples was placed in a snap-lock bag and field screened using a Photo Ionisation Detector (PID) for volatile organic compounds. Results are indicated on Borehole Reports included in Appendix E and in Table 7 below, where PID readings above 0.0 ppm, were recorded.

Table 7: PID Readings

Borehole	Depth Range	PID Reading (ppm)
BH2	0.4 - 0.7 m	6.2
BH2	1.0 - 1.3m	75.8
BH5	0.3 - 0.5m	3.0
BH6	1.2 - 1.4	19.9
BH10	0.5 - 0.7	1.0
BH11	0.5 - 0.7	23.7
BH12	1.8 - 2.0	2.1
BH13	0.5 - 0.8	6.0
BH17	0.5 - 0.7	38.0

5.5 QA/QC Program

Quality control samples obtained were as follows:

- Duplicate Samples – One sample per 20 primary samples (analysed at primary laboratory);
- Triplicate Samples – One sample per 20 primary samples (analysed at secondary laboratory); and
- Rinsate Sample – Obtained off push tube sampler following decontamination procedures (analysed at primary laboratory).

All samples were submitted to National Analytical Testing Authority (NATA) accredited laboratories under Chain of Custody (CoC) documentation. Primary samples were submitted to Australian Laboratory Services (ALS) of Stafford, Queensland. Triplicate samples were submitted to AMDEL of Murarrie, Queensland. On receipt by the laboratory, samples were booked in and any breaches noted on Sample Receipt Notification (SRN). CoC and SRN documentation is included in Appendix G.

5.6 Soil Conditions

Soil conditions encountered during the soil boring program in the vicinity of the tank farm and workshops consisted of between 0.1 and 0.8 metres of silty, sandy fill overlying natural firm to stiff medium plasticity clay to between 2m and 3m. Bedding sands were encountered in BH7 within the first 0.5m of fill. The clay was underlain by weathered rock, generally at depths between 2m and 3m. Soils in this area generally had a hydrocarbon odour at depths between 0.8 and 2.0m. The maximum drilling depth was 4m.

Ash was encountered in BH8 (0.3-0.7m) and BH9 (0.05-0.3m) during the Golder investigation and in Bore No. 3 from 0.2 – 0.9m depth in the Douglas Partners investigation. These locations are in the vicinity of boreholes S9, S8, S8A and S7 where soil materials were identified as fill containing ash by Australis. Although fill was observed in boreholes BH6

and BH7, in the vicinity of Bore No 3, during the Golder investigation no ash or clinker was observed during the advancement of these holes.

A total of twelve holes across the three investigations have been advanced in the south-eastern corner of the Site. Six of these boreholes have encountered fill containing ash. Samples in this area have been analysed for TPH/BTEX, PAHs and heavy metals. Of the six boreholes identified as containing ash, one sample (BH9 0.05-0.2m) had a concentration of copper above the phytotoxicity guideline, but below HIL 'A'. There have been no elevated concentrations of PAHs or benzo(a)pyrene reported in the fill materials. Although there is a layer of fill in the south-eastern corner of the Site, ash containing fill is limited to isolated pockets across this area.

Black hydrocarbon staining was observed in BH2 between 0.4 and 0.7m depth. A hydrocarbon sheen was observed in BH3 between 0.4 and 0.8m depth. A hydrocarbon odour was observed in boreholes BH1-BH14. No odours were observed in boreholes BH15-BH17 to TPR1-TPR3.

Moisture was observed in most boreholes within the fill material. Fill and sands in boreholes BH7, BH8, BH11BH14 and BH15 and hand augers TPR1, TPR2 and TPR3 were observed to be moist to wet within the top 0.5m to 1.4m. As heavy rain events preceded the investigation, it is likely that there is a small amount of perched water in the high permeability sands and fill materials overlying the natural clays. This water is expected to travel across the top of the clay layer in a southerly direction towards Vulture Street.

Soil conditions outside the tank farm and workshops area, consisted of firm, medium to high plasticity clays underlain by shallow (generally less than 2m) weathered rock.

Samples TPR1 and TPR2 were collected within the garden beds between the terraces towards the northern portion of the Site. Soils in this area consisted of sandy and clayey silt. TPR3 was collected in silty sandy fill adjacent to the western boundary as shown in Figure 5.

6.0 LABORATORY TESTING

6.1 Soil Screening Criteria

Assessment of the results of analysis conducted was based on the following criteria contained in the EPA Draft Guidelines (1998):

- Environmental Investigation Levels (EIL);
- Health Based Levels (HIL) for Exposure Setting 'A' (Residential), which would apply during any site redevelopment when the soils are exposed;

- Exposure Setting 'D' (Residential with minimal opportunities for soil access), which will apply following development and the 'Material change of use' of the Site; and
- Exposure Setting 'F' (Commercial/Industrial), which currently applies.

The current land-use of the site is commercial/industrial, therefore the health-based exposure setting type 'F' as described in Appendix 9 of the EPA Draft Guidelines (1998) is considered appropriate. During the redevelopment of the site when exposure to soils is expected, exposure setting 'A' will apply. When the development is complete and the land use setting changes to high density residential, exposure setting 'D' will then apply.

For the Site to be removed from the EMR, the HIL 'A' assessment criteria and general EPA acceptance levels for TPH will apply. In addition, the phytotoxicity guidelines for copper and zinc of 100mg/kg and 400mg/kg respectively, have been applied. These guidelines relate to the accumulation of contaminants within plant tissues which have the potential to affect the growth and development of the plants.

6.2 Results of Soil Analysis

Laboratory Reports are attached in Appendix G. A summary of full analytical results are shown in Table 9 (included at the end of the main body of text), while a summary of analytical results which exceeded the adopted screening criteria are given in Table 8.

Table 8: Summary of Soil EIL/HIL Exceedences

Borehole	Depth (m)	Cu	Pb	Zn	Benzene	Total BTEX [^]	TPH C ₆ -C ₉	TPH C ₁₀ -C ₁₄	TPH Total
BH5	2-2.2	-	-	-	-	-	-	200	-
BH6	0.05-0.2	-	-	-	9.7	30.4	115	300	1085
BH9	0.05-0.2	294	-	-	-	-	-	-	-
TPR1	0-0.5	-	-	564	-	-	-	-	-
TPR3	0-0.5	-	392	894	-	-	-	-	-
EPA	-	100*	-	400*	1	7	100	100	1000
HIL (A)	-	1000	300	7000	-	-	-	-	-
HIL (D)	-	4000	1200	28000	-	-	-	-	-
HIL (F)	-	5000	1500	35000	-	-	-	-	-

NOTES:

All values are in mg/kg

EIL – Environmental Investigation Levels.

HIL (A) – Health based Investigation Levels for Residential land use.

HIL (D) – Health based Investigation Levels for Residential with minimal opportunities for soil access land use.

HIL (F) – Health based Investigation Levels for Commercial/Industrial land use.

“*” Denotes generally accepted EPA guideline values for TPH.

“-” Denotes no guideline value available

[^] - Denotes sum of individual components

* - Denotes phytotoxicity guideline

An elevated copper concentration above the EPA phytotoxicity guideline was reported for a sample collected from BH9 between 0.05 and 0.2m at a concentration of 294mg/kg. This result is below the HIL A guideline. This location is in the vicinity of the former service station building and the sample was collected from fill material containing ash. Based on a 95% Upper Confidence Limit (UCL), the copper levels across the Site were below the nominated guidelines.

Elevated zinc concentrations were reported for samples collected from TPR1 and TPR3 at depths between 0-0.5m. Samples from TPR1 and TPR3 were collected in clayey silt and silty sandy fill respectively. Based on a 95% Upper Confidence Limit (UCL), the zinc levels across the Site were below the nominated guidelines. All zinc results were below the HIL A guideline.

An elevated lead concentration of 392mg/kg was reported in TPR3-0-0.5m. Although this concentration is above the HIL A guideline level, based on a 95% UCL, the lead levels are below the nominated guidelines.

An elevated Total Petroleum Hydrocarbon (TPH) fraction C₁₀-C₁₄ was reported in BH5 between 2-2.2m depth. This hydrocarbon contamination is likely to be the result of leaks from the underground storage tanks or from spills during filling. Elevated benzene, total Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), TPH C₆-C₉, TPH C₁₀-C₁₄ and Total TPH

concentrations were reported in BH6 between 0.05-0.2m. The near surface hydrocarbon contamination at the site is likely to be the result of leaks from the underground pipe-work associated with the underground storage tanks and dispensers or from surface spills during vehicle filling.

7.0 QUALITY CONTROL

The following presents an assessment of quality control samples used throughout this assessment. Soil (duplicate and triplicate) and water (rinsate) QA/QC data is presented in Tables 10 and 11 respectively located at the end of the body of this report.

7.1 Duplicate & Triplicate Samples

One duplicate and triplicate soil sample was analysed with its respective parent sample. The following acceptance levels for Relative Percent Difference (RPD) between primary, duplicate and triplicate sample were applied for the analysis undertaken:

- $<5 \times \text{LOR}$ – RPD to not exceed 200%;
- $>5 \times \text{LOR}$ (coarse grained soils) – RPD to not exceed 50%; and
- $>5 \times \text{LOR}$ (fine grained soils) – RPD to not exceed 75%.

All results were within the acceptance levels with the exception of lead (65%) and zinc (103%) between the primary and duplicate samples. The samples were collected in heterogeneous silty sand fill material. The primary and triplicate samples were within the acceptable RPD range for zinc. The RPD exceedence is likely a result of the heterogeneity associated with the fill. Given that the primary and quality control sample results are below the EILs, these QA/QC results do not effect the conclusions of this report.

7.2 Rinsate Sample

The rinsate sample obtained from the split spoon sampler contained concentrations of PAH, BTEX, TPH and heavy metals below laboratory Limits of Reporting (LOR) indicating decontamination procedures utilised were sufficient to prevent cross-contamination between samples.

8.0 QUALITATIVE RISK ASSESSMENT

The following presents a qualitative risk assessment based on available data.

8.1 Soil Contamination Risk Sources

Potential soil contamination risk sources identified at the site, including potentially contaminating activities include;

- The two former vehicle workshops;
- Service station and associated aboveground and underground infrastructure; and
- Former metal finishing workshop.

A bus depot is mentioned in the Australis report, however no Council records were available to demonstrate a maintenance workshop or refuelling facility in this section of the Site. It is understood from the Australis report that the buses were parked in a storage shed at the Site.

Contamination (metals and TPH) encountered on the Site was identified in areas which are mostly sealed and unlikely to be readily accessed by humans, see Figure 4. Direct exposure pathways for humans include ingestion, inhalation and dermal contact of surface soils. The zinc, lead, copper, arsenic, TPH and BTEX concentrations encountered on the site although exceeding the Environmental Investigation Level were generally below the Health based Investigation Level for residential use (i.e. high likelihood of exposure to humans) and at this concentration the Site is suitable for on-going use as an Industrial site.

During the redevelopment of the site when exposure to soils is expected, HIL A applies. All metals results were reported at levels below the HIL A exposure setting. The removal of the TPH contamination identified in the vicinity of the UST area will require the guidance of a Site Management Plan to minimise the risk and exposure to workers during this time of redevelopment.

During redevelopment fill and soil on the site is to be removed to a depth of approximately 4 metres, followed by the removal of rock material to a total depth of 17 metres to allow installation of an underground car park. Contamination levels remaining on the Site, following the removal of fill and soil will be validated as being below Environmental Investigation Levels, prior to further excavation of underlying soil and rock indicating that the site would be suitable for any land use. A Site Management Plan (SMP) and Remediation Action Plan (RAP) have been prepared for the Site.

Following remediation, an application will then be made to the EPA for removal of lots on the EMR from the register. When the redevelopment is complete, the land use will be high density residential. .

8.2 Potential Terrestrial Fauna and Flora Receptors

The site has been significantly transformed from its natural state and due to the highly disturbed nature of its setting, any risk for exposure to contamination of any terrestrial flora or fauna that may enter the site, is considered negligible.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 Extent of Contamination

Contamination identified on the site was generally associated with the UST area, imported fill and the former vehicle workshops, see Figure 4. TPH, BTEX, zinc, copper and arsenic were identified in surface soil fill. TPH contamination at depth (BH5 2-2.2m) is likely to be associated with the underground fuel infrastructure.

Based on the findings of the Golder investigation, all contamination that exceeds the 'HIL A' has been delineated vertically and horizontally. i.e. the TPH contamination delineation has been undertaken to the nearest borehole below the EPA unpublished guidelines for TPH including boreholes BH2, BH3, BH7, BH8 and BH9.

It should be noted that some areas of contamination are expected to exist in areas inaccessible to sampling for health and safety reasons and these include the majority of the area directly adjacent to underground tanks, dispenser and fuel lines (i.e. within and adjacent to bedding sands).

9.2 Recommendations

The Site is to undergo redevelopment for high rise residential landuse. As part of the redevelopment a seventeen metre deep excavation is required to construct the proposed car park. This will require the removal of all underground fuel infrastructure and further excavation of natural rock under the guidance of a Site Management Plan (SMP) and Remediation Action Plan (RAP). Following validation and redevelopment of the Site under the SMP/RAP, the site is to be removed from the EPA Environmental Management Register (EMR).

Based on the client objective of removing the Site from the EMR and development for future high density residential landuse the following remediation activities are recommended:

SMP/RAP

As a Development Application (DA) is required for site redevelopment either:

1. Contamination exceeding the EILs is to be removed including sources and subsequently validated to allow the Site to be removed from the EMR; or

2. SMP/RAP – current contamination levels and procedures (Health, safety and environmental) are to be used during redevelopment.

As the DA is pending and sufficient information on site contamination has been obtained, Option 2 is recommended.

Following review by the TPR an SMP and RAP will be completed to allow the DA to proceed.

A SMP and RAP typically contains information outlining how the contaminated material will be managed during excavation and disposal to reduce potential exposure for human health and environmental receptors. An EPA disposal permit will be required to enable removal of contaminated material off-site to a licensed landfill. Information from the Golder investigation will be used for the disposal permit, in conjunction with additional soil samples collected during the removal of the six USTs at a rate of one sample per 50m³ to characterise the soils for offsite disposal.

The contaminated area is approximately 200m². Approximately 500m³ (in-situ volume) of soil is estimated to be impacted with TPH in the tank pit area. The hydrocarbon-impacted soil will be excavated from this location and managed in accordance with the EPA Guidelines.

UST Removal/Abandonment & Validation – The six USTs currently on the site are to be removed by an accredited contractor and destroyed according to Australian Institute of Petroleum standards (i.e. cold cut or gas freed prior to destruction). Destruction certificates are to be provided for the decommissioning validation report.

All areas containing contaminant sources (UST's, fuel pipe work, former dispenser locations, former oil sump and interceptor areas), or identified contamination (Australis and this report) are to be excavated and validated by an accredited environmental specialist.

10.0 IMPORTANT INFORMATION

Your attention is drawn to the document - "Important Information about your Environmental Engineering Report", which is included in Appendix H of this report. This document has been prepared by the ASFE (*Professional Firms Practicing in the Geosciences*), of which Golder Associates is a member. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be, and to present you with recommendations on how to minimise the risks associated with the groundworks for this project. The document is not intended to reduce the level of responsibility accepted by Golder Associates, but rather to ensure that all parties who may rely on this report including the Third Party Reviewer and Queensland EPA are aware of the responsibilities each assumes in so doing.

We would be pleased to answer any questions about this important information from the reader of this report.

GOLDER ASSOCIATES PTY LTD

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Tables

Table 9 : LABORATORY RESULTS - SOILS

Sample Location	Depth	Description									B Benzene	T Toluene	E Ethylbenzene	X Xylenes	Total BTEX ^a	TPH				Polycyclic Aromatic Hydrocarbons		Sample Date		
			As	Cd	Cr	Cu	Pb	Ni	Zn	Hg						C ₆ - C ₈	C ₁₀ - C ₁₄	C ₁₅ - C ₂₀	C ₂₁ - C ₂₈	TPH ^a	B(a)p		Total PAH ^a	
BH1	0.5-0.7	Clay	-	-	-	-	11	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH1	1-1.2	Clay	6	<1	2	<5	9	<2	<5	0.1	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH2	0.4-0.7	Sandy Fill	-	-	-	-	48	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH2	1-1.3	Clay	-	-	-	-	17	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH3	0.1-0.3	Sandy Fill with Gravel	-	-	-	-	159	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH3	0.5-0.7	Silty Sandy Fill	<5	<1	<2	<5	22	<2	17	<0.1	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH3	1-1.2	Sandy Clay	-	-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH4	0.5-0.7	Clay	-	-	-	-	18	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH4	1-1.2	Clay	-	-	-	-	16	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH5	1-1.2	Clay	<5	<1	2	<5	19	<2	12	<0.1	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH5	2-2.2	Clay	-	-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	200	710	<100	910	<0.5	<8	20/11/2007	
BH5	2.8-3.0	Weathered Rock	-	-	-	-	-	-	-	-	-	-	-	-	-	<10	<50	<100	<100	<260	-	-	20/11/2007	
BH6	0.05-0.2	Silty Fill	5	<1	6	38	152	12	229	<0.1	9.7	3.3	5.6	11.8	30.4	115	300	470	200	1085	<0.5	1.8	20/11/2007	
BH6	0.5-0.7	Clay	-	-	-	-	106	-	137	-	0.3	<0.5	<0.5	0.5	0.8	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH7	0.2-0.4	Silty Sandy Fill	-	-	-	-	168	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH8	0.3-0.5	Fill	7	<1	4	38	146	22	120	<0.1	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH8	0.8-1	Clay	-	-	-	-	11	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	20/11/2007	
BH9	0.05-0.2	Fill	5	<1	2	294	231	17	299	<0.1	-	-	-	-	-	-	-	-	-	<260	<0.5	<8	21/11/2007	
BH9	0.5-0.7	Sandy Clay	<5	<1	2	<5	9	<2	13	<0.1	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	21/11/2007	
BH9	1-1.2	Clay	-	-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	21/11/2007	
BH10	0-0.2	Sandy Fill	22	<1	12	24	103	6	37	<0.1	-	-	-	-	-	-	-	-	-	<260	<0.5	<8	21/11/2007	
BH10	0.5-0.7	Clay	8	<1	5	<5	15	<2	<5	<0.1	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	21/11/2007	
BH11	0.2-0.4	Silt	<5	<1	<2	<5	44	<2	19	<0.1	-	-	-	-	-	-	-	-	-	<260	<0.5	<8	21/11/2007	
BH11	0.5-0.7	Sandy Clay	-	-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	21/11/2007	
BH12	0.2-0.4	Silt	-	-	-	-	18	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	21/11/2007	
BH12	0.8-1.0	Clay	<5	<1	5	<5	14	<2	6	<0.1	-	-	-	-	-	-	-	-	-	<260	<0.5	<8	21/11/2007	
BH13	0.2-0.4	Clay	5	<1	4	<5	12	<2	<5	<0.1	-	-	-	-	-	-	-	-	-	<260	<0.5	<8	21/11/2007	
BH13	0.5-0.8	Clay	-	-	-	-	12	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	21/11/2007	
BH14	0.6-0.8	Clay	<5	<1	2	<5	11	<2	<5	<0.1	-	-	-	-	-	-	-	-	-	<260	<0.5	<8	21/11/2007	
BH15	0-0.2	Sandy Fill with Gravel	<5	<1	6	20	20	4	54	<0.1	-	-	-	-	-	-	-	-	-	<260	<0.5	<8	21/11/2007	
BH15	0.5-0.7	Sandy Fill	-	-	-	-	22	-	-	-	<0.2	<0.5	<0.5	<0.5	<1.7	<10	<50	<100	<100	<260	<0.5	<8	21/11/2007	
BH16	0.5-0.7	Clay	6	<1	3	<5	11	<2	<5	<0.1	-	-	-	-	-	-	-	-	-	<260	<0.5	<8	21/11/2007	
BH17	0-0.2	Silt	9	<1	<2	<5	16	<2	23	<0.1	-	-	-	-	-	-	-	-	-	<260	<0.5	<8	21/11/2007	
BH17	0.5-0.7	Clay	<5	<1	3	<5	8	<2	7	0.1	-	-	-	-	-	-	-	-	-	<260	<0.5	<8	21/11/2007	
TPR1	0-0.5	Clayey Silt	<5	<1	8	31	132	7	564	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	29/01/2008
TPR2	0-0.5	Sandy Silt	<5	<1	2	<5	36	<2	74	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	29/01/2008
TPR3	0-0.5	Silty Sandy Fill	12	2	33	80	392	20	894	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	29/01/2008
Environmental Investigation Levels (mg/kg)			na	na	na	100*	na	na	400*	na	1	-	-	-	-	7	100*	100*	1000*	1000*	1000*	-	-	Number of Samples 37
Health Based Investigation Levels 'A' (mg/kg)			100	20	100	1000	300	600	7000	15	-	-	-	-	-	-	-	-	-	-	-	0.5	20	
Health Based Investigation Level 'D' (mg/kg)			400	80	400	4000	1200	2400	28000	60	-	-	-	-	-	-	-	-	-	-	-	4	80	
Health Based Investigation Levels 'F' (mg/kg)			500	100	500	5000	1500	3000	38000	75	-	-	-	-	-	-	-	-	-	-	-	5	100	

All Concentrations are expressed in mg/kg

** Denotes this value is the sum of individual components

*- Denotes currently no Investigation Limits in EPA Draft Guidelines

*** Denotes no specific Investigation Levels. Values represent general EPA acceptance levels.

* - Below detection limits

*- Denotes analysis not requested for this sample

BTEX - Benzene, Toluene, Ethylene & Xylene

TPH - Total Petroleum Hydrocarbons

* - denotes that these are EPA guidelines for phytotoxicity

na - not applicable

Values in **Bold** exceed the EIL for that substance
 Values in **Bold** exceed the HIL 'A' for that substance
 Values in **Bold** exceed the HIL 'D' for that substance
 Values in **Bold** exceed the HIL 'F' for that substance



Table 10 : LABORATORY QA/QC RESULTS - SOILS

Sample Location	Description															TPH					Polycyclic Aromatic Hydrocarbons		Sample Date
		As	Cd	Cr	Cu	Pb	Ni	Zn	Hg	B	T	E	X	Total	C ₁₀ ^a	C ₁₁ ^a	C ₁₂ ^a	C ₂₀ ^a	TPH ^a	B(a)P	PAHs		
BH3 0.5-0.7m	Silty Sandy Fill	<0.5	<1	<2	<5	22	<2	17	<0.1	<0.2	<0.5	<0.5	<0.5		<10	<50	<100	<100	<260	<0.5	<0.5	20/11/2007	
QC3		5	<1	<2	5	43	<2	53	0.3	<0.2	<0.5	<0.5	<0.5		<10	<50	<100	<100	<260	<0.5	<0.5		
RPD%		-	-	-	-	65	-	103	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3 0.5-0.7m	Silty Sandy Fill	<0.5	<1	<2	<5	22	<2	17	<0.1	<0.2	<0.5	<0.5	<0.5		<10	<50	<100	<100	<260	<0.5	<0.5	20/11/2007	
QC4		4.2	<1	<2	2.3	19	<2	20	0.1	<0.2	<1	<1	<3		<5	<10	<20	<20	<55	<5	<8	20/11/2007	
RPD%		-	-	-	-	15	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laboratory LOR		<0.5	<1	<2	<5	<5	<2	<5	<0.1	<0.2	<0.5	<0.5	<0.5		<10	<50	<100	<100	<260	<0.5	<0.5		

All Concentrations are expressed in mg/kg

Values in

Bold

exceed the acceptable RPD for that analyte

RPD - Relative Percent Difference

Where one measurement is below the detection limit a value half of the LOR is used to calculate RPD

"**" Denotes this value is the sum of individual components

"--" Denotes both results below Laboratory Limits of Reporting (LOR)

"---" Denotes no specific Investigation Levels. Values represent general EPA acceptance levels.

