



## APPENDIX G

# Supplementary Contamination Assessment

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191 Miller Road,  
Chester Hill, NSW

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JBS 40414 - 11915 (Rev 0)  
JBS Environmental Pty Ltd

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Appendix H – Site Management Plan (HLA 2002)

## List of Abbreviations

A list of the common abbreviations used throughout this report is provided below.

- As Arsenic
- Cd Cadmium
- Cr Chromium
- Cu Copper
- BTEX Benzene, Toluene, Ethylbenzene and Xylenes
- B(a)P Benzo (a) pyrene
- DECC NSW Department of Environment and Climate Change
- DoP NSW Department of Planning
- DQO Data Quality Objectives
- DP Deposited Plan
- EPA New South Wales Environment Protection Authority
- Hg Mercury
- HIL Health Based Investigation Level
- LOR Limit of Reporting
- MAH Monocyclic Aromatic Hydrocarbon
- Ni Nickel
- OCP Organochlorine Pesticide
- SAR Site Audit Report
- SAS Site Audit Statement
- PAH Polycyclic Aromatic Hydrocarbons
- Pb Lead
- PIL Phytotoxicity Based Investigation Level
- PCB Polychlorinated Biphenyls
- PQL Practical Quantitation Limit
- QA/QC Quality Assurance/Quality Control
- RPD Relative Percentage Difference
- TPH Total Petroleum Hydrocarbons (C<sub>6</sub>-C<sub>9</sub> and C<sub>10</sub>-C<sub>36</sub>)
- Zn Zinc

## Executive Summary

JBS Environmental Pty Ltd was engaged by T H & T H Chung to undertake soil and groundwater contamination studies at the property located at 191 Miller Road, Chester Hill, NSW. The site consists of Lots 1 to 7 within DP851138.

Historically, the site has been used for the storage and manufacturing of liquid and solid chemicals by various companies since 1942, until decommissioning in 2002. Remediation of the site followed, with several buildings onsite demolished and a Statutory Site Audit Statement (SAS) issued (CH2MHILL 2002), confirming that the site was suitable for continued commercial/industrial use subject to the implementation of a Site Management Plan (HLA 2004).

In 2005 CMA Corporation Pty Ltd occupied the site and operated a small scrap metal transfer facility (i.e., less than 30,000 tonnes p.a.). It is understood that the property is being considered for sale and prior to divestment an investigation of the environmental status of soils and groundwater at the site is required to assess ongoing environmental suitability for commercial / industrial uses.

As part of the current investigation, soil samples were collected from 20 sampling locations across the site via testpits from the surface (0-0.1m) and to a maximum investigation depth of 2m (unless prior refusal) and groundwater samples were obtained from three existing monitoring wells at the site.

The site was generally underlain by fill material comprising variable amounts of gravel, gravely silty clay and sandy clay across of the majority of the site with several areas notably elevated in the north eastern, south eastern and central regions. The fill material is underlain by natural stiff residual clays and shale.

On comparison of the soil and groundwater analytical results with the adopted site criteria, the following results were obtained:

- Localised hydrocarbon impact TPH (C<sub>10</sub>-C<sub>36</sub>) was identified above the adopted site criterion (1000 mg/kg) in surface fill material at sample locations TP1, TP6, TP7 and TP17 (2500-8500mg/kg). The identified impact was generally confined to the upper 0.5m layer.
- Benzo(a)pyrene and total PAHs were reported above the adopted site criteria for commercial/ industrial use (HIL-F) in surface fill material at sample locations TP3, TP5 and TP17. The identified impact was generally confined to the upper 0.5m layer.
- Heavy metals, BTEX, VOCs, phenols, OCP and PCBs were not reported above the adopted assessment criteria (HIL-F) in any soil sample collected from the site. Asbestos fragments were not identified at the site, and asbestos fibres were not reported in any soil sample submitted for analysis. However, it is noted that asbestos was reportedly placed in a 6m deep pit and covered with clean imported material as part of the previous remedial works (CH2MHILL 2002).
- Levels of impact in groundwater were found to be below the adopted groundwater assessment criteria apart from slightly elevated concentrations of dissolved zinc and 1,2-dichloroethane. These slightly elevated levels are not considered to pose an unacceptable risk to the receiving environment. Groundwater analytical results reported for this investigation were found to be consistent with historical data pertaining to the site.