"<" - Below detection limits

"-" Denotes analysis not requested for this sample

BTEX - Benzene, Toluene, Ethylene & Xylene

TPH - Total Petroleum Hydrocarbons



Table 11 : LABORATORY QA/QC RESULTS - WATERS

Sample Location	Description	B Benzene	T Toluene	E Ethylbenzene	X Xylenes	Total BTEX^	TPH					Polycyclic Aromatic Hydrocarbons										Sample Date	
							C ₆ ⁺ C ₉	C ₁₀ ⁺ C ₁₄	C ₁₅ ⁺ C ₂₈	C ₂₉ ⁺ C ₃₆	TPH^	B(a)p	Total PAH^	As mg/L	Cd mg/L	Cr mg/L	Cu mg/L	Pb mg/L	Ni mg/L	Zn mg/L	Hg mg/L		
							Rinsate Water Sample																
QCA		<1	<2	<2	<^	<7	<20	<50	<100	<50	<^	<0.5	^	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.0001	21/11/2007
Laboratory LOR		1	2	2	^	7	20	50	100	50	^	0.5	^	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001	

All Concentrations are expressed in µg/L, otherwise specified in the table

^{^^} Denotes this value is the sum of individual components

[<] - Below detection limits

BTEX - Benzene, Toluene, Ethylene & Xylene

TPH - Total Petroleum Hydrocarbons

⁻⁻⁻ Denotes both results below Laboratory Limits of Reporting (LOR)



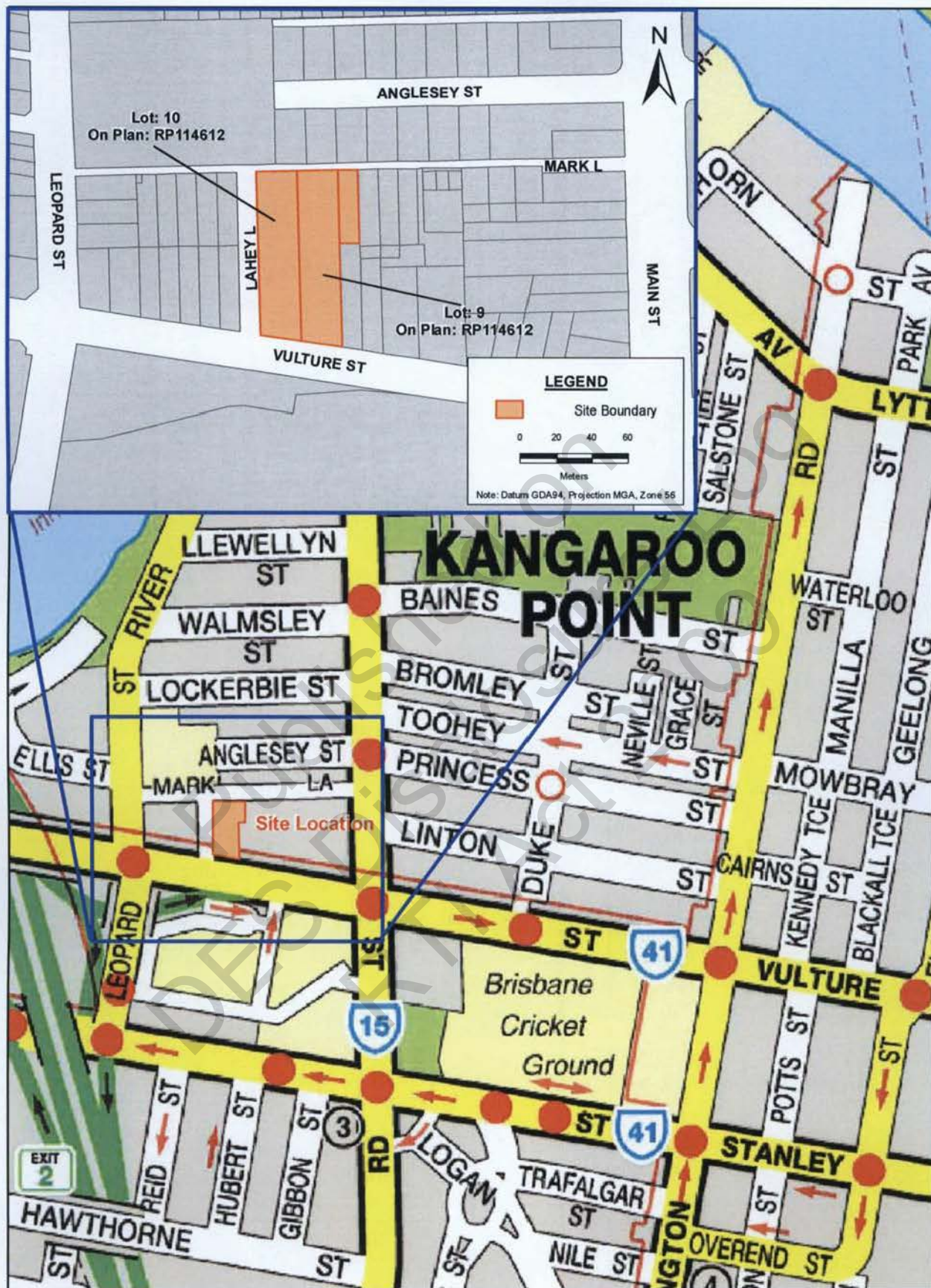
Figures

Figures

Checked by:

sch 4 - signature

Date: 11/3/08



CLIENT Philip Usher Constructions PTY. LTD.		PROJECT 320 - 324 Vulture St, Kangaroo Point	
DRAWN CFJ	DATE 20-11-07	TITLE SITE LOCATION PLAN	
CHECKED CW*	DATE 20-11-07		
SCALE Not To Scale		PROJECT No 001-077633089	FIGURE No 1
		REV No 0	A4

S1 (0-100mm)	
Cu	112
EPA	100

S11 (0-200mm)	
Pb	
	1450
EIL	300

S8A (2.0m)	
TPH C ₁₀ - C ₁₄	
	129
EIL	100

S7 (1.0m)		
	TPH C ₈ - C ₉	TPH C ₁₀ - C ₁₄
	149	303
EIL	100	100

LEGEND:

x S1 PREVIOUS TEST LOCATION

Note:
All results in mg/kg

EPA - QLD EPA Phytotoxicity Guideline



INTERPRETIVE ONLY
DO NOT SCALE

	CLIENT	Philip Usher Constructions		PROJECT	Stage 1 PSI Kangaroo Point 320-324 Vulture Street, Kangaroo Point		
	DRAWN	REJ	DATE	14/12/07	TITLE	SITE FEATURES MAP + PREVIOUS INVESTIGATION LOCATIONS	
	CHECKED	*CW	DATE	8/02/08	PROJECT No	001-077633089	FIGURE No
	SCALE	1:400 APPROX				2	REV No
						0	A3

NOTE: THE * BESIDE THE TYPED INITIALS DENOTES THE ORIGINAL DRAWING ISSUE WAS SIGNED OR INITIALED BY THAT RESPECTIVE PERSON.

File A

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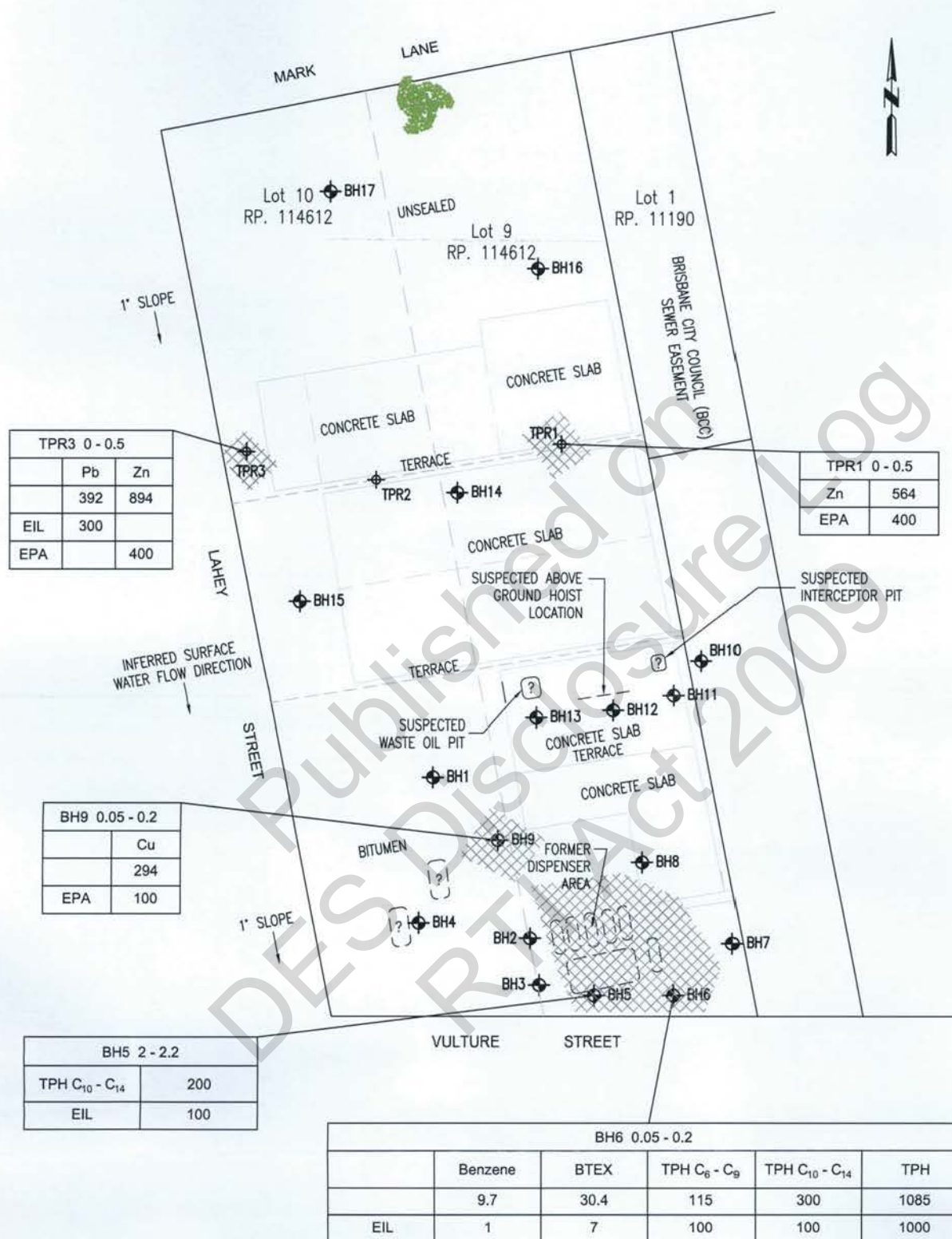
RTI 18-548



INTERPRETIVE ONLY
DO NOT SCALE

	CLIENT Philip Usher Constructions		PROJECT Stage 1 PSI Kangaroo Point 320-324 Vulture Street, Kangaroo Point						
	DRAWN REJ	DATE 30/11/07	TITLE SITE INVESTIGATION LOCATIONS						
	CHECKED *CW	DATE 8/02/08							
	SCALE 1:400 APPROX		PROJECT No	001-077633089	FIGURE No	3	REV No	0	A3

NOTE: THE * BESIDE THE TYPED INITIALS DENOTES THE ORIGINAL DRAWING ISSUE WAS SIGNED OR INITIALED BY THAT RESPECTIVE PERSON.



Note:
All results in mg/kg

EPA - QLD EPA Phytotoxicity Guideline

Extent of Contamination

1:400

0 8 16 m

8 4

INTERPRETIVE ONLY
DO NOT SCALE

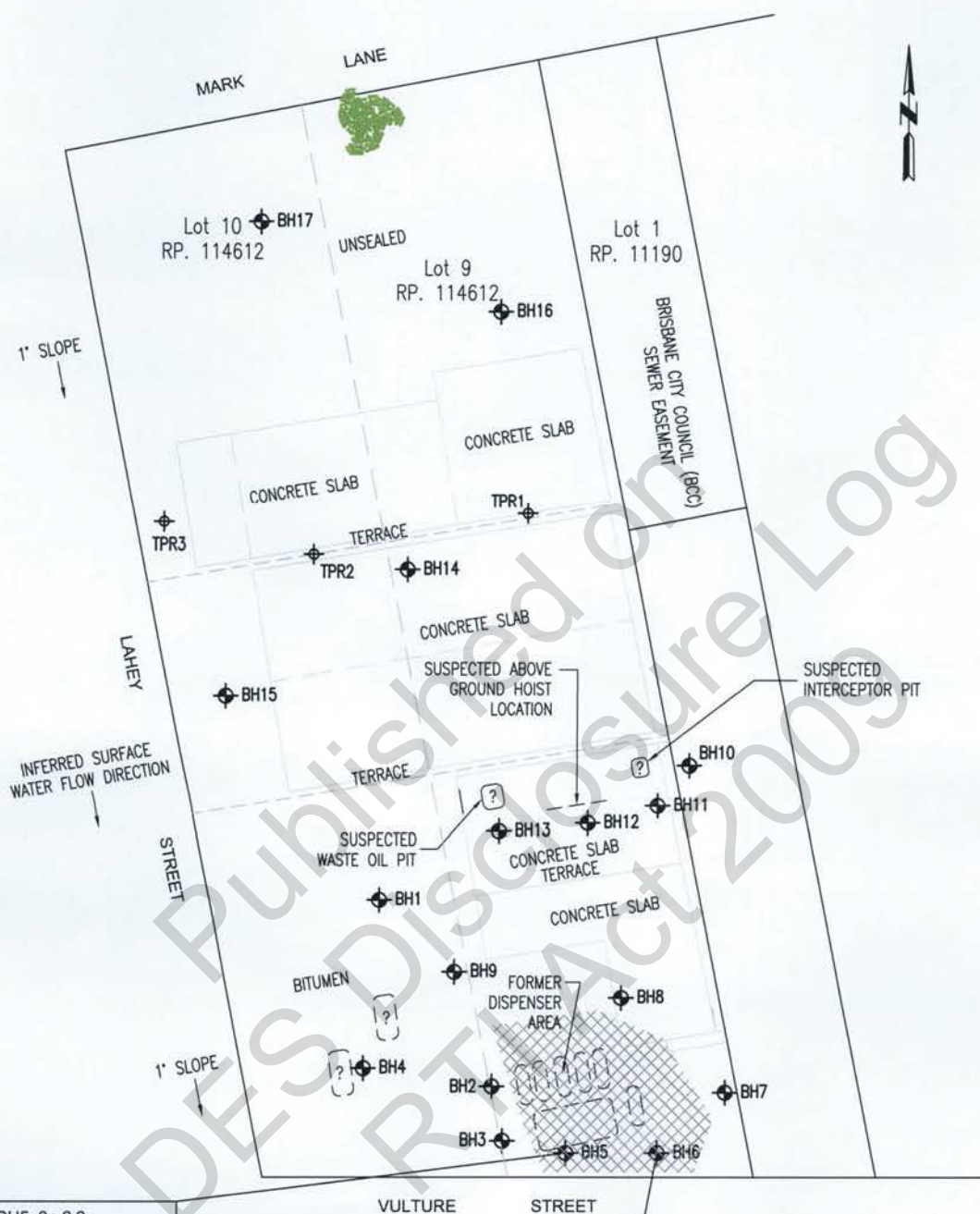
	CLIENT	Philip Usher Constructions		PROJECT	Stage 1 PSI Kangaroo Point 320-324 Vulture Street, Kangaroo Point		
	DRAWN	REJ	DATE	30/11/07	TITLE	IDENTIFIED AREAS OF CONTAMINATION FROM CURRENT INVESTIGATION	
	CHECKED	*CW	DATE	8/02/08	PROJECT No	001-077633089	FIGURE No
	SCALE	1:400 APPROX				4	REV No
						0	A3

NOTE: THE * BESIDE THE TYPED INITIALS DENOTES THE ORIGINAL DRAWING ISSUE WAS SIGNED OR INITIALED BY THAT RESPECTIVE PERSON

File A

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RTI 18-548



BH5 2 - 2.2	
TPH C ₁₀ - C ₁₄	200
EIL	100

BH6 0.05 - 0.2					
	Benzene	BTEX	TPH C ₆ - C ₉	TPH C ₁₀ - C ₁₄	TPH
	9.7	30.4	115	300	1085
EIL	1	7	100	100	1000

Note:
All results in mg/kg

EPA - QLD EPA Phytotoxicity Guideline

Extent of Contamination
Requiring Management

1:400 0 8 16 m

INTERPRETIVE ONLY
DO NOT SCALE

	CLIENT		Philip Usher Constructions		PROJECT				Stage 1 PSI Kangaroo Point 320-324 Vulture Street, Kangaroo Point															
	DRAWN		REJ		DATE		30/11/07		TITLE				IDENTIFIED AREAS OF CONTAMINATION REQUIRING MANAGEMENT											
	CHECKED		*CW		DATE		8/02/08		PROJECT No				001-077633089		FIGURE No		5		REV No		0		A3	
	SCALE		1:400 APPROX																					

NOTE: *CW * BESIDE THE TYPED INITIALS DENOTES THE ORIGINAL DRAWING ISSUE WAS SIGNED OR INITIALED BY THAT RESPECTIVE PERSON



August 2009



RECEIVED

25 AUG 2009

ECSU

Further Environmental Site Assessment including UST Validation, 320-324 Vulture Street, Kangaroo Point

Submitted to:

Glen Frew
Phillip Usher Constructions Pty Ltd
PO Box 1536
Browns Plains 4118

REPORT



A world of
capabilities
delivered locally

Report Number: 014-077633089-R-Rev0

Distribution:

Robin Wagland (Third Party Reviewer)
WSP Environmental Pty Ltd





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FIGURES

Figure 1: Site Location Plan

Figure 2: Site Map Including Validation Locations

Figure 3: Soil Exceedences Following Validation Works

APPENDICES

APPENDIX A

Limitations

APPENDIX B

Test Pit Logs

APPENDIX C

Disposal Permit & EMR Search Records

APPENDIX D

Photograph Log

APPENDIX E

Analytical Data

APPENDIX F

Wastewater Removal, UST Destruction, Trade Waste Permit, Landfill Dockets, Correspondence

APPENDIX G

QAQC Assessment



1.0 INTRODUCTION

Golder Associates (Golder) were engaged by Phillip Usher Constructions Pty Ltd (Phillip Usher) to undertake further environmental works including validation of an underground storage tank (UST) area at a Site located at 320-324 Vulture Street, Kangaroo Point (see Figure 1). The Site formerly operated as a service station and included light industry (i.e. metal finishing).

The works are being undertaken to meet the requirements of a Department of Environment and Resource Management (DERM, formerly EPA) information request issued following lodgement of a Development Application (DA) for proposed redevelopment of the Site into a 20 level residential tower including a three-level underground car park (approximately 15 m deep).

The DERM information request stipulated that prior to granting a DA for a Material Change of Use the Site was to be either:

- Removed from the DERM Environment Management Register (EMR); or
- Preparation of a Site Management Plan/Remediation Action Plan for management of any contamination during redevelopment.

All works required assessment by a DERM appointed Third Party Reviewer (TPR). The TPR for the Site is Robin Wagland of WSP Environmental.

2.0 BACKGROUND

Two previous environmental assessments have been undertaken on the Site. They are:-

- *Environmental Site Assessment, Vulture Street, Australis Contract Engineering Pty Ltd (Australis), November 2002.*

Information from the Australis report (2002) indicated that a service station building with two workshops, a sales office, dispenser and six USTs were present at the site during their investigation in 2002. Additional infrastructure identified at the time included;

- A shed housing the former furniture business (Lahey's Joinery), salt lick distribution business (Olsson's Industries) and a building used for storage of two buses;
- A second shed which housed an upholstery business and later an above ground 0.5m³ metal finishing bath used for brass plating small objects; and
- A two storey office building used for an upholstery business.

The findings of this report indicated elevated hydrocarbon fractions in shallow soils at depths of 1 m and 2 m in the vicinity of the eastern UST area Total Petroleum Hydrocarbons (TPH) fraction C₆-C₉ to 149mg/kg and C₁₀-C₁₄ to 303mg/kg. Elevated levels of copper (112mg/kg) were identified in surface soils in the northern portion of the Site. An elevated lead concentration (1,450mg/kg) was identified in surface soils located on the eastern end of the northern workshop beyond the Lot boundary (in the adjacent easement).

Note: As this report was not undertaken by a suitably qualified person (identified by DERM), and no statutory declaration could be obtained, information in this report has been used for reference only. No reliance on this information is made within this report.

- *Stage 1 and Stage 2 Site Investigation, 320-324 Vulture Street, Kangaroo Point, Report 001-077633089, Golder Associates, March 2008.*

Contamination identified on the site was generally associated with the UST area, imported fill and the former vehicle workshops. TPH, Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), zinc, copper and arsenic were identified in surface soil fill. TPH contamination at depth (BH5 2-2.2m) is likely to be associated with the underground fuel infrastructure.



Based on the findings of the Golder investigation, all contamination that exceeds the 'HIL A' has been delineated vertically and horizontally, i.e. the TPH contamination delineation has been undertaken to the nearest borehole below the DERM unpublished guidelines for TPH including boreholes BH2, BH3, BH7, BH8 and BH9.

Some areas of contamination were expected to exist in areas inaccessible to sampling for health and safety reasons and these include the majority of the area directly adjacent to underground fuel tanks, dispenser and fuel lines (i.e. within and adjacent to bedding sands).

2.1 Site Description

The Site consists of two Lots (Lots 9 and 10 on RP 114612) and is approximately 0.37ha in area. The Site is situated between Mark Lane (to the north) and Vulture Street (to the south). Approximately 3 metres of elevation change occurs across the Site with the lowest point adjacent to Vulture Street. The Site has been terraced to form 4 level areas. The Site is primarily surfaced with concrete with unsealed areas present on the upper terrace and directly adjacent to Lahey Street (to the west).

The Site is bounded by Light Industry to the west (over Lahey Street), a council easement to the east and beyond that a Greek Orthodox Church. Residential properties are present beyond Mark Lane to the north, and to south of the Site is the off ramp from the M1 to Vulture Street.

A large sign (~15m span) is present on the lower terrace of the Site adjacent to the previously identified underground storage tanks. No other structures are present on the Site.

Both Lots are listed on the EPA EMR as follows:

Lot 9 on RP 114612 – Listed for use as a Service Station.

Lot 10 on RP 114612 – Listed for use as a Service Station and for Metal Treatment or Coating.

Search records (undertaken for PSI report) are included in Appendix C. The Lots are not listed on the Contaminated Land Register (CLR).

3.0 OBJECTIVES

Based on the DERM/TPR comments for work undertaken to date the following was required to meet the DA requirements of the Information Request:

- Removal of underground storage tanks, excavation of impacted soils and disposal to landfill and subsequent validation of surrounding/underlying soils; and
- Further sampling and analysis of fill material on the upper northern tier of the Site (adjacent to Mark Lane). This area had been previously used for metal treatment and coating.

Following these works the Site was to either be:

- Removed from the DERM Environmental Management Register (on the basis that concentrations of potential contaminants remaining on-site pose no environmental or human health based risk) and therefore the site is considered suitable for unrestricted use; or
- Managed under a Site Management Plan if sufficient contamination was identified remaining on-site.

To meet these objectives the proposed methodology (Document 012-077633089) was supplied to the client and TPR for comment prior to undertaking works. Comments were received on 7 April 2009 and included a request for more extensive sample analysis for metals.

4.0 GUIDELINES

The validation criteria selected were based on the Environmental Investigation Levels (EILs). Where EILs were exceeded, Health Based Investigation Investigations for Residential Land Uses (HIL (A)) as per Table



5A of the National Environmental Protection Measure 1999 were compared. Phytotoxicity guidelines for copper and zinc have also been applied.

The criteria discussed above are shown in Table 1.

Table 1: Validation Criteria

Compound	EIL (mg/kg)	HIL (A) (mg/kg)
Benzene	1	
Total BTEX	7	
TPH (C ₆ -C ₉)	100*	
TPH (C ₁₀ -C ₁₄)	100*	
TPH (C ₁₅ -C ₂₈)	1,000*	
TPH (C ₂₉ -C ₃₆)	1,000*	
PAH (total)	-	20
Benzo(a)pyrene	-	1
Arsenic	20	100
Cadmium	3	20
Chromium (as Cr VI)	50	100
Copper	200^	1000
Lead	300	300
Mercury	1	15
Nickel	60	600
Zinc	400^	7000

* QLD DERM Acceptance Criteria

^ QLD DERM Phytotoxicity Levels

5.0 QA/QC

The following field QA/QC was performed as per NEPM (1999) for the work:

- Duplicate samples at a rate of 1 per 20 primary samples; and
- Triplicate samples at a rate of 1 per 20 primary samples.

No rinsate samples were obtained as all sampling equipment used was disposable.