- On the basis of the results of this investigation, and subject to the limitations outlined in **Section 9**, the site is considered suitable for continued commercial/industrial use subject to the continued implementation of the Site Management Plan (HLA 2002b).

# 1 Introduction

## 1.1 Introduction and Background

JBS Environmental Pty Ltd was engaged by T H & T H Chung to undertake soil and groundwater contamination studies at the former industrial property located at 191 Miller Road, Chester Hill, NSW. The site consists of Lots 1 to 7 within DP851138.

Historically, the site has been used for the storage and manufacturing of liquid and solid chemicals by various companies since 1942, until decommissioning in 2002. Subsequent remediation of the site followed, with several buildings onsite demolished.

During 2002, the site was validated following an extensive soil and groundwater investigation (HLA 2002a<sup>1</sup>). Following, a detailed review of all of the site characterisation and validation data was conducted by a NSW EPA Accredited Site Auditor (CH2MHILL 2002)<sup>2</sup> for the provision of a Statutory Site Audit Statement (SAS), under the provisions of the *Contaminated Land Management Act 1997*.

The SAS concluded that the site was suitable for continued commercial/industrial use provided that a site specific management plan (HLA 2002b)<sup>3</sup> was implemented to ensure ongoing protection of site users and requesting quarterly groundwater monitoring for twelve months. Following review of the final groundwater monitoring report (HLA 2004)<sup>4</sup>, it was concluded in an audit review (CH2MHILL 2004)<sup>5</sup> that identified groundwater contamination would not pose any risk for continued commercial/industrial use, and the remaining requirements outlined in the site management plan continue to be implemented.

In 2005 CMA Corporation Pty Ltd occupied the site and operated a small scrap metal transfer facility (i.e., less than 30,000 tonnes p.a.). It is understood that the property is being considered for sale by CMA Corporation Pty Ltd and prior to divestment an investigation of the environmental status of soils and groundwater at the site is required to assess ongoing environmental suitability for commercial / industrial uses.

## 1.2 Objectives

The objective of the supplementary investigation is to assess the environmental status of the site prior to divestment of the site, such that conclusions can be made as to the ongoing environmental suitability for commercial / industrial uses following the use of the site as a scrap metal transfer facility.

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<sup>1</sup> *Site Validation Report, 191 Miller Road, Chester Hill, HLA-Envirosciences, 2 August 2002 (HLA 2002a)*

<sup>2</sup> *PacLib Industrial Pty Ltd, 191 Miller Road, Chester Hill, Site Assessment, Remediation, Validation and Ongoing Site Management-Summary Site Audit Report (SSAR 2002/13), CH2MHILL Australia Pty Ltd, August 2002 (CH2MHILL 2002).*

<sup>3</sup> *Site Management Plan, 191 Miller Road, Chester Hill, HLA-Envirosciences, 22 August 2002 (HLA 2002b)*

<sup>4</sup> *Groundwater Monitoring Report, Final Round, 2004, 191 Miller Road, Chester Hill, NSW, HLA-Envirosciences, 30 July 2004 (HLA 2004)*

<sup>5</sup> *Auditor review of Groundwater Monitoring Report, Chester Hill, NSW, CH2MHILL 19 October 2004 (CH2MHILL 2004)*

## 2 Site Condition & Surrounding Environment

### 2.1 Site Identification

The site is located at 191 Miller Road, Chester Hill, NSW. The site location is shown in **Figures 1** and **2**. The site details are summarised in **Table 2.1** and described in more detail in the following sections.

**Table 2.1 Summary Site Details**

Lot/DP	Lots 1 to 7 in Deposited Plan 851138
Address	191 Miller Road, Chester Hill, NSW
Local Government Authority	Bankstown City Council
Site Zoning	4(a) General Industrial zone
Current Use	Commercial / Industrial and vacant land
Site Area	66,539m <sup>2</sup>

### 2.2 Site Condition

The site is located on relatively flat ground with a very slight slope to the southwest.