6.0 DISPOSAL PERMIT

As soil excavated from the fuel storage was expected to contain elevated concentrations of volatile components, it was preferred to remove excavated material directly to landfill for characterisation in



preference to characterising and possible on-site remediation. This preference was chosen due to a number of sensitive receptors in close vicinity to the Site (residential to the north and a church to the east).

To remove material directly off-site to the landfill a DERM soil disposal permit was sought for up to 600m³ to be removed to landfill for characterisation and subsequent disposal. A copy of the disposal permit is included in Appendix C.

7.0 FIELDWORK

UST validation works were undertaken between 1 June 2009 and 17 June 2009. Prior to 1 June 2009, USTs were removed by an accredited contractor, McKinnon Earthmoving. From 17 June 2009, backfilling of the excavation was undertaken. Validation sample locations are presented on Figure 2. All works were undertaken under the supervision of a suitably qualified environmental scientist. A test pitting program was also undertaken during this period on the northern portion of the Site (see Section 7.4).

7.1 UST Removal

Six 5,000L USTs were identified on-site. Prior to removal, USTs were drained of contents by Fuel Medix, a licensed waste water contractor. USTs were then removed from the ground, fittings removed and removed "gassed up" by a dangerous goods licensed haulage company. Tanks were destroyed off-site by an accredited contractor, 4D Installations. Waste water receipt and tank destruction certificate are included in Appendix F.

USTs were in reasonable condition with minor surface rust present (refer to photographs 1 and 2 of Appendix D). Water with a hydrocarbon sheen (approximately 7,250l) was removed from the USTs. It is unknown whether an anti-rust agent was also present.

Other locations identified in the Australis report as potential contaminant areas are discussed below:

- USTs in the vicinity of BH4 – Excavation of this area was undertaken for validation of dispensers and removal of residual contamination in this area. No evidence of USTs were identified. No additional pipework was identified;
- Dispensers in the vicinity of BH4 – The dispensers were identified to be in a different location to those determined by Australis. Dispensers were at the locations identified in Figures 2 and 3;
- Interceptor pits, in-ground hoists, workshop sources (i.e. near BH11 and BH13) – No evidence of these was identified on the Site. Concrete was removed from the most probable of locations (near BH8) however no in-ground hoist was identified.

7.2 Validation Sampling (wall and base)

Validation sampling was undertaken following excavation of potentially contaminated fill (identified by olfactory evidence and photoionisation detector (PID) screening). Initial excavation validation was undertaken between 1st and 11th June 2009. Following initial failure of wall samples Wall Val 20 and Vent, these areas were excavated to the Lot boundary. Further excavation was not possible in the easement due to presence of underground services and as no approval was obtained from Brisbane City Council who own this easement. Additional validation samples, Wall Val 20a and Vent 2 located on the eastern site boundary, were obtained from similar depths to previous samples at the new excavation surface. Further excavation was not possible south of sampling location BDYS 1 located at the southern extent of the site as it was located on the property boundary and services were present directly adjacent in the footpath on Vulture Street.

Validation sampling was undertaken to the frequency prescribed by DERM including a minimum of:

- 1 sample per 25m² on excavation base and walls;
- For USTs <4m in length, 1 sample from the base and each of the walls of the excavation;



- 1 sample at the base of dispensers;
- 1 sample per 5m length of former product line; and
- 1 sample at the base of the vent points.

Validation samples were collected from the excavator bucket primarily with samples obtained directly from the excavation surface only where possible (based on health and safety restrictions i.e. shallow depth, battered wall). Samples obtained from the excavation bucket were obtained from central areas of the bucket to prevent potential cross contamination. All samples were obtained with disposable nitrile gloves that were disposed between samples.

7.2.1 Volatile Screening

Validation samples were screened using a PID for volatile components. Where elevated volatile results (i.e. >20ppm) were observed on excavation walls and base, further excavation was directed (where practical to do so). Only one sample contained elevated PID levels, BDY S1 0.4m had a PID value of 64ppm. This location is included in Appendix D, Photograph 4. The sample was obtained from a small pocket of fill (gravelly clay) at the southern site boundary. This area could not be excavated further as the sample was obtained from a batter adjacent to the Vulture Street site boundary. The remainder of the batter consisted of silty clays which contained no elevated PID concentrations.

PID calibration was undertaken by an external body as per PID requirements (6 monthly). The calibration certificate is included in Appendix F. Daily checks of calibration were undertaken by field staff against Calgas isobutylene. These documents have been previously provided to TPR for reference.

7.2.2 Sample Failures

Where initial testing of samples identified exceedences of adopted validation criteria, a further scrape was undertaken (up to 0.3m) and material removed to landfill. Subsequent samples were generally given a suffix i.e. Wall Val 20a is the further sample obtained following scrape from location Wall Val 20 (approximately 0.5m to the east of original sample) on the property boundary.

7.3 Temporary Stockpile Material

Material from the excavation was temporary stockpiled on-site as indicated on Figure 2. The stockpile was placed directly on soil surface. Following removal of the stockpile, validation samples SP Base 1 and SP Base 2, were obtained from the soil surface. Following elevated concentrations of lead (480 and 642mg/kg) in these samples, a further 300mm scrape of this area was undertaken. Additional validation samples SP Base 1a and SP Base 2a were obtained from the new excavated surface. Soil disposal information is included in Section 7.8.

7.4 Testpit Program

As per the request of the DERM/EPA, four testpits, (TP1 to TP4) were advanced on the upper terrace of the Site (formerly the location of a small above-ground metal finishing bath). Samples were obtained of fill material and underlying weathered rock. Testpit logs are included in Appendix B.

7.5 Water Management

During excavation works, rainfall entered the excavation following UST removal. Where possible, water was prevented from entering the excavation (i.e. earthen bund upgradient). One sample, WS1 was obtained of the water in the excavation on 21 May 2009. This sample was analysed for potential contaminants including BTEX, TPH, heavy metals and suspended solids. Water volume at this time was estimated at approximately 75,000L. The results of this sample are included in Table 8 following the body of this report.

These results were used to apply for a trade waste agreement with Brisbane City Council for disposal of wastewater from the excavation. Water was pumped from the excavation at regular intervals during



backfilling works. A total of approximately 230kL was pumped from the excavation over the duration of works. A copy of the trade waste agreement and summary of volume removed is included in Appendix F.

7.6 Excavation Reinstatement

The excavation was backfilled with concrete formerly covering the surface of the excavated area. Approximately 580m³ of clean backfill shale material was sourced from Lots 1 to 5 on RP 42010 located on Arch Lane, Brisbane to make up the deficit. These Lots are currently on the DERM EMR, however fill material is rock material below the previously validated base. These Lots have been previously validated by Golder Associates. The TPR for these Lots is Trevor Lloyd of Lloyd Consulting. Email correspondence between Golder and Trevor Lloyd confirmed that this backfill material is classified as "clean", and is included in Appendix F.

7.7 Soil Conditions

Soil conditions encountered on the Site were generally consistent with previous works. Fill including silty clays, gravel and sand was present overlying residual soils and a thin layer of weathered rock (up to 0.3m) overlying less weathered Brisbane Tuff rock. Fill thickness was generally up to 1.8m thick on the northern end of the Site (close to Mark Lane) to greater than 2.8m thick in the vicinity of the underground storage tanks (close to Vulture Street). Layers of ash were observed across the Site. Where ash was encountered in testpits, preference was given to these samples for analysis.

7.8 Landfill Characterisation

A total of 1002.20 tonnes of fill was removed to landfill under the disposal which equates to 572m³ allowing for a bulk density of 1.75 t/m³ (given that the majority of fill removed was coarse grained i.e. tank pit sands). This value is under the quantity allowed for in the disposal permit of 600m³. Refer to Appendix F for documentation.

Sampling was undertaken of the stockpile at the landfill on 11 June 2009. The stockpile was estimated at 810m³ (loose) and 17 characterisation samples (SP 1-1 to SP1-17) were obtained. A further 50m³ of soil was received at the landfill post this date from scraped soil on-site following initial exceedences. This extra material was not sampled as initially failed validation samples on-site were expected to represent concentrations sent to the landfill (i.e. SP Base 1 and SP Base 2).

As the 572m³ removed from the site is estimated as *insitu* (as per the disposal permit application) and the material was bulked (assuming a bulking factor of 1.3) the estimated bulked volume is 750m³. As landfill dockets were not available at the time of characterisation sampling, a field estimate was undertaken which estimated a value of 810m³ (i.e. within 10% of bulked volume).

Three samples of the material at the landfill SP Base 1, SP Base 2 and SP1-2 were further analysed for deionised water leachate due to elevated concentrations of lead in these samples. Lead concentrations in the leachate indicated the stockpile was suitable for disposal to unlined landfill. One exceedance of lined landfill was noted for total lead (642mg/kg) and was from material removed post initial site validation and this material (estimated at 50m³) was disposed to lined landfill. Concentrations of hydrocarbons were marginally above EIL and within guidelines for unlined landfill. As some of the material contained heavy end TPH and lead and zinc concentrations (i.e. scrape from Wall Val 20 area) which is not amenable to remediation or possible to segregate, all material with the exception of the 50m³ discussed previously was disposed to unlined landfill. A letter from Transpacific on final disposal of material is included in Appendix F.

Note: No TCLP analysis was undertaken as soil disposed at Transpacific unlined/lined landfill is not co-disposed with refuse and therefore deionised water leachate (SPLP) is used for characterisation.

8.0 ANALYSIS

Following collection, all samples were identified with a unique identifier and placed on ice in an esky for transport to the laboratory. Samples were submitted to National Association of Testing Authority (NATA) accredited laboratories for the analysis requested. Primary and duplicate samples were submitted to



Australian Laboratory Services (ALS) of Stafford, Queensland. Triplicate samples were submitted to Labmark of Murarrie, Queensland. All samples were submitted under Chain-of-Custody (CoC) documentation and Sample Receipt Advice/ Sample Receipt Notification (SRA/SRN) were provided by the laboratory on receipt of the samples. CoC and SRA/SRN documentation is included with analytical reports in Appendix E.

Soil samples were analysed as follows:

- UST Validation – All samples analysed for BTEX, TPH and lead. Selective analysis for PAHs and seven further metals (arsenic, cadmium, chromium, copper, nickel, zinc and mercury);
- Test Pits - All samples analysed for 8 metals (i.e. including lead) and selectively analysed for PAHs;
- Stockpile Samples - All samples analysed for BTEX, TPH and lead. Selective analysis for PAHs and seven further metals (arsenic, cadmium, chromium, copper, nickel, zinc and mercury); and
- Leachate analysis (SPLP) of elevated results for landfill disposal.

Quality duplicate and triplicate samples were analysed for the same analytes as primary samples.

9.0 RESULTS

Validation sample results are included in Table 4 (following the body of this report). All samples contained concentrations below validation criteria on the Site with the exceptions listed in Table 2.

Table 2: Validation Criteria Exceedences

Sample (Depth)	Date	Location	Concentration (mg/kg)	Validation Criteria (mg/kg)	Notes
BDY S1 (0.4m)	3/6/09	Batter adjacent to Vulture St lot boundary.	TPH C ₉ -C ₉ - 165mg/kg	100mg/kg	No further excavation possible due to close proximity of Vulture Street.
			TPH C ₁₀ -C ₁₄ -190mg/kg	100mg/kg	
Wall Val 20a (0.6m)	17/6/09	Eastern lot boundary adjacent to easement.	Lead – 396mg/kg	300mg/kg	No further excavation possible as excavation wall on Lot boundary with easement. Note 1.
			Zinc – 1,210mg/kg	400/7000 mg/kg Note 2	
			TPH C ₂₉ -C ₃₆ -1,270mg/kg	1,000mg/kg	
			Total TPH - 2,130mg/kg	1,000mg/kg	

Note 1 – Previous sampling undertaken in the easement by Australis indicated elevated concentrations of lead in soils in this area (1,450 mg/kg). This easement is owned by Brisbane City Council.

Figure 3 contains a summary of all exceedences noted for the site including validation exceedences in Table 2 and exceedences remaining on the Site noted in previous works. Table 3 lists a summary of the lead analyses undertaken on the Site.

Sample Wall Val 20a (0.6m) was obtained at the eastern lot boundary. Recontamination of the site from this exceedence (volume estimated at <0.5m³ remaining on-site) is not expected as the methods for recontamination of the site are as follows:

- Perched groundwater (on the rare occasions it is present) - Expected at the rock interface (i.e. ~3m depth at this location);
- The material is of a depth of 0.6m meaning that migration through surface runoff is not expected; and



- Leachate is not expected based on the contaminants (heavy fraction TPH and lead) as these are not readily leachable. This is confirmed in SPLP data obtained for lead exceedences removed to landfill.

BDY S1 was obtained at the batter to the site boundary on Vulture Street. PID screening of this wall identified an area ($\sim 0.5\text{m}^2$) of sandy fill where PID concentrations were above background concentrations ($>10\text{ppm}$). A conservative estimate of this material remaining on-site is 5m^3 . As the gradient of the site falls to the south any migration of these relatively low-level contaminants will be to the south (away from the site). Natural attenuation of these concentrations is expected to occur.

Table 3: Heavy Metals (lead) exceeding HIL(A) remaining on-site

Number of Analyses	Number of exceedences remaining onsite exceeding HIL (A)	Percentage of analyses failing the EIL
317	2	0.6%

Given the low percentage of lead samples marginally failing HIL (A) from both the previous site investigation and the current validation works, the remaining exceedences on the lots are not considered to present any risk of harm to the environment or site users. All fill on the site is expected to be removed from the site during bulk excavation works for the basement carpark.

9.1 QA/QC Summary

The QA/QC assessment for this report is included in Appendix G. The following key points were identified:

- All samples were received under the appropriate chain of custody documentation by the primary laboratory in appropriately preserved containers and within appropriate holding times. A breach of holding time (1 day) occurred for moisture content;
- Nine internal duplicate failures were reported: two for arsenic, two for chromium, one for nickel, two for lead, and two for zinc. The laboratory reported that the duplicate failure for nickel and one of the arsenic results was from sample WALL VAL 17 1.8m. One of the lead and one of the zinc results was for WALL VAL 19. These results are likely due to the samples either returning concentrations of metals close to or below the LOR. In this case, results less than five times the LOR in our RPD calculations would have an upper RPD limit of 200%. Additionally, the guidelines for RPD limits set by the laboratory are very stringent, and less than the 50% RPD usually used in these calculations. In stockpile samples SP1-3 and SP1-13, RPD exceedences for lead and zinc were reported by the laboratory. These are considered to be acceptable, as the results were either below this report's DQO of 50% RPD for soils, or else returned concentrations below the remediation criteria. The chromium and the second arsenic and lead results were for anonymous samples not associated with the investigation samples and therefore are not considered further;
- Seven spike results were reported outside the nominated data quality objectives (DQOs);
- One surrogate recovery result was reported outside the nominated DQOs for PAHs, however, no concentrations of PAHs exceeding the laboratory LOR were reported in the results;
- All method blanks were reported below the detection limits.

Results of Relative Percentage Difference (RPD) calculations are included in Table 7 following the body of this report.

- RPDs were recorded above the acceptance criterion of 75% RPD (fill) for lead for TP4 0.8m and its duplicate QC5, with a value of 129%. RPDs were also recorded above 50% for lead and zinc between TP4 0.8m and its triplicate QC6, with values of 111% and 117%, respectively. The reason for RPD exceedences is likely due to the heterogeneity of the fill in these locations. As all concentrations measured in sample/duplicate pairs were below the site validation criteria these results are deemed acceptable.



With the above points considered, the laboratory and field QA/QC carried out for this report is considered to provide sufficient basis for accepting all investigation results.

9.2 Risk Assessment

Concentrations of contaminants identified as remaining on the site are not expected to pose an environmental or health and safety risk to the proposed use of the Site (i.e. high density residential). Although zinc and copper concentrations exceeding phytotoxic levels, elevated concentrations were either at depths greater than 0.5m or beneath a concrete slab. The site is not vegetated and is not expected to be vegetated (with the exception of possibly above-ground planter boxes). Additionally, as the identified locations are not present at the soil surface mobilisation of these contaminants off-site (i.e. to a more environmentally sensitive area) is not expected. Two lead concentrations in the fill material (0.6% of samples analysed) marginally exceeded HIL (A) with concentrations of 392 and 396mg/kg. These concentrations are not expected to pose any risk to the human health or the environment as the site is zoned for high density residential.

Based on the low number of samples marginally exceeding HIL (A), the site is suitable for unrestricted use (i.e. removed from the DERM EMR).

It should also be noted that prior to construction of the building, all fill will be excavated as well as underlying rock material for formation of the three-level underground car-park.

10.0 CONCLUSIONS

Based on the findings of these validation works and those obtained during the previous Golder assessment (March, 2008) the following conclusions are made:

- Contaminant sources (i.e. fuel infrastructure) have been removed from the site and appropriately disposed;
- Contaminated soil associated with the fuel infrastructure has been removed from site and subsequently disposed at landfill;
- Minor metals impact has been noted in fill on the site (copper, zinc and lead). Two lead concentrations marginally exceeding HIL (A) remain on the site and based on the distribution, are present in the heterogeneous fill. Suitable delineation (generally within 5m) has been undertaken of samples exceeding guideline values.
- Validation of the fuel storage area has been adequately undertaken;
- TPH exceedences are present in one sampling location, BDY S1 adjacent to Vulture Street (C₆-C₉ 165mg/kg, C₁₀-C₁₄ 190mg/kg). Further excavation could not be undertaken beyond this location due to instability concerns along the footpath and road, and the underground services located along the lot boundary. The volume of fill relating to this sample remaining on-site is estimated at less than 5m³;
- Fill present in the lot easement east of the site contains exceedences of lead (to 1,450mg/kg) from previous investigations, and beyond the eastern property boundary adjacent to the former vents (C₂₉-C₃₆ 1,270mg/kg, Total TPH 2,130mg/kg and zinc 1,210mg/kg); and
- Contaminants remaining on the site indicate the site is suitable for unrestricted use (i.e. removal from the DERM EMR).

11.0 RECOMMENDATIONS

Based on the findings of these validation works and those obtained during the previous Golder assessment (March, 2008) the following recommendations are made:



- Notification to the DERM of identified contamination (suspected to be present in contaminated fill) in the BCC easement east of the Site i.e. beyond the Lot boundary; and
- Removal of Lots 9 and 10 on RP 114612 from the DERM EMR.

12.0 LIMITATIONS

Golder's standard limitations are included in Appendix A. This report can additionally be used by the Third Party Reviewer and the Department of Environment and Resource Management. In regard to "additional studies"; based on the findings of this report (i.e. conditions encountered), no additional studies are required.

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TABLES

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Table 4 : LABORATORY RESULTS - VALIDATION SOIL SAMPLES

Sample Location	Depth	Location Description	As Cd Cr Cu Pb Ni Zn Hg								Benzene	Toluene	Ethylbenzene	Xylenes*	Total BTEX*	TPH					Polycyclic Aromatic Hydrocarbons		Sample Date		
			As	Cd	Cr	Cu	Pb	Ni	Zn	Hg						C ₁	C ₂	C ₃	C ₄	TPH*	BaP	Total PAH*			
Well Val 1	1.8	Obtained from excavation walls.	-	-	-	11	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Well Val 2	2		-	-	-	14	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Well Val 3	2		-	-	-	13	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Well Val 4	2		-	-	-	18	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Well Val 5	2		-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	1/06/2009			
Well Val 6	1.8		-	-	-	19	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Well Val 7	1.8		-	-	-	11	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Well Val 8	1.8		-	-	-	13	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Well Val 9	1.8		-	-	-	11	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Well Val 10	2		-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	3/06/2009			
Well Val 11	1.8		-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	3/06/2009			
Well Val 12	2		-	-	-	9	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	3/06/2009			
Well Val 13	1.8		-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	3/06/2009			
Well Val 14	2.8		-	-	-	9	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	3/06/2009			
Well Val 15	1.8		-	-	-	15	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	3/06/2009			
Well Val 16	1		-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	4/06/2009			
Well Val 17	1		-	-	-	11	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	4/06/2009			
Well Val 18	1		-	-	-	13	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	4/06/2009			
Well Val 18a	1.8		-	-	-	20	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	11/06/2009			
Well Val 19	0.6	-	-	-	84	15	143	<0.1	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	11/06/2009				
Well Val 20	0.6	Excavated further, replacement sample Well Val 20a obtained. 0.5m to west of Well Val 20. Beyond Lot boundary, no further excavation possible.	-	-	-	112	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	860	2080	2940	-	-	11/06/2009			
Well Val 20a	0.6		9	1	8	41	396	7	1219	0.2	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	860	1270	2130	<0.5	0.5	17/06/2009		
Well Val 21	0.8	Obtained from excavation walls.	-	-	-	6	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	17/06/2009			
Well Val 22	0.8		-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	17/06/2009			
Base Val 1	2.8	Obtained from excavation base.	-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Base Val 2	2.8		-	-	-	9	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Base Val 3	2.8		-	-	-	5	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	1/06/2009			
Base Val 4	2.8		-	-	-	5	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	1/06/2009			
Base Val 5	2.8		-	-	-	5	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	3/06/2009			
Base Val 6	2.8		-	-	-	5	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	3/06/2009			
Base Val 7	1.4		-	-	-	18	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	11/06/2009			
Base Val 8	2.8		<5	<1	4	<5	17	<2	12	<0.1	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	11/06/2009		
Base Val 9	2		<5	<1	3	<5	11	<2	5	<0.1	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	17/06/2009		
SP Base 1	0.1	300mm scrape undertaken and replacement sample SP Base 2a obtained.	-	-	-	450	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	11/06/2009			
SP Base 1a	0.4	Replacement sample for SP Base 2.	-	-	-	14	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	17/06/2009			
SP Base 2	0.1	300mm scrape undertaken and replacement sample SP Base 1a obtained.	-	-	-	642	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	11/06/2009			
SP Base 2a	0.4	Replacement sample for SP Base 1.	-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	17/06/2009			
Line 1	2.4	Obtained from below former fuel line location.	-	-	-	13	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	4/06/2009			
Line 2	2.4	Obtained from below former fuel line location.	-	-	-	11	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	4/06/2009			
Disp 1	2.4	Obtained from below former dispenser location.	-	-	-	11	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	4/06/2009			
Disp 2	2.4	Obtained from below former dispenser location.	-	-	-	6	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	4/06/2009			
Vent	0.6	Excavated further, replacement sample Vent 2 obtained.	-	-	-	349	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	990	570	1560	-	-	4/06/2009			
Vent 2	0.6	Beyond Lot boundary, no further excavation possible.	-	-	-	221	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	150	380	530	-	-	17/06/2009			
BDYS1	0.4	Batter adjacent to Vulture Street. No further excavation possible due to ug services.	-	-	-	81	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	355	-	-	3/06/2009			
Batter 1	1.45	Obtained from midway down the batter from Vulture Street.	-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	3/06/2009			
Fill	0.5	Obtained from ash fill located adjacent to sign.	<5	<1	4	32	125	21	87	<0.1	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	4/06/2009		
Environmental Investigation Levels (mg/kg)			20	3	50	200	300	60	400	1	1	-	-	-	7	100	100	1000	1000	1000	-	-	-		
Health Based Investigation Levels (A) (mg/kg)			100	20	100	1000	300	600	7000	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

All Concentrations are expressed in mg/kg

*** Denotes this value is the sum of individual components

-/- Denotes currently no Investigation Levels in EPA Draft Guidelines

--- Denotes no specific Investigation Levels. Values represent general EPA acceptance levels.

-/- Below detection limits

-/- Denotes analysis not requested for this sample

BTEX - Benzene, Toluene, Ethylene & Xylene

TPH - Total Petroleum Hydrocarbons

-/- denotes that these are EPA guidelines for phytotoxicity

na - not applicable

Values in Bold exceed the EIL for that substance
Values in Bold exceed the HIL 'A' for that substance

Table 5 : LABORATORY RESULTS - TEST PIT SAMPLES

Sample Location	Depth	Location Description								Polycyclic Aromatic Hydrocarbons		Sample Date
			As	Cd	Cr	Cu	Pb	Ni	Zn	B(a)p	Total PAH^	
TP1	0.8		<5	<1	<2	<5	6	2	<5	-	-	4/06/2009
TP2	0.8		<5	<1	<2	<5	5	<2	<5	<0.5	<8	4/06/2009
TP3	0.6		8	<1	6	62	140	<2	367	<0.5	<8	4/06/2009
TP4	0.8		6	<1	4	9	42	<2	63	-	-	4/06/2009
Environmental Investigation Levels (mg/kg)			20	3	50	200*	300	60	400*	--	--	
Health Based Investigation Levels 'A' (mg/kg)			100	20	100	1000	300	600	7000	0.5	20	

Values in **Bold**

exceed the EIL for that substance

Values in **Bold**

exceed the HIL 'A' for that substance

All Concentrations are expressed in mg/kg

"A" Denotes this value is the sum of individual components

"--" Denotes currently no Investigation Limits in EPA Draft Guidelines

"*" Denotes no specific Investigation Levels. Values represent general EPA acceptance levels.

"<" - Below detection limits

"-" Denotes analysis not requested for this sample

BTEX - Benzene, Toluene, Ethylene & Xylene

TPH - Total Petroleum Hydrocarbons

* - denotes that these are EPA guidelines for phytotoxicity

na - not applicable



Table 6 : LABORATORY RESULTS - STOCKPILE SOIL SAMPLES

Sample Location	Depth	Location Description									B Benzene	T Toluene	E Ethylbenzene	X Xylenes	Total BTEX ^A	TPH				TPH ^A	Polycyclic Aromatic Hydrocarbons		Leachate Pb mg/L	Sample Date
			As	Cd	Cr	Cu	Pb	Ni	Zn	Hg						C ₆ - C ₉	C ₁₀ - C ₁₄	C ₁₅ - C ₂₀	C ₂₁ - C ₂₈		B(a)p	Total PAH ^A		
SP1-1	0.2	Stockpile removed under disposal permit to Transpacific for characterisation and subsequently disposed as unlined landfill.	-	-	-	-	288	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	-	11/06/2009
SP1-2	0.2		-	-	-	-	451	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	0.08	11/06/2009
SP1-3	0.2		7	<1	6	13	160	4	126	<0.1	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	<0.5	<8	-	11/06/2009
SP1-4	0.2		-	-	-	-	160	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	-	11/06/2009
SP1-5	0.2		-	-	-	-	103	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	69	130	<100	<100	199	-	-	-	11/06/2009
SP1-6	0.2		-	-	-	-	64	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	-	11/06/2009
SP1-7	0.2		-	-	-	-	109	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	-	11/06/2009
SP1-8	0.2		5	<1	4	19	130	5	164	<0.1	<0.2	<0.5	<0.5	<1	<2.2	90	120	<100	140	350	<0.5	1.3	-	11/06/2009
SP1-9	0.2		-	-	-	-	107	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	-	11/06/2009
SP1-10	0.2		-	-	-	-	185	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	28	140	<100	<100	168	-	-	-	11/06/2009
SP1-11	0.2		-	-	-	-	203	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	13	140	<100	<100	153	-	-	-	11/06/2009
SP1-12	0.2		-	-	-	-	103	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	-	11/06/2009
SP1-13	0.2		-	-	-	-	120	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	20	60	<100	<100	80	-	-	-	11/06/2009
SP1-14	0.2		-	-	-	-	30	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	-	11/06/2009
SP1-15	0.2		-	-	-	-	25	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	-	11/06/2009
SP1-16	0.2		-	-	-	-	135	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	117	250	120	110	597	-	-	-	11/06/2009
SP1-17	0.2		-	-	-	-	100	-	-	-	0.4	<0.5	<0.5	0.6	1	31	<50	<100	<100	31	-	-	-	11/06/2009
SP Base 1	0.2	Validation exceedences on	-	-	-	-	480	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	0.1	11/06/2009
SP Base 2	0.2	Site removed to lined landfill	-	-	-	-	642	-	-	-	<0.2	<0.5	<0.5	<1	<2.2	<10	<50	<100	<100	<260	-	-	0.14	11/06/2009
Environmental Investigation Levels (mg/kg)			20	3	50	200*	300	60	400*	1	1	-	-	-	7	100*	100*	1000*	1000*	1000*	-	-	-	
Unlined Landfill Acceptance (Transpacific)			200	40	200	2000	600	600	14000	20	10	300	500	250	500	500	5000	10000	10000	10000	-	-	500	0.5

Values in **Bold** exceed the EIL for that substance
 Values in **Bold** exceed Transpacific unlined landfill criteria

All Concentrations are expressed in mg/kg

*** Denotes this value is the sum of individual components

*** Denotes currently no guidelines in documentation

*** Denotes no specific Investigation Levels. Values represent general EPA acceptance levels.

c - Below detection limits

*- Denotes analysis not requested for this sample

BTEX - Benzene, Toluene, Ethylene & Xylene

TPH - Total Petroleum Hydrocarbons

* - denotes that these are EPA guidelines for phytotoxicity



Table 7 : LABORATORY QA/QC RESULTS - SOILS

Sample Location	Description															TPH				Polycyclic Aromatic Hydrocarbons		Sample Date
		As	Cd	Cr	Cu	Pb	Ni	Zn	Hg	B	T	E	X	Total	C ₆	C ₁₀	C ₁₅	C ₂₀	TPH ^A	B(a)P	PAHs	
BASE VAL 5	Obtained from excavation base	-	-	-	-	<5	-	-	-	<0.2	<0.5	<0.5	<0.5	<A	<10	<50	<100	<100	<A	-	-	3/06/2009
QC1		-	-	-	-	<5	-	-	-	<0.2	<0.5	<0.5	<0.5	<A	<10	<50	<100	<100	<A	-	-	3/06/2009
RPD%		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BASE VAL 5	Obtained from excavation base	-	-	-	-	<5	-	-	-	<0.2	<0.5	<0.5	<0.5	<A	<10	<50	<100	<100	<A	-	-	3/06/2009
QC2		-	-	-	-	8	-	-	-	<0.2	<1	<1	<3	<A	<5	<10	<20	<20	<A	-	-	3/06/2009
RPD%		-	-	-	-	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WALL VAL 11	Obtained from excavation wall	-	-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<0.5	<A	<10	<50	<100	<100	<A	-	-	3/06/2009
QC3		-	-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<0.5	<A	<10	<50	<100	<100	<A	-	-	3/06/2009
RPD%		-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WALL VAL 11	Obtained from excavation wall	-	-	-	-	10	-	-	-	<0.2	<0.5	<0.5	<0.5	<A	<10	<50	<100	<100	<A	-	-	3/06/2009
QC4		-	-	-	-	11	-	-	-	<0.2	<1	<1	<3	<A	<5	<10	<20	<20	<A	-	-	3/06/2009
RPD%		-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP4 0.8m	Test pit from northern part of the Site	6	<1	4	9	42	<2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	4/06/2009
QC5		<5	<1	<2	<5	9	<2	34	-	-	-	-	-	-	-	-	-	-	-	-	-	4/06/2009
RPD%		18	-	67	57	129	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP4 0.8m	Test pit from northern part of the Site	6	<1	4	9	42	<2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	4/06/2009
QC6		3.8	<1	<2	<1	12	<2	19	-	-	-	-	-	-	-	-	-	-	-	-	-	4/06/2009
RPD%		45	-	67	160	111	-	107	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP1-11	Stockpiled soil at landfill	-	-	-	-	203	-	-	-	<0.2	<0.5	<0.5	<1	<A	13	140	<100	<100	153	-	-	11/06/2009
DUP		-	-	-	-	111	-	-	-	<0.2	<0.5	<0.5	<1	<A	61	<50	<100	<100	61	-	-	11/06/2009
RPD%		-	-	-	-	59	-	-	-	-	-	-	-	-	130	139	-	-	-	-	-	-
SP1-11	Stockpiled soil at landfill	-	-	-	-	203	-	-	-	<0.2	<0.5	<0.5	<1	<A	13	140	<100	<100	153	-	-	11/06/2009
TRIP		-	-	-	-	120	-	-	-	<0.2	<1	<1	<3	<A	29	74	30	40	173	-	-	11/06/2009
RPD%		-	-	-	-	51	-	-	-	-	-	-	-	-	76	62	50	22	-	-	-	-
Laboratory LOR		0.5	1	2	5	5	2	5	0.1	0.2	0.5	0.5	0.5		10	50	100	100		0.5	0.5	

All Concentrations are expressed in mg/kg

Values in

Bold

exceed the acceptable RPD for that analyte

RPD - Relative Percent Difference

Where one measurement is below the detection limit a value half of the LOR is used to calculate RPD

*** Denotes this value is the sum of individual components

*- Denotes both results below Laboratory Limits of Reporting (LOR)

*** Denotes no specific Investigation Levels. Values represent general EPA acceptance levels.

*c - Below detection limits

*- Denotes analysis not requested for this sample

BTEX - Benzene, Toluene, Ethylene & Xylene

TPH - Total Petroleum Hydrocarbons



Table 8 : LABORATORY RESULTS - STORMWATER

Sample Location	Description	B Benzene	T Toluene	E Ethylbenzene	X Xylenes	Total BTEX [^]	TPH				Total TPH [^]									Total Suspended Solids mg/L	Sample Date
							C ₉ [^] C ₉	C ₁₀₋₁₄ [^] C ₁₄	C ₁₅₋₂₈ [^] C ₂₈	C ₂₉₊ [^] C ₂₈		As	Cd	Cr	Cu	Pb	Ni	Zn	Hg		
WS1	Stormwater Sample	0.5	<1	<1	<3 [^]	<5.5	<20	100	<100	<100	<320	1.6	<0.1	<1	8.5	2.1	<5	49	<1	32	21/05/2009
Laboratory PQL		0.5	1	1	3 [^]	[^]	20	40	100	100	[^]	1	0.1	1	2	1	5	5	1	20	

All Concentrations are expressed in µg/L, otherwise specified in the table

[^] Deotes this value is the sum of individual components

<- Below detection limits

BTEX - Benzene, Toluene, Ethylene & Xylene

TPH - Total Petroleum Hydrocarbons

- Denotes both results below Laboratory Limits of Reporting (LOR)





FIGURES

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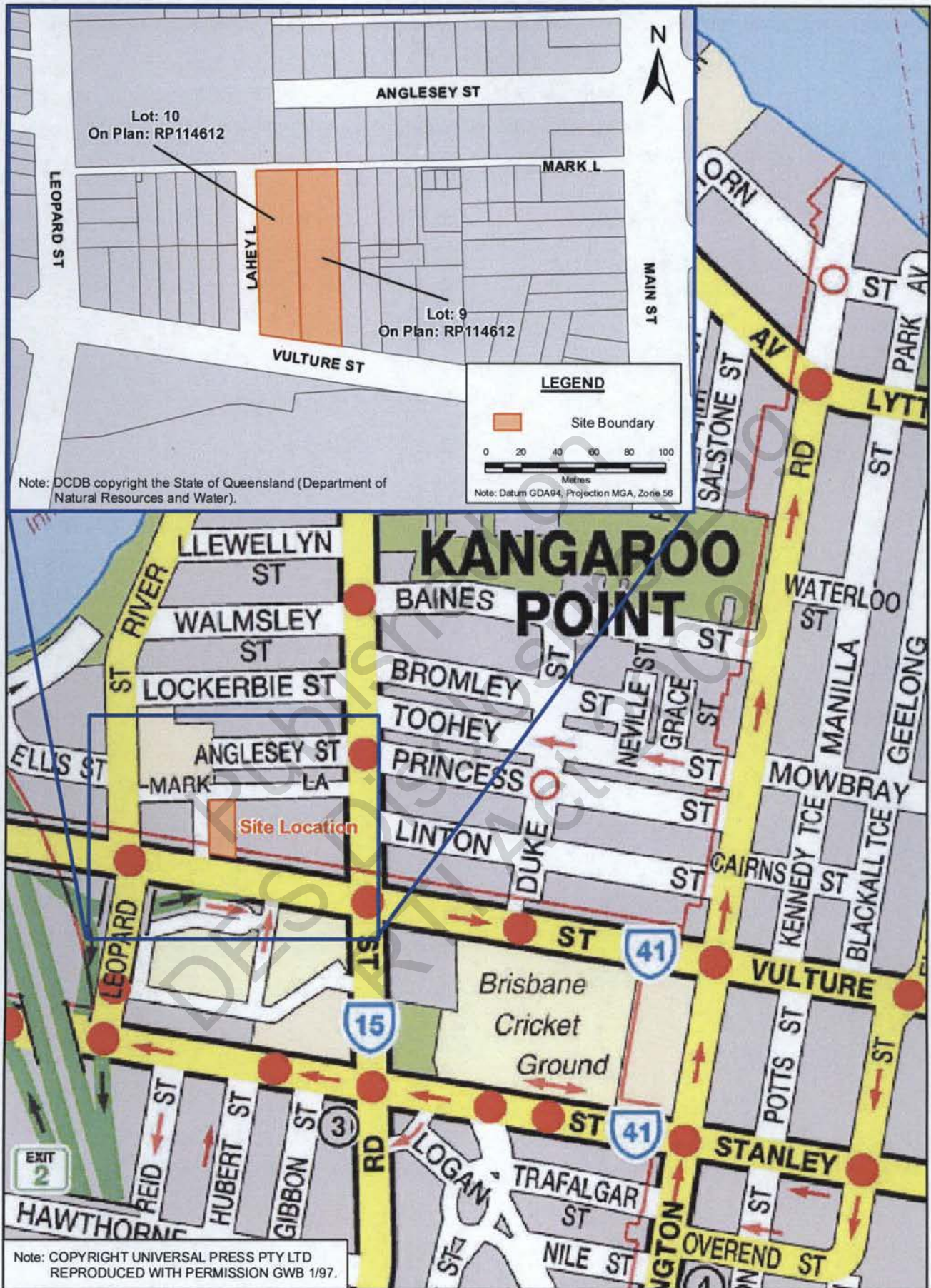
FIGURES

Checked by:

sch 4 - signature

Date:

5/8/09



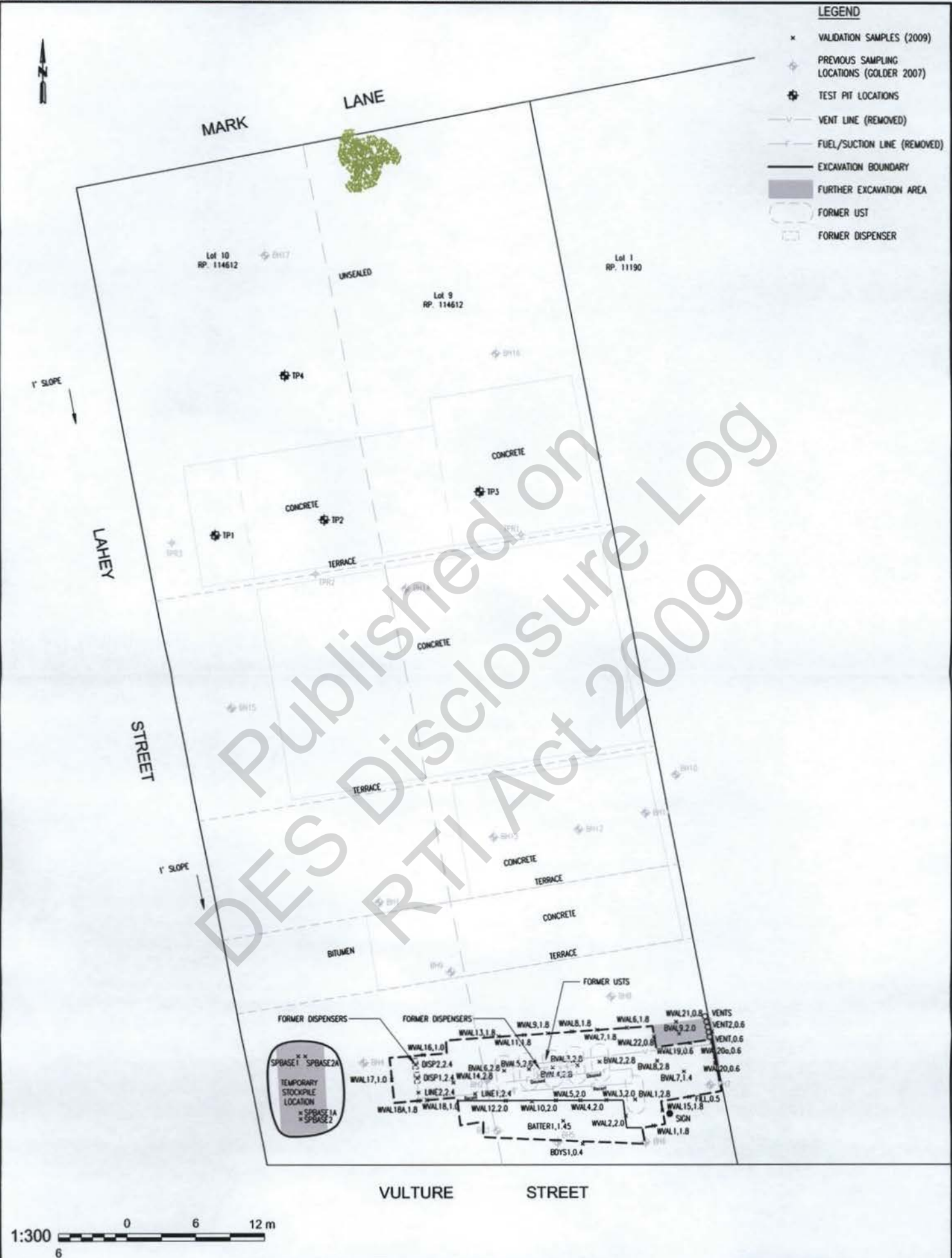
RTI 18-548

CLIENT	Phillip Usher Constructions		
DRAWN	CFJ/BQ	DATE	06-07-09
CHECKED	MJP*	DATE	06-07-09
SCALE	Not To Scale		

File A

PROJECT	320 - 324 Vulture St, Woolloongabba		
TITLE	SITE LOCATION PLAN		
PROJECT No	014-077633089	FIGURE No	1
REV No	0	A4	

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LEGEND

- x VALIDATION SAMPLES (2009)
- PREVIOUS SAMPLING LOCATIONS (GOLDER 2007)
- TEST PIT LOCATIONS
- VENT LINE (REMOVED)
- FUEL/SUCTION LINE (REMOVED)
- EXCAVATION BOUNDARY
- FURTHER EXCAVATION AREA
- FORMER UST
- FORMER DISPENSER

1:300
0 6 12 m

INTERPRETIVE ONLY
DO NOT SCALE



CLIENT Philip Usher Constructions		PROJECT Remediation Works 320-324 Vulture Street, Kangaroo Point	
DRAWN REJ	DATE 16/06/09	TITLE SITE MAP INCLUDING VALIDATION LOCATIONS	
CHECKED *MJP	DATE 16/06/09	PROJECT NO 014-077633089	FIGURE NO 2
SCALE 1:300 APPROX	FILE A	Page 98 of 186	REV No A3

NOTE: THE 'x' BESIDE THE TYPED INITIALS DENOTES THE ORIGINAL DRAWING ISSUE WAS SIGNED OR INITIALED BY THAT RESPECTIVE PERSON.



MARK LANE

Lot 10
RP. 114612

BH17

UNSEALED

Lot 9
RP. 114612

BH16

Lot 1
RP. 11190

1' SLOPE

LAHEY STREET

TPR3	0-0.5m
Soil Type	Silty Sandy Fill
	mg/kg
Pb	392
Zn	894

TPR1	0-0.5m
Soil Type	Clayey Silt
	mg/kg
Zn	564

BH9	0.05-0.2m
Soil Type	Fill
Cu	294

Wall 20a	0.6m
Soil Type	Sandy Clay Fill
Pb	396
Zn	1210
C ₂₅ -C ₃₅	1270
Total TPH	2130

BDY S1	0.4m
Soil Type	Fill
C ₅ -C ₉	165
C ₁₀ -C ₁₄	190

LEGEND

- × VALIDATION SAMPLES (2009)
- × PREVIOUS INVESTIGATION BY AUSTRALIS
- PREVIOUS SAMPLING LOCATIONS (GOLDER 2007/2008)
- ⊕ TEST PIT LOCATIONS
- VENT LINE (REMOVED)
- FUEL/SUCTION LINE (REMOVED)
- EXCAVATION BOUNDARY
- FURTHER EXCAVATION AREA
- FORMER UST
- FORMER DISPENSER

1:300
0 6 12 m

INTERPRETIVE ONLY
DO NOT SCALE

RTI 18-548



CLIENT Philip Usher Constructions		PROJECT Remediation Works 320-324 Vulture Street, Kangaroo Point	
DRAWN REJ	DATE 06/07/09	TITLE SOIL EXCEEDENCES FOLLOWING VALIDATION WORKS	
CHECKED *MJP	DATE 06/07/09	PROJECT No 014-077633089	FIGURE No 3
SCALE 1:300 APPROX	FILE A	REV No A3	Page 39 of 186

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APPENDIX A

Limitations

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APPENDIX B

Test Pit Logs

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TESTPIT REPORTS

Checked by:

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Date:

6/8/09



REPORT OF TEST PIT: TP1

CLIENT: Philip Usher Constructions Pty Ltd
PROJECT: UST VALIDATION
LOCATION: 320-324 Vulture St., Kangaroo Point
JOB NO: 077633089

POSITION: Refer to Figure 2
SURFACE RL: m DATUM: AHD
PIT DEPTH: 2.00 m
BUCKET TYPE: 0.5m

SHEET: 1 OF 1
MACHINE: Excavator
CONTRACTOR: McKinnon EM
LOGGED: ELB DATE: 4/6/09
CHECKED: MJP DATE: 16/7/09

Excavation				Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0					CONCRETE			
			0.15								
			0.40		TP1 0.30m PID = 0.9 ppm		SP	GRAVELLY SAND with trace Clay Dark brown	D	MD	
			0.5					ASH FILL Dark brown with grey	D	L	
			0.60				CL	Sandy CLAY Grey, low plasticity			
			1.0		TP1 0.80m PID = 1.6 ppm						
			1.5								
			2.0	2.00							
			2.0		TP1 2.00m PID = 1.2 ppm			TEST PIT DISCONTINUED @ 2.00 m Backfilled on completion			
			2.5								
			3.0								
			3.5								
			4.0								
			4.5								
			5.0								

This report of test pit must be read in conjunction with accompanying notes and abbreviations.



REPORT OF TEST PIT: TP2

CLIENT: Philip Usher Constructions Pty Ltd
PROJECT: UST VALIDATION
LOCATION: 320-324 Vulture St., Kangaroo Point
JOB NO: 077633089

POSITION: Refer to Figure 2
SURFACE RL: m DATUM: AHD
PIT DEPTH: 1.80 m
BUCKET TYPE: 0.5m

SHEET: 1 OF 1
MACHINE: Excavator
CONTRACTOR: McKinnon EM
LOGGED: ELB DATE: 4/6/09
CHECKED: MJP DATE: 16/7/09

Excavation				Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0					CONCRETE			
			0.15								
			0.40		TP2 0.30m PID = 0.5 ppm		CL	Sandy CLAY Dark brown, some concrete/brick rubble, low plasticity	M	S	
			0.5					FILL Ashy fill, dark brown with grey	D-M	L	
			0.60				CL	Sandy CLAY Fine grained, low plasticity, trace gravel			
			1.0		TP2 0.80m PID = 1.0 ppm				W	S	
			1.5								
			1.70					Weathered rock, yellow with grey and orange			
			1.80								
			2.0		TP2 1.80m PID = 1.3 ppm			TEST PIT DISCONTINUED @ 1.80 m Backfilled on completion			
			2.5								
			3.0								
			3.5								
			4.0								
			4.5								
			5.0								

This report of test pit must be read in conjunction with accompanying notes and abbreviations.



REPORT OF TEST PIT: TP3

CLIENT: Philip Usher Constructions Pty Ltd POSITION: Refer to Figure 2
PROJECT: UST VALIDATION SURFACE RL: m DATUM: AHD
LOCATION: 320-324 Vulture St., Kangaroo Point PIT DEPTH: 1.80 m
JOB NO: 077633089 BUCKET TYPE: 0.5m

SHEET: 1 OF 1
MACHINE: Excavator
CONTRACTOR: McKinnon EM
LOGGED: ELB DATE: 4/6/09
CHECKED: MJP DATE: 16/7/09

Excavation				Sampling		Field Material Description							
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION		MOISTURE	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0					CONCRETE					
			0.15										
					TP3 0.20m PID = 0.9 ppm		SP	GRAVELLY SAND Dark brown with trace clay		D		S	
			0.40										
								Ashy FILL Dark brown with grey, low plasticity		D		L	
			0.50				SP	Gravelly SAND Dark brown with trace clay					
					TP3 0.60m PID = 1.4 ppm					M		MD	
			1.0										
					TP3 1.10m PID = 0.9 ppm		CI	Sandy CLAY Grey, medium plasticity				S	
			1.5							M			
								Weathered rock, yellow with grey and orange					
			1.70										
			1.80										
					TP3 1.80m PID = 1.1 ppm			TEST PIT DISCONTINUED @ 1.80 m Backfilled on completion					
			2.0										
			2.5										
			3.0										
			3.5										
			4.0										
			4.5										
			5.0										

This report of test pit must be read in conjunction with accompanying notes and abbreviations.



REPORT OF TEST PIT: TP4

CLIENT: Philip Usher Constructions Pty Ltd
PROJECT: UST VALIDATION
LOCATION: 320-324 Vulture St., Kangaroo Point
JOB NO: 077633089

POSITION: Refer to Figure 2
SURFACE RL: m DATUM: AHD
PIT DEPTH: 1.20 m
BUCKET TYPE: 0.5m

SHEET: 1 OF 1
MACHINE: Excavator
CONTRACTOR: McKinnon EM
LOGGED: ELB DATE: 4/6/09
CHECKED: MJP DATE: 16/7/09

Excavation				Sampling		Field Material Description				
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0				CL-CI	Sandy CLAY Brown to dark brown, low to medium plasticity	D	S
			0.5	0.60	TP4 0.30m PID = 1.1 ppm					
			1.0	1.10	TP4 0.80m PID = 0.8 ppm QC5/QC6		GP	Sandy GRAVEL With trace clay, (weathered rock) yellow and very pale grey		
			1.20		TP4 1.10m PID = 0.8 ppm			Weathered rock, yellow with pale grey		
								TEST PIT DISCONTINUED @ 1.20 m Backfilled on completion		
			1.5							
			2.0							
			2.5							
			3.0							
			3.5							
			4.0							
			4.5							
			5.0							

This report of test pit must be read in conjunction with accompanying notes and abbreviations.

GAP gINT FN. F01e
RL2

EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT REPORTS

DRILLING/EXCAVATION METHOD

AS*	Auger Screwing	RD	Rotary blade or drag bit	HQ	Diamond Core - 63 mm
AD*	Auger Drilling	RT	Rotary Tricone bit	NMLC	Diamond Core - 52 mm
*V	V-Bit	RAB	Rotary Air Blast	NQ	Diamond Core - 47 mm
*T	TC-Bit, e.g. ADT	RC	Reverse Circulation	BH	Tractor Mounted Backhoe
HA	Hand Auger	PT	Push Tube	EX	Tracked Hydraulic Excavator
ADH	Hollow Auger	CT	Cable Tool Rig	EE	Existing Excavation
DTC	Diatube Coring	JET	Jetting	HAND	Excavated by Hand Methods
WB	Washbore or Bailer	NDD	Non-destructive drilling		

PENETRATION/EXCAVATION RESISTANCE

- L Low resistance.** Rapid penetration possible with little effort from the equipment used.
- M Medium resistance.** Excavation/possible at an acceptable rate with moderate effort from the equipment used.
- H High resistance** to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment.
- R Refusal or Practical Refusal.** No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine.

These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator.

WATER



Water level at date shown



Partial water loss



Water inflow



Complete water loss

GROUNDWATER NOT OBSERVED

The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit.

GROUNDWATER NOT ENCOUNTERED

The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period.

SAMPLING AND TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-1993
4,7,11 N=18	4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm seating
30/80mm	Where practical refusal occurs, the blows and penetration for that interval are reported
RW	Penetration occurred under the rod weight only
HW	Penetration occurred under the hammer and rod weight only
HB	Hammer double bouncing on anvil
DS	Disturbed sample
BDS	Bulk disturbed sample
G	Gas Sample
W	Water Sample
FP	Field permeability test over section noted
FV	Field vane shear test expressed as uncorrected shear strength (s_v = peak value, s_r = residual value)
PID	Photoionisation Detector reading in ppm
PM	Pressuremeter test over section noted
PP	Pocket penetrometer test expressed as instrument reading in kPa
U63	Thin walled tube sample - number indicates nominal sample diameter in millimetres
WPT	Water pressure tests

Ranking of Visually Observable Contamination and Odour (for specific soil contamination assessment projects)

R = 0	No visible evidence of contamination	R = A	No non-natural odours identified
R = 1	Slight evidence of visible contamination	R = B	Slight non-natural odours identified
R = 2	Visible contamination	R = C	Moderate non-natural odours identified
R = 3	Significant visible contamination	R = D	Strong non-natural odours identified

ROCK CORE RECOVERY

TCR = Total Core Recovery (%)	SCR = Solid Core Recovery (%)	RQD = Rock Quality Designation (%)
$= \frac{\text{Length of core recovered}}{\text{Length of core run}} \times 100$	$= \frac{\sum \text{Length of cylindrical core recovered}}{\text{Length of core run}} \times 100$	$= \frac{\sum \text{Axial lengths of core} > 100 \text{ mm}}{\text{Length of core run}} \times 100$

METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT REPORTS

	FILL		CLAY (CL, CI or CH)
	GRAVEL (GP or GW)		ORGANIC SOILS (OL or OH or Pt)
	SAND (SP or SW)		COBBLES or BOULDERS
	SILT (ML or MH)		

Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay.

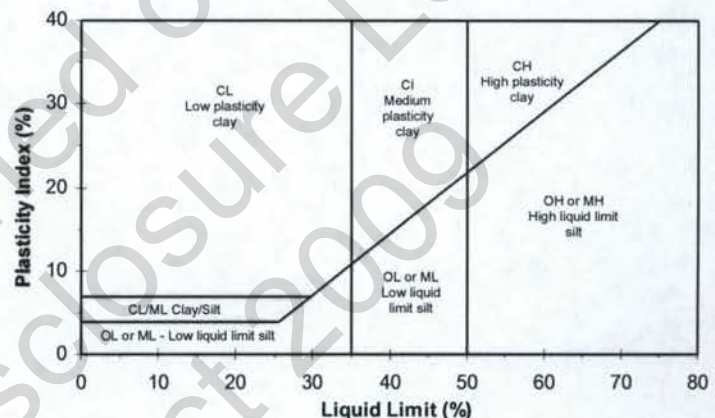
CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil and Rock is classified and described in Reports of Boreholes and Test Pits using the preferred method given in AS1726 – 1993, Appendix A. The material properties are assessed in the field by visual/tactile methods.

Particle Size

Major Division	Sub Division	Particle Size
BOULDERS		> 200 mm
COBBLES		63 to 200 mm
GRAVEL	Coarse	20 to 63 mm
	Medium	6.0 to 20 mm
	Fine	2.0 to 6.0 mm
SAND	Coarse	0.6 to 2.0 mm
	Medium	0.2 to 0.6 mm
	Fine	0.075 to 0.2 mm
SILT		0.002 to 0.075 mm
CLAY		< 0.002 mm

Plasticity Properties



MOISTURE CONDITION

AS1726 - 1993

Symbol	Term	Description
D	Dry	Sands and gravels are free flowing. Clays & Silts may be brittle or friable and powdery.
M	Moist	Soils are darker than in the dry condition & may feel cool. Sands and gravels tend to cohere.
W	Wet	Soils exude free water. Sands and gravels tend to cohere.

CONSISTENCY AND DENSITY

AS1726 - 1993

Symbol	Term	Undrained Shear Strength	Symbol	Term	Density Index %	SPT "N" #
VS	Very Soft	0 to 12 kPa	VL	Very Loose	Less than 15	0 to 4
S	Soft	12 to 25 kPa	L	Loose	15 to 35	4 to 10
F	Firm	25 to 50 kPa	MD	Medium Dense	35 to 65	10 to 30
St	Stiff	50 to 100 kPa	D	Dense	65 to 85	30 to 50
VSt	Very Stiff	100 to 200 kPa	VD	Very Dense	Above 85	Above 50
H	Hard	Above 200 kPa				

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.

SPT correlations are not stated in AS1726 – 1993, and may be subject to corrections for overburden pressure and equipment type.

TERMS FOR ROCK MATERIAL STRENGTH & WEATHERING AND ABBREVIATIONS FOR DEFECT DESCRIPTIONS

STRENGTH

Symbol	Term	Point Load Index, $I_s(50)$ (MPa)	Field Guide
EL	Extremely Low	< 0.03	Easily remoulded by hand to a material with soil properties.
VL	Very Low	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30 mm can be broken by finger pressure.
L	Low	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
M	Medium	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
H	High	1 to 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken with pick with a single firm blow; rock rings under hammer.
VH	Very High	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
EH	Extremely High	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

ROCK STRENGTH TEST RESULTS

- ▼ Point Load Strength Index, $I_s(50)$, Axial test (MPa)
- ▲ Point Load Strength Index, $I_s(50)$, Diametral test (MPa)

Relationship between $I_s(50)$ and UCS (unconfined compressive strength) will vary with rock type and strength, and should be determined on a site-specific basis. UCS is typically 10 to 30 x $I_s(50)$, but can be as low as 5.

ROCK MATERIAL WEATHERING

Symbol	Term	Field Guide
RS	Residual Soil	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
EW	Extremely Weathered	Rock is weathered to such an extent that it has soil properties - i.e. it either disintegrates or can be remoulded, in water.
DW	HW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores. In some environments it is convenient to subdivide into Highly Weathered and Moderately Weathered, with the degree of alteration typically less for MW.
	MW	
SW	Slightly Weathered	Rock is slightly discoloured but shows little or no change of strength relative to fresh rock.
FR	Fresh	Rock shows no sign of decomposition or staining.

ABBREVIATIONS FOR DEFECT TYPES AND DESCRIPTIONS

Defect Type	Coating or Infilling	Roughness
B Bedding parting	Cn Clean	Sl Slickensided
X Foliation	Sn Stain	Sm Smooth
C Contact	Vr Veneer	Ro Rough
L Cleavage	Ct Coating or Infill	
J Joint	Planarity	
SS/SZ Sheared seam/zone (Fault)	Pl Planar	Vertical Boreholes – The dip (inclination from horizontal) of the defect is given. Inclined Boreholes – The inclination is measured as the acute angle to the core axis.
CS/CZ Crushed seam/zone (Fault)	Un Undulating	
DS/DZ Decomposed seam/zone	St Stepped	
IS/IZ Infilled seam/zone		
S Schistosity		
V Vein		



APPENDIX C

Disposal Permit & EMR Search Records

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RTI Act 2009



Queensland
Government

Enquiries to: Paul Ritchie
Telephone: (07) 3225 1080 / fax (07) 3247 3278
Your reference:
Our reference: BNE8920 Project Ref. 287684 Permit No. CLEB00029709

Environmental Protection Agency
Incorporating the
Queensland Parks and Wildlife Service

Permit to Remove and Dispose of Contaminated Soil

Pursuant to Section 424 of the *Environment Protection Act 1994* (EP Act) permission is given to the applicant

Rodney Smith

McKinnon Earthmoving (Qld) P/L

PO Box 203

Holland Park 4121

Telephone sch 4 - mobile phone

to remove soil contaminated with hydrocarbon from 320-324 Vulture Street, Kangaroo Point, Lots 9 and 10 on RP114612 and described in the following correspondence:

Application for Contaminated Soil Disposal Permit dated 19 March 2009 and received 20 April 2009.

The permit holder is responsible for ensuring that all personnel involved in the excavation, removal and disposal comply with the specific and standard conditions in Schedules 1 and 2 of this permit.

Signed

sch 4 - signature

Kim Barry
Team Leader, Contaminated Land Unit

Cc: EPA (Brisbane South Region), attn: Louise Jordan, louise.jordan@epa.qld.gov.au

Cc: Transpacific Industries Group Ltd, New Chum Landfill, attn: Erik Dekker, E.

edekker@transpac.com.au

Cc: TPR, attn: Robin WaglandE. Robin.Wagland@WSPGroup.com

Notice to Applicant

The conditions on this permit have been decided after consideration of the standard criteria (EP Act) and for the purpose of preventing environmental harm. The applicant may apply for a review or appeal against the decision within 10 business days of receipt of this notice (s521 and s531).

288 Edward Street Brisbane
Queensland 4000 Australia
GPO Box 2771, Brisbane Qld 4001
Telephone (07) 3225 1827
Facsimile (07) 3247 3278
Website www.env.qld.gov.au
ABN 87 221 158 786

Schedule 1 of 2 – Specific Conditions

The volume or mass of the contaminated soil shall not exceed 600 cubic metres in-situ.

The soil is to be disposed of in accordance with the disposal facility approval letter dated 17 March 2009 for stockpile at Transpacific Industries Group Ltd New Chum Landfill, at 100 Chum Street, NEW CHUM QLD 4303 (Lot 268 on SP103913).

The soil must be disposed of between 30/04/2009 and 30/06/2009.

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DES Disclosure Log
RTI Act 2009

Schedule 2 of 2 - Standard Conditions**1. Volume / mass of contaminated soil**

This permit applies to the specified volume or mass only. Any increases to the specified quantity will require a new disposal permit.

2. Disposal time period

Disposal must occur within the dates specified or a new disposal permit must be sought.

3. Excavation and loading

The holder of this disposal permit must take all reasonable precautions necessary to prevent the spillage of contaminated soil during loading and prevent contaminated soil being transported from the site of origin on vehicle tyres and plant and equipment.

4. Transportation**(a) Transporter to be advised of permit conditions**

Prior to the removal of contaminated soil, the permit holder must provide a copy of the permit and conditions to the transporter.

(b) Load to be secured

The contaminated soil must be covered in the transportation vehicle to ensure that the contaminated soil or offensive or noxious gases are not released during transport.

(c) Cleaning of vehicles and plant equipment

An effective system must be employed for cleaning of vehicles and plant and equipment which are used to transport or handle contaminated soil which prevents release of contaminants onto any roadway or to any waters or stormwater drainage system.

(d) Spillage

Any spillage of contaminants must be cleaned up as quickly as practicable. Spillages must not be cleaned up by hosing, sweeping or otherwise releasing such contaminants or material to any stormwater drainage system, roadside gutter or waters.

5. Receival and disposal**(a) Licence conditions**

The acceptance and disposal of the contaminated soil must comply with the licence conditions and the specific requirements of the disposal facility.

(b) Disposal receipts

Copies of disposal acceptance receipts are to be submitted to the Administering Authority within 10 business days of the date of disposal. The holder of, or person acting under a disposal permit, must comply with the conditions of the permit (s425 of the *Environmental Protection Act 1994*).

Maximum penalty - 100 penalty units.

6. Interim storage

Contaminated soil which is temporarily stored at the site of origin or approved for storage at a separate property must be stockpiled and securely covered and/or managed to ensure that:

- (a) rainwater is drained away from the stockpiles;
- (b) contaminated soil is not transported from the stockpile by wind or rainwater;
- (c) offensive odours or noxious gases are not released; and
- (d) soil underlying the stockpiles is not affected by contamination.

A report is to be provided to the Administering Authority within 28 days of final disposal that verifies that the storage area is fully cleared of contamination.

7. Treatment of soil**(a) Licensed facility**

When treatment is to be undertaken at a licensed general waste disposal facility or regulated waste treatment and disposal facility, acceptance receipts must be provided to the Administering Authority within 10 days of contaminated soil delivery. The contamination level in the soil must be reduced to a level agreed by the Administering Authority. When contaminated soil is stored at such facility pending treatment, storage is to be undertaken according to condition 6.

(b) Other treatment sites**(i) Soil remediation and validation report.**

The permit holder must provide a report of the soil remediation including chemical test results that validate that the contamination has been lowered to levels agreed with the Administering Authority. The report must provide evidence that the land underlying the treatment activity is not affected by contamination.

(ii) Environmental harm.

Treatment activities must be carried out to ensure that environmental harm is not caused and that contaminants including treatment agents are not released from the site by wind, stormwater or as offensive or noxious gases. The requirements of condition 6 also apply.

(c) Final disposal

When soil contamination has been reduced to levels acceptable to the Administering Authority, the soil may be disposed of as general fill unless otherwise specified in Schedule 1. The location of the final disposal site of the soil is to be identified after treatment by written advice to the Administering Authority.

****End of Document****

FACSIMILE

To: Golder Associates
Attention: Carina Worsley
CC:
Fax No: 07 3271 5400
From: Robin Wagland
Date: 13/02/2008
Our Ref: 2-07-126
Pages: 5
Re: Stage 1 Preliminary Site Investigation 320 – 324 Vulture Street and 54 Mark Lane, Woolloongabba, Queensland, and Australis Report– TPR Review

Dear Carina,

Robin Wagland of WSP Environmental Pty Ltd (WSP) has been commissioned by Philip Usher Construction Pty Ltd (Philip Usher) to undertake the role of Third Party Reviewer (TPR) role for the Preliminary Site Investigation of the development site located at 320 – 324 Vulture Street and 54 Mark Lane, Woolloongabba. The site investigations are restricted to Lots 9 and 10 on RP114612 and Lot 1 on RP11190.

The TPR appointment is under the EPA guidelines outlined in the Terms of Reference¹ and Robin Wagland of WSP was approved as the Third Party Reviewer (TPR) for the Phillip Usher development site.

The following fax is a review of the Golder Associates (GA) Preliminary Site Investigation Report dated February 2008, ref 001-077633089.

BACKGROUND

The following WSP fax outlines the TPR comments on the report dated February 2008. The information should not be considered pre-emptive of the final TPR report submission and certification for the report, but rather represents the TPR opinions based on the current review of available site information.

¹ Terms of Reference for Use of a Third Party Reviewer (TPR) for assessment and management of site contamination. Final Version 8B DG. Approved 28/8/03.

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WSP Environmental Pty Ltd
16 Douglas Street Milton Qld 4064 PO Box 2261 Milton Qld 4064
Phone 07 3367 4300 Fax 07 3367 4399 Website: www.wspenvironmental.com

SCOPE OF WORKS

The TPR scope of work was as follows:

- Initial meeting and site visit to observe the area of investigation.
- Review of the Australis Preliminary Report.
- Detailed review of GA Stage 1 PSI Report
- Preparation of comments related to the Stage 1 PSI Report.

Yet to be completed are as follows:

- Review of the SMP and RAP.
- Preparation of comments related to the SMP and RAP.
- Site visit to observe sampling and investigation progress and take Assessor samples.
- Review of the updated Stage 1 PSI Report and RAP and SMP.
- Preparation of a certification report.

It should be noted that the TPR considers the reports to be of a generally acceptable quality for the purposes for which they were written. The TPR also appreciates that the works were undertaken within a specified scope agreed between Phillip Usher and GA under contractual arrangements; therefore the following summary is to be noted within this context.

It is requested to aid the future process that any changes to the report be provided to the TPR in Word version in "track changes" mode to allow for ease and speed of reviewing the amendments made.

STAGE 1 PRELIMINARY SITE INVESTIGATION 320 – 324 VULTURE STREET AND 54 MARK LANE WOOLLOONGABBA

The following comments relate to our review of the report (dated February 2008). The comments are referenced to section numbers. All comments should be noted and addressed appropriately as follows:

GENERAL COMMENTS:

- Ensure that the final report is signed and dated appropriately.
- Is the site in Woolloongabba or Kangaroo Point, as different references have been made?
- The Appendix review is based on the appendices provided with the CD of the December 2007 report, as no new appendices were provided with the updated February 2008 report.
- Should this report be Stage 2 delineation? PSI suggests that this is only a limited investigation. For completion of a SMP, the full extent of contamination associated with the site, should be understood. Given a previous Stage 1 has been completed

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this may be better termed a Stage 2. If sufficient work has not been done to cover the requirements of a Stage 2 then there is insufficient to develop a RAP and SMP.

DETAILED COMMENTS:

Section 1

- Paragraph 3 –
 - To develop an SMP/RAP, is it necessary to delineate (both laterally and vertically) the extent of contamination at the site. Please ensure this requirement has been satisfied by the investigation. There is also the requirement to determine the volume of soil requiring remediation – has this been done?
 - "is to be removed" – only if suitable? It may be worth mentioning this at an early stage about proposed removal of all underlying material to allow for the basement of the car park.
- Paragraph 5 – also confirm compliance with AS4482.1 and NEPM and include these in the references.

Section 2

- Table 1 –
 - There are no title certificates or registered plan for Lot 1. If this is part of the assessment, please include.
 - "Philip Usher Constructions" should read "Philip Usher Constructions Pty Ltd".
- Section 2.3 – Last paragraph – no EMR search results for Lot 9 and Lot 1 provided. Please update and provide.
- Section 2.4 – Last paragraph – no information confirming the lack of spills – is this anecdotal, please provide details. What is the zoning of the site?

Section 3

- Section 3.2 – Mention noted depth of bedrock and observed shallow soils encountered.
- Section 3.4 – Paragraph 2 – as discussed on-site, details from the Geotech boreholes would be useful to confirm the minimum depth of groundwater.

Section 4

- Section 4.2 –
 - Reference to Appendix C – no title information for Lot 1 has been provided. Again, is this included in the assessment or not. Please confirm.
 - The third sentence onwards is a review of the Australis report and not historical title information. Suggest this review be reported all in one separate section as Australis report review. Also you should comment on Ampol Petroleum. Is this when the service station commenced operation? There is no mention in the historical titles of who owned and operated the service station – please provide
- Section 4.3 - Table 6 – "this?" remove the "?" or expand. Should "south" be "south-east".
- Section 4.4 – What about inclusion of sections on the following:
 - Anecdotal evidence; and
 - Site setting.
 - Globally update "Phillip" to "Philip" throughout the report and Figures.
 - Was anecdotal evidence sort?

Section 5

- Section 5.2 –
 - Bullet point 1 – by who – please provide the details?

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- Bullet point 3 – do you mean noted in the soils? Are the number of sample locations sufficient to determine this?
 - Bullet point 4 – what is meant by significant? Significant as compared to what?
 - Bullet point 6 – be consistent with “;” and “.”
 - Bullet point 7 – provide details as to the maximum depth of the Geotech investigations.
- Section 5.3 –
 - Paragraph 3 – “diesel and unleaded petrol are known to have been stored on the site” – based on what information?
 - Paragraph 6 – “sump” is this the same as the oil pit in *Figure 3*. Have these areas been sampled?
 - Bullet point 2 – what about the bus depot mentioned in the *Australis* report?
 - Bullet point 3 – add a full stop at the end of the sentence.
- Section 5.6 –
 - Paragraph 1 –
 - “vicinity of the tank farm” were any bedding sands encountered?
 - Two sentences that contradict – was it clay to 4m or rock from 2 to 3m?
 - Was there any associated staining with the hydrocarbons?
 - “Ash” what was the extent of the ash across the site as this was also noted in the *Australis* report.
 - Paragraph 2 – to what depth did the clays extend? Was there fill present?
 - Paragraph 3 – *Figure 5* – has not been provided in this report - this will need to be reviewed.

Section 6

- Section 6.1 –
 - Paragraph 2 – “present therefore” – delete “present”.
 - Paragraph 3 – “EIL” – HIL ‘A’ is appropriate for removal not EIL with the use of phytotoxic guidelines for Cu and Zn.
- Section 6.2 –
 - Table 7 – there is a Table 7 in Section 5.4. Amend this and subsequent tables.

Section 7

- “Tables 9 and 10” should be “Tables 10 and 11”.

Section 8

- Section 8.1 –
 - Bullet points – bus depot?
 - Paragraph 3 –
 - SMP – and RAP?
 - Paragraph 4 –
 - “fill and soil on the site is to be removed” – to what depth?
 - “site will be below” should this read “site will be validated as being below”
 - “site is suitable” should this read “site would be suitable”?
 - “Application will be made” should this read “Application will then be made”.

Section 9

- Section 9.2 –
 - Paragraph 1 –
 - “Remedial” should read “Remediation”.
 - “EMP/RAP” should this read “SMP/RAP”?

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- The site can only be removed from the EMR if it is suitably validated.
 - Paragraph 3 – "DA" should be written in full the first time used.
- To develop a RAP the extent and volume of soil requiring remediation needs to be determined (as per Qld Draft Guidelines). The volumes of soil in each area should therefore be concluded or more investigations will need to be completed.
- Is there sufficient information to complete a Disposal Permit application (as per Qld Draft Guidelines)?

Section 10

- Need to specify the report can be used by the EPA and TPR.

Tables

- Ensure that all table numbers are correct (after Table 7).

Figures

- Check spelling "Phillip" should be "Philip".
- Figure 3 –
 - Provide the location of the Hoist, Interceptor and Waste Oil UST. Can the extent of the lead be delineated?
- Figure 4 –
 - Provide a key for shaded areas.
 - Why is the area shaded south of BH15 and BH17 and how is the extent of impact known based on 1 bore?
 - How is the NE extent of impact known in the shaded area above BH6?

Appendices

- Appendix D –
 - Aerial Photos – provide the exact site outline on the photo would be useful.
- Appendix E –
 - A number of logs are recoded as wet in shallow fill – is there likely perched water?
 - Borelogs – Where are the PID readings recorded? Should the reference to Figure 2 be Figure 3?

I trust the above comments are useful to aid in progressing the report to its final production and I look forward to receipt of the final report in due course.

In the meantime should you require any additional information or wish to discuss any aspects of the TPR comments, please do not hesitate to contact me further.

Kind regards,

sch 4 - signature

.....
Robin Wagland
Queensland Manager
Third Party Reviewer

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Page 5



To: Department of Environment and Resource Management
Attention: Kim Barry

Address: 15th Floor
160 Ann Street
Brisbane QLD 4000

RECEIVED
25 AUG 2009
EGSU

Date: 24/08/2009

Re: Further Environmental Site Assessment including UST Validation,
320-324 Vulture Street, Kangaroo Point.

Description	Copies
WSP Environmental Third Party Review Certification Report	1
WSP Statutory Declaration	1
Golder Associates Further Environmental Site Assessment including UST Validation Report	1
Golder Associates Statutory Declaration	1
Golder Associates Application Forms (Part A and B)	1
DERM Application Fee Cheque 2 x Lot (\$2096)	1

sch 4 - signature

From: Robin Wagland
WSP Environmental Pty Ltd

Receipt No. 1W214630
Date 25/8/09
Amount \$2096.00
Initials HB

WSP Environmental Pty Ltd
16 Douglas Street Milton Qld 4064 PO Box 2261 Milton Qld 4064
Phone 07 3367 4300 Fax 07 3367 4399 Website: www.wspenvironmental.com

STATUTORY DECLARATION

Address of Site Investigated: 320-324 Vulture Street, Kangaroo Point, QLD.
Real Property Description: Lots 9 and 10 on RP114612.
Title of Report: Third Party Reviewer Certification Report,
Stage 1 and Stage 2 Site Investigation, March
2008 and Further Site Assessment including
UST Validation, 320-324 Vulture Street,
Kangaroo Point, August 2009.

I, Robin Wagland, of WSP Environmental Pty Ltd (Level 1, 16 Douglas Street, Milton) in the State of Queensland, do solemnly and sincerely declare that:

1. I was the Third Party Reviewer appointed by the Queensland Government Department of Environment and Resource Management, Contaminated Land Unit for the Vulture Street site described above.
2. Information was collected and collated by Golder Associates (Golders) in their reports titled Stage 1 and Stage 2 Site Investigation, March 2008 and Further Site Assessment including UST Validation, August 2009.
3. I am a member of the Environment Institute of Australia and New Zealand and my qualifications and experience (submitted previously to the DERM) is relevant to this investigation.
4. I have not knowingly included any false, misleading or incomplete information in the report.
5. I certify that the site has been assessed to a standard such that the health and environmental risks associated with the contamination at the site have been addressed.
6. I concur with Golders that the site is suitable for the proposed high density residential redevelopment.
7. I recommend that Lots 9 and 10 on RP114612 be removed from the EMR.

And I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the Oaths Act 1867

Signature

sch 4 - signature

Name

Mr Robin M Wagland

Taken and declared before me at Milton this 19th day of August 2009

Witness (Justice of the Peace/Commissioner for Declarations/Solicitor)

Signature

sch 4 - signature

Name

Jan Gordon





THIRD PARTY REVIEWER CERTIFICATION REPORT

Stage 1 and Stage 2 Site Investigation
and Further Site Assessment including
UST Validation, 320 – 324 Vulture Street,
Kangaroo Point, QLD

RECEIVED

25 AUG 2009

EGSU

24 August 2009

2-09-034



WSP Environmental Pty Ltd
Level 1, 16 Douglas Street,
Milton, Brisbane, 4064

Stage 1 and Stage 2 Site Investigation
and Further Site Assessment including
UST Validation, 320 – 324 Vulture Street,
Kangaroo Point, QLD

TPR Certification Report

August 2009
2-09-034

Written by:	<u>Robin Wagland</u>
Position:	<u>Third Party Reviewer</u>
Signed:	<div style="border: 1px solid red; padding: 5px; display: inline-block;">sch 4 - signature</div>
Date:	<u>August 2009</u>

This Certification Report has been prepared by Robin Wagland of WSP Environmental Pty Ltd (WSP) for the client.

This report has been prepared in accordance with the scope of services described in the contract or agreement between WSP Environmental and the Client. The report relies upon data, surveys, measurements and results taken at or under the particular times and conditions specified herein and by another party. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client and Queensland Government EPA. WSP Environmental accepts no responsibility for its use by other parties.



PROPERTY DESCRIPTION

SITE ADDRESS: 320 – 324 Vulture Street and 54 Mark Lane,
Kangaroo Point, Queensland.

LOT DESCRIPTION: Lots 9 and 10 on RP114612.

OWNER: Philip Usher Constructions Pty Ltd.

CURRENT USE: Vacant Lot.

PROPOSED USE: High density residential.

LISTED ON EMR/CLR: Lots 9 and 10 on RP114612 are listed on
the Environmental Management Register
(EMR) but neither are listed on the
Contaminated Land Register (CLR).

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1 INTRODUCTION

WSP Environmental Pty Ltd (WSP) was commissioned by Philip Usher Constructions Pty Ltd (PUC) to undertake a Third Party Review (TPR) of the environmental investigations carried out at the site located at 320 – 324 Vulture Street, Kangaroo Point, Queensland. This site is described as Lots 9 and 10 on RP114612. Upon completion of a search of the Queensland Government Department of Environment and Resources (DERM) Environmental Management Register (EMR) and Contaminated Land Register (CLR), the Lots were noted to be on the EMR due to the notifiable activities of *operating service station* and *metal treatment or coating / service station* respectively.

Under the DERM guidelines outlined in the Terms of Reference¹, Mr Robin Wagland submitted an application for approval as a TPR for the site. This was confirmed in the DERM acceptance letter dated 2 January 2008, a copy of which is included in *Appendix A*.

The certification process included a review of the Further Environmental Site Assessment including UST Validation Report produced by Golder Associates Pty Ltd (Golders). In addition, the TPR had initially reviewed the Stage 1 and Stage 2 Site Investigation, produced by Golders March 2008 and a previous report compiled by Australis in November 2002. The data contained in the Australis report has been utilised by Golders to assist in forming the conclusions drawn but the work was verified by additional Golders assessment work. As such the Australis report was considered appropriate for the purpose of background information.

This TPR certification report also includes a summary of the outcomes of the TPR site inspections and TPR correspondence. This information forms part of the final TPR Certification Report and is accompanied by a statutory declaration, a copy of which is provided in *Appendix B*.

¹ Terms of Reference for Use of a Third Party Reviewer (TPR) for assessment and management of site contamination. Final Version 8B DG. Approved 28/8/03.

2 TPR SCOPE OF WORKS

The scope of work for the TPR was as follows:

- DERM TPR application submission;
- A site visit/audit to confirm and verify Stage 1 investigation findings and sampling density, location and instruct the collection of TPR samples during additional Stage 2 investigations;
- Review of the Stage 1 and 2 report including provision of comments;
- Review of the further Environmental Site Assessment including UST Validation report including provision of comments; and
- Production of a TPR Certification Report.

The following sections outline some of the key findings of the review process.

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3 TPR PRECISE OF THE STAGE 1 AND 2 INVESTIGATION REPORT

The following sections provide a precise of the report and the TPR assessment of this report.

3.1 Introduction

Golders were contracted by PUC to complete a Stage 1 and Stage 2 Site Investigation (SI) for the site located on 320 – 324 Vulture Street and 54 Mark Lane, Kangaroo Point, Queensland.

The objective of the work was to identify current and historically potentially contaminating activities at the site to enable the site to be remediated, validated and re-developed prior to removal of the site from the EMR (if appropriate).

3.2 Background Information

The site (Lots 9 and 10 on RP114612) is 0.37 hectares (ha) in area and is rectangular in shape. The site is bound by Mark Lane to the north, Lahey Street to the west, Vulture Street to the south and a drainage easement followed by the Russian Orthodox Church and a Child Care Centre to the north east. During the initial site inspection in January 2008, the following was identified at the site:

- The former location of the furniture upholstering operations and storage areas – hardstand;
- The location of the underground storage tanks (USTs);
- The location of the interceptor, and
- The location of former service station buildings and infrastructure.

The site is terraced and slopes from the north to the south with the nearest surface water body being the Brisbane River approximately 300m to the northwest of the site. Groundwater is expected to be between 40m and 50m in depth with electrical conductivity indicating that it is likely to be brackish and unsuitable for drinking water, however it may be suitable for livestock watering (unlikely to be used as such, given the site setting).

The underlying site geology consists of Triassic aged Brisbane Tuff comprising rhyolitic tuff, ignimbrite, agglomerate, conglomerate sandstone and shale. Geotechnical investigations identified bedrock at depths of 0.4m (in the south) to 2.67m (in the north).

3.3 Site History

A review of the historical aerial photographs and historical title details indicates that the site was originally one parcel of land in the Deed of Grant issued in 1854. PUC gained ownership of the site in 2002. Between 1886 and 1902 the site was owned by the Lahey family. The Lahey family operated a furniture manufacturing operation at the site. A portion of the site was leased to Olsson's Industries Pty Ltd for the storage and distribution of salt licks. The southern portion of the site was leased by Ampol Petroleum Qld Pty Ltd in 1953.

A previous investigation had been conducted at the site – Environmental Site Assessment, Vulture Street by Australis Contract Engineers Pty Ltd in November 2002. The findings of this report are summarised as follows:

- The service station infrastructure included:
 - Two workshops;
 - A sales office;
 - Dispensers; and
 - Six USTs.
- Other site infrastructure included:
 - A shed housing the former furniture business, salt lick distribution business and storage areas for these two businesses;
 - A second shed housing the upholstery business and later a small above ground metal finishing bath for brass plating small objects; and
 - A two storey office building associated with the upholstery business.

The initial report identified elevated hydrocarbon fractions in the shallow soils in the vicinity of the eastern UST area located to the south of the site. Elevated copper was identified in the northern portion of the site and in the eastern UST area. Elevated lead was identified in the surface soils on the eastern end of the northern workshop area and zinc was identified in the surface soils in the vicinity of the central western site boundary.

TPR comments on the Golders site description and site history are summarised as follows:

- The Golders site information meets the TPR requirements. It appears that all former potential sources of contamination were identified and a suitable Stage 2 sample plan was developed on a judgemental basis to cover potential areas and contaminants of concern.
- The site layout was confirmed by the TPR during the site visit on 25 January 2008.
- The Golders site background information and site history is suitable for the purposes of this site investigation. It should be noted that a number of the aerial photographs were of poor quality, however, it is expected that these were the only photographs available and the TPR does not believe that this will affect the assessment of contamination at the site.
- The remaining hardstand on the site enabled the identification of major former buildings and infrastructure.
- It should also be noted that the USTs had not been used since 2003. The TPR is therefore satisfied that the notifiable activities on-site have ceased and have subsequently been removed and suitable validation completed.

3.4 Methodologies

- Stage 2 soil samples were collected by the progression of 17 soil bores using a solid flight drill rig based on a judgmental sampling strategy.
- Samples were collected using a push tube sampler with disposable internal plastic sleeves to minimise cross contamination and were screened using a photoionisation detector (PID).
- During the site inspection, additional sample locations were identified by the TPR including two samples in the garden beds directly to the south of the two hardstand areas on the upper terrace (TPR 1 and TPR 2) at points where natural

surface run-off would occur, and one sample to the west of the concrete slab on the upper terrace. These additional samples were progressed via the use of a hand auger.

- A review of groundwater data indicated that groundwater was not expected to be encountered during the course of the investigations (at depths of greater than 40m) and was not investigated. It was concluded that the risk of groundwater contamination would be expected to be very low due to the depth of the aquifer and the following:
 - Historical record reviews indicated that there had been no hydrocarbon spills reported to regulatory authorities during site operation;
 - The metal contaminant sources on-site were previously aboveground;
 - Inground sources of impact have not been used since the service station operation ceased and have been empty for more than five years;
 - The contaminants identified in the previous report were limited to the top 2m of soil;
 - The floor coverings of the eastern workshop was concrete and tile; and
 - The underlying geology of the site is Brisbane Tuff (a hard massive formation with generally few fractures). During the geotechnical investigations the maximum depth of drilling was 17.02m and as such, it is considered unlikely that a contaminant would move through this formation to a depth of greater than 40m to reach the underlying aquifer.

The TPR comments on the fieldwork methodology are summarised as follows:

- The sample design and sampling was undertaken in accordance with The Australian Standard, *Guide to the Sampling and Investigation of Potentially Contaminated Soil* (AS4482.1-2005) and was based on the findings of the Stage 1 investigation and the previous investigation undertaken by Australis in November 2002. Whilst fewer than required sample points, two were initially collected, in the northern portion of the site, the areas near the USTs and the former service station buildings were sampled at a higher than required density on a judgemental basis.
- In addition, three additional samples were collected in the northern portion of the site (TPR1 – TPR3) to address the issue of lower sampling rates in the north.
- Additional sampling in the northern portion has been undertaken during the UST removal and validation with an additional 4 locations. With the new locations, this brings the total sample locations to 24 across the entire site with the requirements of AS4482.1 being between 9 and 11 sample locations for 0.37ha site.
- Soil sampling methodologies and maintenance of sample integrity were deemed to be suitable.
- Sampling locations were identified in order to suitably investigate and delineate any potential contamination at the site. The criteria for assessment of soil was considered appropriate for determining the contamination status of the site.
- It was noted that some areas of the site initially contained no soil bores due to the presence of services but this was not deemed to detract from the overall coverage of the site meeting suitable guidelines. These areas have now been subsequently sampled during the remediation and validation phase of work.

3.5 Stage 2 Environmental Site Assessment

- 17 soil bores were progressed across the site and three additional hand auger sample points were collected after the TPR site visit at the TPR request to address potential data gaps.
- Soil conditions in the vicinity of the tank farm and workshops consisted of between 0.1 – 0.8m of silty, sandy fill overlying natural firm to stiff medium plasticity clay (between 2 – 3m). The clay was underlain by weathered rock at depths of 2 – 3m. Soils in this area generally had a hydrocarbon odour. The maximum drilling depth was 4m due to the presence of bedrock likely restricting downward migration of contaminants.
- Minor ash layers were identified in BH8 and BH9.
- A total of 12 holes were advanced in this and the previous investigation in the south-eastern corner of the site. Ash was encountered in six of these. Of these samples, only one contained contaminant concentrations (copper) above the investigation criteria (phytotoxicity guideline) and this sample was below HIL 'A'.
- Black hydrocarbon staining were observed in BH2 between 0.4 – 0.8m in depth. A hydrocarbon sheen was identified in BH3 and hydrocarbon odours were noted in BH1 – BH14. No odours were noted in BH15 – BH17 or in TPR1 – TPR3.
- Soils outside the tank farm area were firm, medium to high plasticity clays underlain by shallow (< 2m) weathered rock.
- Based on an assessment of the quality control procedures, the results of the Stage 2 ESA were deemed to be acceptable.
- Soil investigation criteria included the EILs, HIL 'A' (to be applied during site redevelopment when soils are exposed), HIL 'D' (to be applied following the development and the "Material change of use" at the site) and HIL 'F' (currently applied).
- Duplicate and triplicate samples were collected at a rate of 1/20 samples and rinsate samples were collected on a daily basis.

3.6 Results

A summary of the laboratory results exceeding the investigation criteria are provided as follows:

- BH5 – 200mg/kg C₁₀-C₁₄.
- BH6 – 9.7mg/kg Benzene, 30.4mg/kg benzene, toluene, ethylbenzene and xylenes (BTEX), 115 C₆-C₉, 300mg/kg C₁₀-C₁₄ and 1085mg/kg total petroleum hydrocarbons (TPH).
- BH9 – 294mg/kg Copper.
- TPR 1 – 564mg/kg Zinc.
- TPR 3 - 392mg/kg Lead and 894mg/kg Zinc.

The TPR comments on the fieldwork methodology are summarised as follows:

- The sample design and sampling was undertaken using a judgemental basis and was designed based on the findings of Stage 1 and previous work.
- Sampling locations were identified in order to suitably investigate and delineate any potential contamination at the site.
- As previously noted, the sampling density in the northern portion of the site did not meet the AS4482.1, 2005 requirements. Additional samples were requested by the TPR during the UST removal and validation phase of work. Additional sampling now meets the AS4482.1 standard of 9 to 11 sample locations for a 0.37ha sized site.
- It should be also noted that the furniture business and upholstery were considered to be a lower risk activity than the service station and warrant a less dense level of investigation.

The TPR comments regarding the assessment criteria and results of the investigation are summarised as follows:

- The criteria for assessment of soil were considered appropriate for determining the contamination status of the site.
- Interpretation of the results has been in accordance with the nominated investigation levels.
- The coverage of the investigations for soil was deemed suitable for the former site uses.
- The use of statistics to discount minor metal exceedances were considered to be suitable and the conclusions drawn appropriate.
- Additional sampling was subsequently completed to further assess the presence of any elevated metals with the final sampling regime deemed as suitable.

The TPR comments on the Quality Assurance/Quality Control (QA/QC) are summarised as follows:

- Sample receipt notices were provided and the samples were received in order, chilled with chain of custody documents and security seals intact. Chain of custody documents were completed signed and received by the laboratory.
- Samples were received within holding times.
- A QA/QC assessment had been undertaken outlining QA procedures, sample methodology, documentation and sample transportation.
- Quality control samples were obtained meeting the recommended sampling rate.
- All rinsate samples were below the limit of reporting.
- All duplicate and triplicate samples were within the acceptable QC ranges with the exception of lead (65%) and zinc (103%). These samples were collected in heterogeneous silty sand fill material. The primary and triplicate samples were within the recommended RPD range for zinc. Given the fact that the primary and quality control sample results were below the EILs, these extraneous results are not expected to affect the quality of the results in this report.
- Laboratory QA/QC was considered acceptable.

4 TPR PRECISE OF THE FURTHER ENVIRONMENTAL SITE INVESTIGATION INCLUDING VALIDATION OF UST AREA REPORT

The following sections provide a precise of the Golders Further Environmental Site Investigation including Validation of UST report and the TPR assessment of this report.

4.1 Introduction

Golders were commissioned by PUC to undertake further environmental site investigation work including validation of the UST area for the site located on 320 – 324 Vulture Street, Kangaroo Point, Queensland.

The works were carried out to meet the requirements of a DERM information request issued following lodgement of a Development Application for proposed residential tower redevelopment.

Based on the DERM comments for previous work undertaken the following was required:

- Removal of underground storage tanks, remediation of impacted soils and subsequent validation of surrounding/underlying soils; and
- Further sampling and analysis of fill material on the upper northern tier of the site. This area had been previously used for metal treatment and coating.

4.2 Methodologies

- Six 5,000L USTs were identified on-site, prior to removal, USTs were drained of contents by a licensed wastewater contractor, Fuel Medix. USTs were removed by an accredited contractor, McKinnon Earthmoving.
- Validation sampling was undertaken following excavation of potentially contaminated fill, following initial failure of wall and vent samples, this area was excavated to the Lot boundary.
- Material from the excavation was temporarily stockpiled on-site, following removal of the stockpile, validation samples were collected from the base. A further 300mm was scraped from the soil surface due to elevated concentrations of lead.
- Four test pits were advanced on the upper terrace of the site. Samples were obtained of fill material and underlying weathered rock.
- One water sample was collected from the excavation due to rainfall during excavation works.
- The excavation was filled with clean backfill and concrete that formerly covered the surface of the site.
- A total of 1002.20 tonnes of fill was removed to landfill under a disposal permit. Three samples of the material was undertaken at the landfill and disposed to an unlined landfill.
- Soil samples were analysed as follows:
 - UST validation – all samples were analysed for BTEX, TPH and lead. Selective analysis for PAHs and seven further metals;
 - Test Pits – All samples were analysed for 8 metals and selectively analysed for PAHs;

- Stockpile Samples – All samples were analysed for BTEX, TPH and lead. Selective analysis for PAHs and seven further metals; and
- Duplicate and triplicate samples were also analysed.

The TPR comments on the Further Environmental Site Investigation fieldwork methodology are summarised as follows:

- The sample design and sampling was undertaken in accordance with The Australian Standard, *Guide to the Sampling and Investigation of Potentially Contaminated Soil* (AS4482.1-2005) and was based on the findings of the Stage 1 and 2 investigation and the previous investigation undertaken by Australis in November 2002.
- The total number of sampling locations across the site was 24 and exceeded the AS4482.1 standard of between 9 and 11 for 0.37ha.
- Soil sampling methodologies and maintenance of sample integrity were deemed to be suitable. Validation sampling was undertaken as prescribed by DERM.
- Sampling locations were identified in order to suitably investigate and delineate any potential contamination at the site. The criteria for assessment of soil were considered appropriate for determining the contamination status of the site.

4.3 Results

A summary of the laboratory results exceeding the investigation criteria is provided as follows:

- BDYS1 (0.4m) – TPH C₆-C₉ (165mg/kg) and TPH C₁₀-C₁₄ (190mg/kg).
- Wall Val 20a (0.6m) – TPH C₂₉-C₃₆ (1,270mg/kg), Lead (396mg/kg), Zinc (1,210mg/kg) and Total TPH (2,130mg/kg).

Given the low percentage of lead samples marginally failing HIL (A) from both the previous site investigation and the current validation works, the remaining exceedences on the lots are not considered to present any risk of harm to the environment or site users. All fill on the site is expected to be removed from the site during bulk excavation works for the basement carpark.

4.4 Quality Assurance/Quality Control Results

- Nine internal duplicate failures were reported: two for arsenic, two for chromium, one for nickel, two for lead and two for zinc. These results are likely due to the samples either returning concentrations of metals close to or below the limit of reporting (LOR) or results were for anonymous samples not associated with the investigation samples and therefore are not considered further;
- Seven spike results were reported outside the nominated data quality objectives (DQOs);
- One surrogate recovery result was reported outside the nominated DQOs for PAHs, however, no concentrations of PAHs exceeding the laboratory LOR were reported in the results;
- All method blanks were reported below the detection limits.
- Three RPD values were recorded above the acceptance criterion and were likely due to the heterogeneity of the fill in these locations. As all concentrations measured in sample/duplicate pairs were below the site validation criteria these results are deemed acceptable.

4.5 Risk Assessment

Concentrations of contaminants identified as remaining on the site are not expected to pose an environmental or health and safety risk to the proposed use of the Site (i.e. high density residential). Although zinc and copper concentrations exceeding phytotoxic levels, elevated concentrations were either at depths greater than 0.5m or beneath a concrete slab. The site is not vegetated and is not expected to be vegetated (with the exception of possibly above-ground planter boxes). Additionally, as the identified location is not present at the soil surface, mobilisation of these contaminants off-site (i.e. to a more environmentally sensitive area) is not expected. Two lead concentrations in the fill material (0.6% of samples analysed) marginally exceeded HIL (A) with concentrations of 392 and 396mg/kg. These concentrations are not expected to pose any risk to the human health or the environment as the site is zoned for high density residential.

Based on the low number of samples marginally exceeding HIL (A), the site is suitable for unrestricted use.

It should also be noted that prior to construction of the building, all fill will be excavated as well as underlying rock material for formation of the three-level underground car-park.

The TPR comments regarding the assessment criteria and results of the investigation are summarised as follows:

- The criteria for assessment of soil are considered appropriate for determining the contamination status of the site.
- Interpretation of the results has been in accordance with the nominated investigation levels.

The TPR comments on the Quality Assurance/Quality Control (QA/QC) are summarised as follows:

- Sample receipt notices were provided and the samples were received in order, chilled with chain of custody documents and security seals intact. Chain of custody documents were completed signed and received by the laboratory.
- Samples were received within holding times.
- A QA/QC assessment has been undertaken outlining QA procedures, sample methodology, documentation and sample transportation.
- Quality control samples were obtained meeting the recommended sampling rate.
- Nine internal laboratory duplicates failed acceptable criteria, however these were either due to samples returning concentrations close to or below the LOR or were from internal samples not associated with the investigation. One surrogate recovery result was reported outside acceptable criteria for PAHs, however, no concentrations of PAHs exceeding the laboratory LOR were reported in the results. Therefore laboratory QA/QC was considered acceptable and these results were not considered further.
- RPD results for TP4 0.8m indicated lead and zinc above the acceptable limits. However, all concentrations measured were below the site validation criteria and therefore these results are considered acceptable.
- Laboratory QA/QC was considered acceptable.

4.6 Conclusions and Recommendations

4.6.1 Conclusions

The following conclusions were made regarding the site:

- Contaminant sources have been removed from the site and appropriately disposed;
- Contaminated soil associated with the fuel infrastructure has been removed from site and subsequently disposed at landfill;
- Minor metals impact has been noted in fill on the site (copper, zinc and lead). Two lead concentrations marginally exceeding HIL (A) remain on the site and based on the distribution, are present in the heterogeneous fill. Suitable delineation (generally within 5m) has been undertaken of samples exceeding guideline values;
- Validation of the fuel storage area has been adequately undertaken;
- TPH exceedences are present in one sampling location adjacent to Vulture Street. Further excavation could not be undertaken beyond this location due to instability concerns along the footpath and road, and the underground services located along the lot boundary; and
- Fill present in the lot easement east of the site contains exceedences of lead, and beyond the eastern property boundary adjacent to the former vents.

4.6.2 Recommendations

The following recommendations were made regarding the site:

- Notification to the DERM of identified contamination in the Brisbane City Council (BCC) easement east of the site; and
- Removal of Lots 9 and 10 on RP114612 from the DERM EMR.

The TPR comments regarding the Golder's conclusions and recommendations are summarised as follows:

- The work completed on-site has been suitably summarised in this report.
- The conclusions drawn are a fair reflection of the work completed, conditions at the site and the results recorded.
- The recommendation for Lots 9 and 10 on RP114612 to be removed from the EMR is suitably worded.

5 TPR SITE INSPECTIONS SUMMARY 25 JANUARY 2008 AND 4 JUNE 2009

Based on the site investigations the TPR can verify the findings of the Golders work.

The findings of the TPR site inspections are summarised as follows:

- The TPR and TPR representative carried out an initial site inspection on 25 January 2008 to undertake an inspection and verify the findings of the investigation works completed.
- The TPR's observations confirmed the layout of the site and the location of former infrastructure.
- The TPR reviewed the sampling locations and density undertaken as part of the investigations. It was noted that the sampling density in the northern portion of the site was not sufficient and three additional sample points were identified for investigation to delineate potential contamination. The TPR noted that sufficient sampling had been undertaken in the southern portion of the site.
- The TPR and TPR representative carried out a further site inspection 4 June 2009 to observe the UST removal and excavation validation.
- The USTs were all observed to have been suitably removed and the resultant excavation appeared to have little remaining impact.
- TPR general photos are provided in *Appendix D*.

6 CORRESPONDENCE

DERM correspondence is summarised as follows:

- TPR approval letter for the site (provided in *Appendix A*).

TPR correspondence with Golders and PUC is summarised as follows:

- E-mail correspondence throughout the course of the project.
- TPR comments on the Stage 1 Australis and Stage 1 and 2 Site Investigation reports dated 13 February 2008.
- TPR comments on the RAP and SMP dated 20 February 2008, 5 March 2008 and 12 March 2008.
- TPR comments on the Further Environmental Site Assessment including UST Validation report dated 30 July 2009.
- Final TPR comments on the above report dated 5 August 2009.

Appropriate correspondence is included in *Appendix E*.

7 TPR INTERPRETATIONS, CONCLUSIONS AND RECOMMENDATIONS

7.1 TPR Summary of Interpretations and Conclusions

The following provides a summary of the interpretations and conclusions drawn during the assessment of the Golders report, the TPR site inspections and discussions with Golders and DERM:

- During the site visit on 25 January 2008, the TPR raised concerns regarding the insufficient sampling density on the northern portion of the site. Discussions with Golders indicated that the sampling was undertaken on a judgemental basis, and was concentrated on the south-eastern portion of the site in the vicinity of the tank farm and former workshops. Three additional samples were requested by the TPR to address this lack of data. Two samples were directed to be taken from the garden beds directly to the south of the two hardstand areas (former storage sheds) on the upper terrace and one sample in the garden bed at the centre of the western boundary.
- Based on the additional samples and the previous work undertaken by Australis, plus the further validation and sampling undertaken in June 2009, the TPR now considers sufficient work to have been completed to assess the potential contamination at the site.
- The TPR noted that the aerial photographs were of generally poor quality, but concedes that they are likely to be all that were available, and are not expected to impact of the assessment of the site.
- The Stage 1 and 2 Site Investigation suitably summarises the work completed on-site.
- The Further Environmental Site Assessment including UST validation suitably summarises the remediation work completed on-site.
- The conclusions drawn were a fair reflection of the work completed and results recorded for the works.

7.2 TPR Recommendations

Based on the assessment of the Golders report, the following recommendation is made:

- The TPR concurs with Golders conclusion that the site is suitable for redevelopment and that Lots 9 and 10 on RP114612 may be removed from EMR.

8 LIMITATIONS

The findings of this report are based on the Scope of Work outlined above. WSP performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental auditing profession. No warranties express or implied, are made.

Subject to the Scope of Work, WSP's assessment is limited strictly to identifying typical environmental conditions associated with the subject property area and does not include evaluation of any other issues. The absence of any identified hazardous or toxic materials on the subject property should not be interpreted as a guarantee that such materials do not exist on the site.

The results of this assessment are based upon site inspections conducted by WSP personnel and information from Golders, PUC and regulatory agencies. All conclusions and recommendations regarding the property area are the professional opinions of the WSP personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, WSP assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of WSP, or developments resulting from situations outside the scope of this project.

The client acknowledges that this report is for the exclusive use of the client and the Queensland Government Department of Environment and Resource Management, its representatives and advisers and any investors, lenders, underwriters and financiers who agreed to execute the reliance letter, and the client agrees that WSP's report or correspondence will not be, except as set forth herein, used or reproduced in full or in part for such promotional purposes, and may not be used or relied upon in any prospectus or offering circular.

Appendix A
DERM Letter of Approval

Published on
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RTI Act 2009

08 JAN 2008

**Queensland
Government**

Enquiries Greg O'Brien
Telephone (07) 32244514
Your reference
Our reference BNE7447

Environmental Protection AgencyIncorporating the
Queensland Parks and Wildlife Service

2 January 2008

Robin Wagland
WSP Environmental Pty Ltd
PO Box 2261
Milton Qld 4064

Dear Mr Wagland

**THIRD PARTY REVIEWER (TPR) ACCEPTANCE: FORMER SERVICE STATION,
320-324 VULTURE STREET, WOOLLOONGABBA, LOTS 9 & 10 RP114612**

The Environmental Protection Agency (EPA) advises that, following panel review under the TPR Terms of Reference, your application dated 21 November 2007 is accepted to act as TPR for the above site.

The following conditions must be complied with in relation to this approval.

1. The acceptance applies to the subject site only and to site investigation and validation work conducted and certified by a person whose qualifications and experience are acceptable to the EPA under the above provisions.
2. The requirements of the Terms of Reference, *Use of a third party reviewer (TPR) for assessment and management of site contamination*, (TOR) 28 August 2003 must be complied with in relation to all site activities undertaken.
3. The EPA is to be advised in writing within 5 days of final execution of all contractual documents associated with your engagement by the site owner and other relevant parties.

This acceptance does not infer that your services as TPR will be accepted for any other site. Applications for other sites will be assessed according to the TOR.

Should you require any additional information, please contact the undersigned or the EPA project officer for any relevant site.

Yours sincerely

sch 4 - signature

Greg O'Brien
Chief Scientific Advisor Project Support

Page 1 of 1

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Appendix B

TPR Statutory Declaration

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STATUTORY DECLARATION

Address of Site Investigated: 320-324 Vulture Street, Kangaroo Point, QLD.
Real Property Description: Lots 9 and 10 on RP114612.
Title of Report: Third Party Reviewer Certification Report,
Stage 1 and Stage 2 Site Investigation, March
2008 and Further Site Assessment including
UST Validation, 320-324 Vulture Street,
Kangaroo Point, August 2009.

I, Robin Wagland, of WSP Environmental Pty Ltd (Level 1, 16 Douglas Street, Milton) in the State of Queensland, do solemnly and sincerely declare that:

1. I was the Third Party Reviewer appointed by the Queensland Government Department of Environment and Resource Management, Contaminated Land Unit for the Vulture Street site described above.
2. Information was collected and collated by Golder Associates (Golders) in their reports titled Stage 1 and Stage 2 Site Investigation, March 2008 and Further Site Assessment including UST Validation, August 2009.
3. I am a member of the Environment Institute of Australia and New Zealand and my qualifications and experience (submitted previously to the DERM) is relevant to this investigation.
4. I have not knowingly included any false, misleading or incomplete information in the report.
5. I certify that the site has been assessed to a standard such that the health and environmental risks associated with the contamination at the site have been addressed.
6. I concur with Golders that the site is suitable for the proposed high density residential redevelopment.
7. I recommend that Lots 9 and 10 on RP114612 be removed from the EMR.

And I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the Oaths Act 1867

Signature

sch 4 - signature

Name

Me Robin M Wagland

Taken and declared before me at Milton this 19th day of August 2009

Witness (Justice of the Peace/Commissioner for Declarations/Solicitor)

Signature

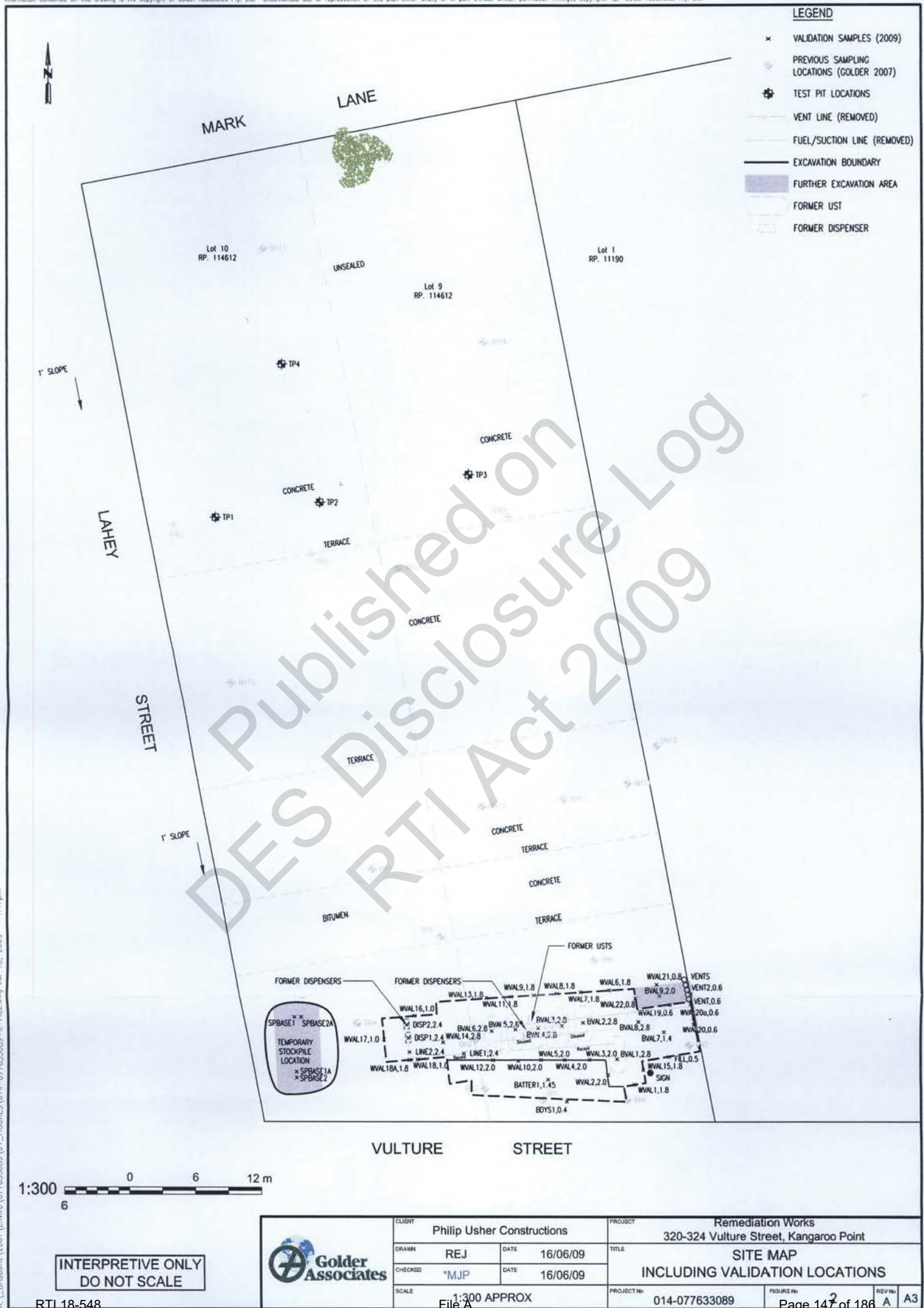
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Name

John Morton



Appendix C
Figures





MARK LANE

Lot 10
RP. 114612

Lot 9
RP. 114612

Lot 1
RP. 11190

UNSEALED

1° SLOPE

TP4

CONCRETE

TP3

CONCRETE

TP2

TERRACE

TP1

LAHEY STREET

TPR3	0-0.5m
Soil Type	Silty Sandy Fill
	mg/kg
Pb	392
Zn	894

TPR1	0-0.5m
Soil Type	Clayey Silt
	mg/kg
Zn	564

BH9	0.05-0.2m
Soil Type	Fill
	mg/kg
Cu	294

BITUMEN

CONCRETE

TERRACE

CONCRETE

TERRACE

TEMPORARY STOCKPILE LOCATION

WVAL20a,0.6

Wall 20a	0.6m
Soil Type	Sandy Clay Fill
	mg/kg
Pb	396
Zn	1210
C ₂₀ -C ₃₀	1270
Total TPH	2130

BDYS1.0.4

BDY S1	0.4m
Soil Type	Fill
	mg/kg
C ₀ -C ₉	165
C ₁₀ -C ₁₉	190

VULTURE STREET

STREET

LEGEND

- x VALIDATION SAMPLES (2009)
- x PREVIOUS INVESTIGATION BY AUSTRALIS
- PREVIOUS SAMPLING LOCATIONS (GOLDER 2007/2008)
- TEST PIT LOCATIONS
- VENT LINE (REMOVED)
- FUEL/SUCTION LINE (REMOVED)
- EXCAVATION BOUNDARY
- FURTHER EXCAVATION AREA
- FORMER UST
- FORMER DISPENSER

1:300
0 6 12 m

INTERPRETIVE ONLY
DO NOT SCALE



CLIENT	Philip Usher Constructions
DRAWN	REJ
CHECKED	*MJP
SCALE	1:300 APPROX

PROJECT	Remediation Works 320-324 Vulture Street, Kangaroo Point
TITLE	SOIL EXCEEDENCES FOLLOWING VALIDATION WORKS
PROJECT No	014-077633089
FIGURE No	3
REV No	0
A3	

NOTE: THE * BESIDE THE TYPED INITIALS DENOTES THE ORIGINAL DRAWING ISSUE WAS SIGNED OR INITIALED BY THAT RESPECTIVE PERSON

Appendix D
TPR Photo Log

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RTI Act 2009



Photo 1 - Initial layout of site during Stage 1 and 2 works, view to the south showing the hardstand areas.

Photo 2 - Former workshop location.



Photo 3 - View to the north looking at the former warehouse areas.

 WSP Environmental Pty Ltd PO Box 2261 Level 1, 16 Douglas Street Milton QLD 4064 Tel: +61 (0)7 3367 4300 Fax: +61 (0)7 3367 4399 www.wspenvironmental.com				Date: August 2009	Client: Philip Usher Constructions	LEGEND:
				Drawn: KD	Project: 2.09.034 Vulture Street, Kangaroo Point	
				Approved: RW	Title: TPR Photographic Log	
				Source: WSP	Figure: Page 1	



Photo 4 - UST Excavation, on Vulture Street boundary looking west.

Photo 5 - UST Excavation.



Photo 6 - C and D waste looking north to rear of site.



Photo 7 - Stockpile material from UST Excavation.

Photo 8 - Northern portion of site looking northwest.



Photo 9 - Concrete seal on eastern boundary of southern portion of site.

Appendix E
Correspondence

Published on
DES Disclosure
RTI Act 2009

From: Wagland, Robin (WSP Environmental, Milton)
Sent: Tuesday, 7 April 2009 3:24 PM
To: Briggs, Emma
Cc: Pomeroy, Matthew
Subject: RE: Disposal permit application, 320-324 Vulture St, Kangaroo Point

Emma,

Sorry for the delay in my review process but we had been awaiting approval to review the disposal permit.

Based upon my review I have the following comments which need to be addressed:

- There has been no allowance made for metal impacted soils noted across other areas of the site. While it is accepted that the amount noted previously would not list the site on the EMR, additional verification was required. Should these noted volumes not be included in off-site removal?
- The proposed suite of analysis includes only lead, it would be sensible to make an allowance for a suite of metals in a selected number of samples given the potential to encounter ash or impacted fill (also as one of the notifiable activities was "Metal Treatment or Coating").
- A figure should be provided to explain the extent of the assumed impacted area forming the 400 square metres, including depths and sample locations.
- Is 1.5m deep enough given that an elevated result (TPH C10-C14) was noted in TP5 at a depth of 2-2.2m and the fact bedrock was not encountered until 2.8m?
- The volume quoted of 600 (20x20x1.5), does not appear to take into account the volume currently occupied by the tanks themselves. There is clearly a need to provide a scaled figure with dimensions to explain how the volumes were calculated.
- There is no mention of TCLP analysis which will be required to characterise the material.
- When discussing disposal of the material, the default under the EPA waste hierarchy where on site remediation cannot be undertaken is off-site remediation. Therefore only following landfarming would it be expected that material will be disposed of at the landfill. This should be made clear in the application ie. rather than "prior to final disposal" this should be following landfarming at the landfill.
- No details have been provided with the application relating to the list outlined in Part B. It is normal practise to provide a figure showing sample locations, assumed extent of impact (to calculate volumes), table of results, lab reports and SRA and sampling methodology. Even if these are only extracts from the previously submitted report, this would greatly assist (and probably speed up) the EPA review process, as they are unlikely to have the previous report readily available.

I am more than happy to look at the above additions electronically to speed the process. Also feel free to call to discuss any of the above.

I will also ensure the final is dealt with on an ASAP basis, but I suggest you put a call in to the EPA to let them know it is coming and has a high level of priority to try to meet your commencement date. We can also copy electronically directly the person who will issue the permit to ensure there is no delay in transfer from EcoAccess.

I trust the above is self explanatory and look forward to finalising the process.

Kind regards,

Robin.

Robin Wagland
Queensland Manager
WSP Environmental Pty Ltd

Level 1, 16 Douglas Street, Milton, QLD 4064

24/08/2009

From: Wagland, Robin (WSP Environmental, Milton)
Sent: Tuesday, 31 March 2009 12:30 PM
To: Briggs, Emma
Cc: Glen Frew; Pomeroy, Matthew
Subject: RE: 320-324 Vulture St, Kangaroo Point

Emma,

Based on the guidelines and my previous experience of such cases, the ideal scenario is that the soil must be characterised and delineated in-situ (during Stage 2 investigations), it also states that "all possible efforts" should be taken to minimise soil disposal. The circumstances of the site in question are however understood and I believe it is acceptable to remove soil directly off-site if concerns exist for odours or H&S issues (as is the case here).

Given that the site is on the EMR and the soil is "potentially contaminated" (based on the notifiable activity and the previous indication of contamination), I believe a Disposal Permit (DP) will be required to move the soil as the degree of contamination is unknown. Unless it can be demonstrated otherwise that the material is "clean" based on a sampling rate of 1/50 cubic metres. This then defaults to off-site characterisation and if the material is subsequently found to be "clean" this material can be reused for backfill on-site with variations to the final disposal volumes reported to the TPR and EPA. The characterisation either on-site or off-site will still need to be at a rate of one sample per 50 cubic metres for all contaminants of concern, plus leaching samples (TCLP) on the highest total results. Sampling should also be completed by a suitably qualified person and results confirmed with the TPR prior to final disposal. Sampling and disposal documentation will also need to be included in the final validation reporting for the site.

Further, during the excavation works "potentially contaminated" soil, as identified by visual, olfactory or PID field screening should be segregated from "potentially clean" soil to have the dual purpose of avoiding active dilution and also to enable costs savings to be realised from disposal at a lesser category based on final landfill characterisation.

In order to process a disposal permit application at this stage, the results and volumes estimates should be based on the in-situ investigations completed to date with any variations informed to the TPR and EPA immediately upon any excavations which may suggested a greater than +/- 10%.

Here is the link to the guidelines for your internal information:

http://www.epa.qld.gov.au/environmental_management/land/contaminated_land/removal_and_disposal/

It should also be noted that the DP application will require TPR review and approval prior to EPA issue and currently the EPA have a 5-10+ working day turnaround, therefore the sooner this application is processed, the sooner the works can commence.

In the meantime, should you have any queries on the above, please do not hesitate to contact me further.

Kind regards,

Robin.

Robin Wagland
Queensland Manager
WSP Environmental Pty Ltd

Level 1, 16 Douglas Street, Milton, QLD 4064
(PO Box 2261, Milton, QLD 4064)
Tel: +61 (0) 7 3367 4300
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24/08/2009

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From: Briggs, Emma [mailto:ebriggs@golder.com.au]
Sent: Monday, 30 March 2009 3:25 PM
To: Wagland, Robin (WSP Environmental, Milton)
Cc: Glen Frew; Pomeroy, Matthew
Subject: 320-324 Vulture St, Kangaroo Point

Robin,

Regarding the Philip Usher Constructions site located at Vulture Street, Kangaroo Point, we are currently putting together a disposal permit application (Part A and Part B) for potentially hydrocarbon-contaminated soil from the area of the site containing the USTs.

As we are proposing to excavate and remove the soil to landfill directly for characterisation sampling, our query is whether we need a disposal permit for this soil given that lab data from the area to be excavated (UST area) is limited due to health and safety concerns. Can you please let us know what procedures and paperwork we need to complete to meet EPA requirements in order to remove this soil from the site to the landfill for characterisation sampling.

Once you have confirmed the required procedures with the EPA if you could please communicate this back to us in an email at your earliest convenience, it would be greatly appreciated.

If you have any queries, please contact me on 3721 4831.

Regards,

Emma Briggs (BA/BSc (Hons)) | Environmental Geologist | **Golder Associates Pty Ltd**
611 Coronation Drive, Toowong, Queensland 4066, Australia (PO Box 1734, Milton BC QLD 4064)
T: +61 7 3721 5400 | D: +61 7 3721 4831 | F: +61 7 3721 5401 | E: ebriggs@golder.com.au |
www.golder.com

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From: Foong, Yin [mailto:yfoong@golder.com.au]
Sent: Wednesday, 1 April 2009 11:10 AM
To: Wagland, Robin (WSP Environmental, Milton)
Cc: Briggs, Emma; glen@philipusher.com.au; mckin.em@bigpond.net.au; Pomeroy, Matthew
Subject: Disposal permit application, 320-324 Vulture St, Kangaroo Point

Dear Robin,

Please find attached to this email the disposal permit application for the site located at 320-324 Vulture Street, Kangaroo Point.

Once you have reviewed and approved the disposal permit application, we will then send it on to the EPA via EcoAccess. If you could you also please send through your approval to the EPA to assist with the disposal permit application process, it would be appreciated.

Should you have any comments or queries regarding the application, please do not hesitate to contact Emma on 3721 4831.

Rgds

Yin

Yin Foong (Dr) | Principal Environmental Engineer | Golder Associates Pty Ltd
611 Coronation Drive, Toowong, Queensland 4066, Australia (PO Box 1734, Milton BC QLD 4064)
T: +61 7 3721 5400 | D: +61 7 37215433 | F: +61 7 3721 5401 | M: +61 (0) 7 3367 4399 (sch 4 - mobile phone) | E: yfoong@golder.com.au | www.golder.com

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24/08/2009

Page 1 of 2

From: Wagland, Robin (WSP Environmental, Milton)
Sent: Thursday, 16 April 2009 10:25 PM
To: Kim Barry
Cc: Foong, Yin
Subject: FW: Kangaroo Point Soil Disposal Application
Attachments: 013-077633089-L-Disposal Permit Application Rev1-with attachments.pdf

Dear Kim,

Please find attached a copy of the Disposal Permit Application from Golder for the Kangaroo Point site on Vulture Street.

As TPR for the site, I have reviewed the attached and I am happy it meets all the requirements for approval.

I am also satisfied that given the location and size of the site, it is appropriate to remove potentially impacted soils directly off-site to the landfill for characterisation and subsequent bioremediation.

It should be noted that the details of the analysis and other additional information have been previously provided in the Stage 1 and Stage 2 ESA report provided by Golder and have been previously reviewed by the myself.

Feel free to contact me further should you require any additional information.

Kind regards,

Robin.

Robin Wagland
Queensland Manager
WSP Environmental Pty Ltd

Level 1, 16 Douglas Street, Milton, QLD 4064
(PO Box 2261, Milton, QLD 4064)
Tel: +61 (0) 7 3367 4300
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From: Foong, Yin [mailto:yfoong@golder.com.au]
Sent: Wednesday, 15 April 2009 11:51 AM
To: Wagland, Robin (WSP Environmental, Milton)
Cc: Briggs, Emma; Pomeroy, Matthew; glen@philipusher.com.au; mckin.em@bigpond.net.au
Subject: Kangaroo Point Soil Disposal Application

Dear Robin,

24/08/2009

Please find attached to this email the revised disposal permit application for the site located at 320-324 Vulture Street, Kangaroo Point.

Once you have reviewed and approved the revised disposal permit application, we will then send it on to the EPA via EcoAccess. Could you also please send through your approval to the EPA to assist with the disposal permit application process, it would be appreciated.

Should you have any comments or queries regarding the application, please do not hesitate to contact Emma on 3721 4831.

Rgds

Yin

Yin Foong (Dr) | Principal Environmental Engineer | Golder Associates Pty Ltd
611 Coronation Drive, Toowong, Queensland 4066, Australia (PO Box 1734, Milton BC QLD 4064)
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Please consider the environment before printing this email.

Emma Briggs (BA/BSc (Hons)) | Environmental Geologist | Golder Associates Pty Ltd
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24/08/2009

From: Wagland, Robin (WSP Environmental, Milton)
Sent: Thursday, 23 April 2009 8:26 AM
To: Briggs, Emma; Glen Frew
Cc: Pomeroy, Matthew; McKinnon Earthmoving
Subject: RE: Proposed meeting onsite, Thursday 30th April 10am

Emma,

Many thanks for the heads up. From my perspective it would be more useful to attend as you have pulled out the tanks to observe the remaining site conditions. I would therefore welcome an update on progress to arrange an appropriate day/time to come along.

I am more than happy for you to proceed with you standard inductions and site set up.

If there is anything you would like to discuss in advance of this feel free to call.

I am also happy to attend if you feel it is necessary and the client wishes me to do so, otherwise I will limit myself to one visits during the remedial works. If requested to attend 09.30 would be better for me as I have another meeting later in the morning.

I look forward to a successful outcome to you works.

Kind regards,

Robin.

Robin Wagland
Queensland Manager
WSP Environmental Pty Ltd

Level 1, 16 Douglas Street, Milton, QLD 4064
(PO Box 2261, Milton, QLD 4064)
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From: Briggs, Emma [mailto:ebriggs@golder.com.au]
Sent: Wednesday, 22 April 2009 5:21 PM
To: Glen Frew
Cc: Pomeroy, Matthew; McKinnon Earthmoving; Wagland, Robin (WSP Environmental, Milton)
Subject: Proposed meeting onsite, Thursday 30th April 10am

Glen,

Have tried to reach you on your mobile, and left you a couple of messages.

24/08/2009

We are hoping to schedule a site meeting at the Vulture St site at Kangaroo Point, for next Thursday at 10am. In attendance will be Golder staff, Rod Smith (McKinnon Earthmoving), and yourself. Robin, if you would be interested in attending this site meeting, please let us know also.

The focus of the site meeting is to discuss health and safety measures on the site, and general site work logistics (fencing, signage, the billboard, etc).

Can you please advise Matthew Pomeroy if you are available to attend this meeting? If another time is preferable, please let us know and we will liaise with Rod.

Regards,

Emma Briggs (BA/BSc (Hons)) | Environmental Geologist | **Golder Associates Pty Ltd**
611 Coronation Drive, Toowong, Queensland 4066, Australia (PO Box 1734, Milton BC QLD 4064)
T: +61 7 3721 5400 | D: +61 7 3721 4831 | F: +61 7 3721 5401 | E: ebriggs@golder.com.au |
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24/08/2009

From: Wagland, Robin (WSP Environmental, Milton)
Sent: Thursday, 30 July 2009 4:18 PM
To: Pomeroy, Matthew
Cc: glen@philipusher.com.au; Briggs, Emma; Worsley, Carina
Subject: Kangaroo Point TPR Comments
Attachments: 2-09-034 TPR Comments Further Assessment 2009 07 30.pdf

Matthew,

Please find attached comments for the above report.

It would be useful to send back a "tracked changes" Word version to help final review.

Also feel free to respond to any comments or call to discuss.

Kind regards,

Robin.

Robin Wagland
Queensland Manager
WSP Environmental Pty Ltd

Level 1, 16 Douglas Street, Milton, QLD 4064
(PO Box 2261, Milton, QLD 4064)
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24/08/2009

10 September 2009

Site ID: 2692
File Number: BNE8920
Enquiries to: Contaminated Land Unit
Telephone: (07) 322 58487

PHILIP USHER CONSTRUCTIONS PTY LTD
PO BOX 2146
CRESTMead DC QLD 4132

NOTICE OF REMOVAL OF LAND FROM THE ENVIRONMENTAL MANAGEMENT REGISTER

In accordance with Part 8 of the *Environmental Protection Act 1994*, notice is given that the parcel of land described below has been removed from the Environmental Management Register (EMR).

Lot: 9 Plan: RP114612
Brisbane City Council

324 VULTURE STREET
WOOLLOONGABBA 4102

SERVICE STATIONS - operating a commercial service station.

The parcel of land has been investigated and relevant reports have been assessed by the administering authority and it has been determined that this land is not contaminated land and the land has therefore been removed from the EMR.

Following removal from the EMR any information relating to this site will NOT be available to the public via a search of the EMR or the Contaminated Land Register (CLR).

Further information regarding this notice may be obtained by contacting the Contaminated Land Unit, EPA on telephone (07) 3225 1827. Further information about contaminated land matters may be obtained by visiting our web-site at:

http://www.epa.qld.gov.au/environmental_management/land/contaminated_land/

sch 4 - signature

Delegate of Administering Authority
Environmental Protection Act 1994

SUITABILITY STATEMENT

DATE PRINTED: 11/09/2009

OWNER

PHILIP USHER CONSTRUCTIONS PTY LTD
PO BOX 2146
CRESTMead DC QLD 4132

DATE OF ISSUE : 09/09/2009

PROPERTY DESCRIPTION

LOT : 9 PLAN : RP114612
324 VULTURE STREET
WOOLLOONGABBA 4102

Brisbane City Council
EMR Site ID: 2692 FILE REFERENCE: BNE8920

STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

Stage 1 and Stage 2 Site Investigation and Further Site Assessment including UST Validation, 320 - 324 Vulture Street, Kangaroo Point, QLD, prepared by WSP Environmental Pty Ltd, dated 24 August 2009 (Doc No 2-09-034)

Further Environmental Site Assessment including UST Validation, 320-324 Vulture Street, Kangaroo Point, prepared by Golder Associates Pty Ltd, dated August 2009 (Doc No 014-077633089-R-Rev0)

Third Party Reviewer Certification Report, Stage 1 and Stage 2 Site Investigation Report, Site Management Plan and Remediation Action Plan, 320 - 324 Vulture Street and 54 Mark Lane, Kangaroo Point, QLD, dated March 2008 (Doc No 2-07-126)

Stage 1 and Stage 2 Site Investigation 320-324 Vulture Street and 54 Mark Lane, Kangaroo Point, Queensland, prepared by Golder Associates Pty Ltd, dated March 2008 (Doc No 001-077633089)

Environmental Site Assessment for 320-324 Vulture Street and 54 Mark Lane, Kangaroo Point, prepared Australis Contract Engineering Pty Ltd, dated 29 November 2002 (Doc No pucesa)

Preliminary Site Assessment for the Proposed Development at Vulture Street & Mark Lane Woolloongabba, dated 23 August 2001 (Doc No Clients)

STATEMENT OF SUITABILITY

On the basis of the information supplied to this Department, the subject site is suitable for any use.

ENVIRONMENTAL MANAGEMENT REGISTER

LOT : 9 PLAN : RP114612

There is no requirement to record this site on the Environmental Management Register or the Contaminated Land Register.

sch 4 - signature

Delegate of Administering Authority
Environmental Protection Act 1994

Published on
DES Disclosure Log
RTI Act 2009

10 September 2009

Site ID: 2693
File Number: BNE8920
Enquiries to: Contaminated Land Unit
Telephone: (07) 322 58487

PHILIP USHER CONSTRUCTIONS PTY LTD
PO BOX 2146
CRESTMEAD DC QLD 4132

NOTICE OF REMOVAL OF LAND FROM THE ENVIRONMENTAL MANAGEMENT REGISTER

In accordance with Part 8 of the *Environmental Protection Act 1994*, notice is given that the parcel of land described below has been removed from the Environmental Management Register (EMR).

Lot: 10 Plan: RP114612
Brisbane City Council

324 VULTURE STREET
WOOLLOONGABBA 4102

METAL TREATMENT OR COATING - treating or coating metal including, for example, anodising, galvanising, pickling, electroplating, heat treatment using cyanide compounds and spray painting using more than 5 L of paint per week (other than spray painting within a fully enclosed booth).
SERVICE STATIONS - operating a commercial service station.

The parcel of land has been investigated and relevant reports have been assessed by the administering authority and it has been determined that this land is not contaminated land and the land has therefore been removed from the EMR.

Following removal from the EMR any information relating to this site will NOT be available to the public via a search of the EMR or the Contaminated Land Register (CLR).

Further information regarding this notice may be obtained by contacting the Contaminated Land Unit, EPA on telephone (07) 3225 1827. Further information about contaminated land matters may be obtained by visiting our web-site at:
http://www.epa.qld.gov.au/environmental_management/land/contaminated_land/

sch 4 - signature

Delegate of Administering Authority
Environmental Protection Act 1994

SUITABILITY STATEMENT

DATE PRINTED: 11/09/2009

OWNER

PHILIP USHER CONSTRUCTIONS PTY LTD
PO BOX 2146
CRESTMED DC QLD 4132

DATE OF ISSUE : 10/09/2009

PROPERTY DESCRIPTION

LOT : 10 PLAN : RP114612
324 VULTURE STREET
WOOLLOONGABBA 4102

Brisbane City Council
EMR Site ID: 2693 FILE REFERENCE: BNE8920

STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

Stage 1 and Stage 2 Site Investigation and Further Site Assessment including UST Validation, 320 - 324 Vulture Street, Kangaroo Point, QLD, prepared by WSP Environmental Pty Ltd, dated 24 August 2009 (Doc No 2-09-034)

Further Environmental Site Assessment including UST Validation, 320-324 Vulture Street, Kangaroo Point, prepared by Golder Associates Pty Ltd, dated August 2009 (Doc No 014-077633089-R-Rev0)

Third Party Reviewer Certification Report, Stage 1 and Stage 2 Site Investigation Report, Site Management Plan and Remediation Action Plan, 320 - 324 Vulture Street and 54 Mark Lane, Kangaroo Point, QLD, dated March 2008 (Doc No 2-07-126)

Stage 1 and Stage 2 Site Investigation 320-324 Vulture Street and 54 Mark Lane, Kangaroo Point, Queensland, prepared by Golder Associates Pty Ltd, dated March 2008 (Doc No 001-077633089)

Environmental Site Assessment for 320-324 Vulture Street and 54 Mark Lane, Kangaroo Point, prepared Australis Contract Engineering Pty Ltd, dated 29 November 2002 (Doc No pucesa)

Preliminary Site Assessment for the Proposed Development at Vulture Street & Mark Lane Woolloongabba, dated 23 August 2001 (Doc No Clients)

STATEMENT OF SUITABILITY

On the basis of the information supplied to this Department, the subject site is suitable for any use.

ENVIRONMENTAL MANAGEMENT REGISTER

LOT : 10 PLAN : RP114612

There is no requirement to record this site on the Environmental Management Register or the Contaminated Land Register.

sch 4 - signature

Delegate of Administering Authority
Environmental Protection Act 1994

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DES Disclosure Log
RTI Act 2009

10 September 2009

Site ID: 2692
File Number: BNE8920
Enquiries to: Contaminated Land Unit
Telephone: (07) 322 58487

Philip Usher Constructions Pty Ltd
PO Box 1536
BROWNS PLAINS QLD 4118

NOTICE OF REMOVAL OF LAND FROM THE ENVIRONMENTAL MANAGEMENT REGISTER

In accordance with Part 8 of the *Environmental Protection Act 1994*, notice is given that the parcel of land described below has been removed from the Environmental Management Register (EMR).

Lot: 9 Plan: RP114612
Brisbane City Council

324 VULTURE STREET
WOOLLOONGABBA 4102

SERVICE STATIONS - operating a commercial service station.

The parcel of land has been investigated and relevant reports have been assessed by the administering authority and it has been determined that this land is not contaminated land and the land has therefore been removed from the EMR.

Following removal from the EMR any information relating to this site will NOT be available to the public via a search of the EMR or the Contaminated Land Register (CLR).

Further information regarding this notice may be obtained by contacting the Contaminated Land Unit, EPA on telephone (07) 3225 1827. Further information about contaminated land matters may be obtained by visiting our web-site at:

http://www.epa.qld.gov.au/environmental_management/land/contaminated_land/

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Delegate of Administering Authority
Environmental Protection Act 1994

SUITABILITY STATEMENT

DATE PRINTED: 11/09/2009

APPLICANT

Philip Usher Constructions Pty Ltd
PO Box 1536
BROWNS PLAINS QLD 4118

DATE OF ISSUE : 09/09/2009

PROPERTY DESCRIPTION

LOT : 9 PLAN : RP114612
324 VULTURE STREET
WOOLLOONGABBA 4102

Brisbane City Council
EMR Site ID: 2692 FILE REFERENCE: BNE8920

STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

Stage 1 and Stage 2 Site Investigation and Further Site Assessment including UST Validation, 320 - 324 Vulture Street, Kangaroo Point, QLD, prepared by WSP Environmental Pty Ltd, dated 24 August 2009 (Doc No 2-09-034)

Further Environmental Site Assessment including UST Validation, 320-324 Vulture Street, Kangaroo Point, prepared by Golder Associates Pty Ltd, dated August 2009 (Doc No 014-077633089-R-Rev0)

Third Party Reviewer Certification Report, Stage 1 and Stage 2 Site Investigation Report, Site Management Plan and Remediation Action Plan, 320 - 324 Vulture Street and 54 Mark Lane, Kangaroo Point, QLD, dated March 2008 (Doc No 2-07-126)

Stage 1 and Stage 2 Site Investigation 320-324 Vulture Street and 54 Mark Lane, Kangaroo Point, Queensland, prepared by Golder Associates Pty Ltd, dated March 2008 (Doc No 001-077633089)

Environmental Site Assessment for 320-324 Vulture Street and 54 Mark Lane, Kangaroo Point, prepared Australis Contract Engineering Pty Ltd, dated 29 November 2002 (Doc No pucesa)

Preliminary Site Assessment for the Proposed Development at Vulture Street & Mark Lane Woolloongabba, dated 23 August 2001 (Doc No Clients)

STATEMENT OF SUITABILITY

On the basis of the information supplied to this Department, the subject site is suitable for any use.

ENVIRONMENTAL MANAGEMENT REGISTER

LOT : 9 PLAN : RP114612

There is no requirement to record this site on the Environmental Management Register or the Contaminated Land Register.

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Delegate of Administering Authority
Environmental Protection Act 1994

Published on
DES Disclosure Log
RTI Act 2009

10 September 2009

Site ID: 2693
File Number: BNE8920
Enquiries to: Contaminated Land Unit
Telephone: (07) 322 58487

Philip Usher Constructions Pty Ltd
PO Box 1536
BROWNS PLAINS QLD 4118

NOTICE OF REMOVAL OF LAND FROM THE ENVIRONMENTAL MANAGEMENT REGISTER

In accordance with Part 8 of the *Environmental Protection Act 1994*, notice is given that the parcel of land described below has been removed from the Environmental Management Register (EMR).

Lot: 10 Plan: RP114612
Brisbane City Council

324 VULTURE STREET
WOOLLOONGABBA 4102

METAL TREATMENT OR COATING - treating or coating metal including, for example, anodising, galvanising, pickling, electroplating, heat treatment using cyanide compounds and spray painting using more than 5 L of paint per week (other than spray painting within a fully enclosed booth).

SERVICE STATIONS - operating a commercial service station.

The parcel of land has been investigated and relevant reports have been assessed by the administering authority and it has been determined that this land is not contaminated land and the land has therefore been removed from the EMR.

Following removal from the EMR any information relating to this site will NOT be available to the public via a search of the EMR or the Contaminated Land Register (CLR).

Further information regarding this notice may be obtained by contacting the Contaminated Land Unit, EPA on telephone (07) 3225 1827. Further information about contaminated land matters may be obtained by visiting our web-site at:

http://www.epa.qld.gov.au/environmental_management/land/contaminated_land/

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Delegate of Administering Authority
Environmental Protection Act 1994

SUITABILITY STATEMENT

DATE PRINTED: 11/09/2009

APPLICANT

Philip Usher Constructions Pty Ltd
PO Box 1536
BROWNS PLAINS QLD 4118

DATE OF ISSUE : 10/09/2009

PROPERTY DESCRIPTION

LOT : 10 PLAN : RP114612
324 VULTURE STREET
WOOLLOONGABBA 4102

Brisbane City Council
EMR Site ID: 2693 FILE REFERENCE: BNE8920

STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

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Preliminary Site Assessment for the Proposed Development at Vulture Street & Mark Lane Woolloongabba, dated 23 August 2001 (Doc No Clients)

STATEMENT OF SUITABILITY

On the basis of the information supplied to this Department, the subject site is suitable for any use.

ENVIRONMENTAL MANAGEMENT REGISTER

✓ LOT : 10 PLAN : RP114612

There is no requirement to record this site on the Environmental Management Register or the Contaminated Land Register.

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Delegate of Administering Authority
Environmental Protection Act 1994

Published on
DES Disclosure Log
RTI Act 2009

10 September 2009

Site ID: 2692
File Number: BNE8920
Enquiries to: Contaminated Land Unit
Telephone: (07) 322 58487

Robin Wagland
WSP Environmental Pty Ltd
Level 1, 16 Douglas Street
MILTON
QLD 4064

NOTICE OF REMOVAL OF LAND FROM THE ENVIRONMENTAL MANAGEMENT REGISTER

In accordance with Part 8 of the *Environmental Protection Act 1994*, notice is given that the parcel of land described below has been removed from the Environmental Management Register (EMR).

Lot: 9 Plan: RP114612
Brisbane City Council

324 VULTURE STREET
WOOLLOONGABBA 4102

SERVICE STATIONS

The parcel of land has been investigated and relevant reports have been assessed by the administering authority and it has been determined that this land is not contaminated land and the land has therefore been removed from the EMR.

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Delegate of Administering Authority
Environmental Protection Act 1994

SUITABILITY STATEMENT

DATE PRINTED: 11/09/2009

THIRD PARTY REVIEWER

Robin Wagland
WSP Environmental Pty Ltd
Level 1, 16 Douglas Street
MILTON QLD 4064

DATE OF ISSUE : 09/09/2009

PROPERTY DESCRIPTION

LOT : 9 PLAN : RP114612
324 VULTURE STREET
WOOLLOONGABBA 4102

Brisbane City Council
EMR Site ID: 2692 FILE REFERENCE: BNE8920

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STATEMENT OF SUITABILITY

On the basis of the information supplied to this Department, the subject site is suitable for any use.

ENVIRONMENTAL MANAGEMENT REGISTER

LOT : 9 PLAN : RP114612

There is no requirement to record this site on the Environmental Management Register or the Contaminated Land Register.

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Delegate of Administering Authority
Environmental Protection Act 1994

Published on
DES Disclosure Log
RTI Act 2009

10 September 2009

Site ID: 2693
File Number: BNE8920
Enquiries to: Contaminated Land Unit
Telephone: (07) 322 58487

Robin Wagland
WSP Environmental Pty Ltd
Level 1, 16 Douglas Street
MILTON
QLD 4064

NOTICE OF REMOVAL OF LAND FROM THE ENVIRONMENTAL MANAGEMENT REGISTER

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Lot: 10 Plan: RP114612
Brisbane City Council

324 VULTURE STREET
WOOLLOONGABBA 4102

METAL TREATMENT OR COATING SERVICE STATIONS

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Delegate of Administering Authority
Environmental Protection Act 1994

SUITABILITY STATEMENT

DATE PRINTED: 11/09/2009

THIRD PARTY REVIEWER

Robin Wagland
WSP Environmental Pty Ltd
Level 1, 16 Douglas Street
MILTON QLD 4064

DATE OF ISSUE : 10/09/2009

PROPERTY DESCRIPTION

LOT : 10 PLAN : RP114612
324 VULTURE STREET
WOOLLOONGABBA 4102

Brisbane City Council
EMR Site ID: 2693 FILE REFERENCE: BNE8920

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STATEMENT OF SUITABILITY

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ENVIRONMENTAL MANAGEMENT REGISTER

LOT : 10 PLAN : RP114612

There is no requirement to record this site on the Environmental Management Register or the Contaminated Land Register.

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Delegate of Administering Authority
Environmental Protection Act 1994

Published on
DES Disclosure Log
RTI Act 2009

10 September 2009

Site ID: 2692
File Number: BNE8920
Enquiries to: Contaminated Land Unit
Telephone: (07) 322 58487

Attention Carl Dowthwaite
Brisbane City Council
G P O Box 1434
BRISBANE
QLD 4001

NOTICE OF REMOVAL OF LAND FROM THE ENVIRONMENTAL MANAGEMENT REGISTER

In accordance with Part 8 of the *Environmental Protection Act 1994*, notice is given that the parcel of land described below has been removed from the Environmental Management Register (EMR).

Lot: 9 Plan: RP114612
Brisbane City Council

324 VULTURE STREET
WOOLLOONGABBA 4102

SERVICE STATIONS

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Delegate of Administering Authority
Environmental Protection Act 1994

SUITABILITY STATEMENT

DATE PRINTED: 11/09/2009

LOCAL GOVERNMENT AUTHORITY

Attention Carl Dowthwaite
Brisbane City Council
G P O Box 1434
BRISBANE
QLD 4001

DATE OF ISSUE : 09/09/2009

PROPERTY DESCRIPTION

LOT : 9 PLAN : RP114612
324 VULTURE STREET
WOOLLOONGABBA 4102

Brisbane City Council
EMR Site ID: 2692 FILE REFERENCE: BNE8920

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STATEMENT OF SUITABILITY

On the basis of the information supplied to this Department, the subject site is suitable for any use.

ENVIRONMENTAL MANAGEMENT REGISTER

LOT : 9 PLAN : RP114612

There is no requirement to record this site on the Environmental Management Register or the Contaminated Land Register.

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Delegate of Administering Authority
Environmental Protection Act 1994

Published on
DES Disclosure Log
RTI Act 2009

10 September 2009

Site ID: 2693
File Number: BNE8920
Enquiries to: Contaminated Land Unit
Telephone: (07) 322 58487

Attention Carl Douthwaite
Brisbane City Council
G P O Box 1434
BRISBANE
QLD 4001

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LOCAL GOVERNMENT AUTHORITY

Attention Carl Dowthwaite
Brisbane City Council
G P O Box 1434
BRISBANE
QLD 4001

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