The 191 Miller Road property is irregular in shape, comprising an area of approximately 66539m<sup>2</sup> (as shown on **Figure 2**). An entrance handle is located at the west of the site of Miller Road. At the time of the current investigation, the site was found to be occupied by several buildings and industrial sheds and extensive concrete pavement and hardstand areas retained from historical occupation of the site.

A two storey office and administration building is located in the western portion of the site adjacent to the Miller Road entrance. The area immediately surrounding the office building consists of a car park and truck parking hardstand area (**Photo 1**). The hardstand area is the former location of where scrap was crushed for off site disposal.



**Photo 1-** View of two storey office and administration building looking west with office car park immediately to the south and truck parking hardstand area in the foreground.

A large transport store warehouse is located in the central northern portion of the site, with a hardstand truck parking area extending from the warehouse to the west. The area surrounding the warehouse consists of several sparsely vegetated areas with exposed soils and roadbase present. (**Photos 2 to 4**).



**Photo 2-** Looking east towards the transport store warehouse located in the central northern portion of the site with the former location of the diesel UST in the foreground.



**Photo 3-** Looking north towards the hardstand truck parking area extending west from the transport store warehouse.



**Photo 4-** Looking north west towards sparsely vegetated region at the eastern end of transport store warehouse.

Several disturbed areas are present at the site, particularly in the area immediately south west of the transport store warehouse in proximity to the former diesel underground storage tank (UST) which was decommissioned and removed in 2002 (HLA 2002d)<sup>6</sup> and former fuel loading point (**Photo 2 & 5**).



**Photo 5-** Looking south-east from the location of the removed diesel UST excavation towards the former fuel loading point (sample location TP3).

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<sup>6</sup> *UST Decommissioning Validation – 191 Miller Road, Chester Hill, HLA-Envirosciences, 29 January 2002 (HLA 2002d)*

Several elevated areas are present across the site, believed to have been raised through the importation of fill material. The northern boundary of the site possesses a 1m to 3m embankment, beyond which lied the Southern Railway (**Photo 6** and **7**).



**Photo 6-** Looking north towards the embankment traversing the northern site boundary with the railway line beyond.



**Photo 7-** Looking north east following the embankment along the northern boundary towards the eastern site boundary.

Two stockpiles, derived predominantly from soil and crushed concrete are present in the central portion of the site, extending towards the eastern site boundary (**Photos 8 and 9**).



**Photo 8-** Looking east towards a portion of the stockpile located in the central portion of the site.



**Photo 9-** Looking south along the eastern site boundary and extent of the stockpile extending from the centre of the site.

Roadways have been retained following previous occupation of the site and are found to dissect the site extending from the eastern entrance off Miller Road and running laterally along the eastern and southern site boundaries (**Photos 9 to 11**).



**Photo 10-** View to the west of the roadway that extends from the site entrance, past the warehouse and to the eastern site boundary.



**Photo 11-** View to the west of the roadway that extends along the southern site boundary towards the workshop area.

Two large buildings utilised as workshops are located in the south western portion of the site (**Photo 11**).

During the current investigation, the surface of the site was relatively free of staining, with the exception of:

- The gravel/roadbase area extending west of the truck parking hardstand area near the warehouse (**Photo 12**);



**Photo 12-** Localised staining noted in the unsealed gravel/roadbase area west of the warehouse (sample location TP1).

- Localised staining in the area near the eastern site boundary;



**Photo 13-** Localised staining observed in the vegetated area within proximity to the eastern site boundary (sample location TP17).

- Localised staining in the southern portion of the site, to the east of the workshop area; and



**Photo 14-** Localised staining observed in the grass vegetated area adjacent to the southern site boundary and east of the workshop area (sample location TP7).

- Localised staining immediately south of the workshop area in the south east portion of the site.

### 2.3 Surrounding Landuse

The surrounding land uses have been identified as follows:

- North – The main southern railway line lies immediately adjacent to the northern site boundary with residential properties beyond;
- South – commercial/industrial properties are located to the south of the site with additional industrial properties beyond;
- East – commercial/industrial properties are located adjacent to the eastern site boundary, with Orchard Road and residential properties beyond; and
- West – Miller Road borders the property to the west as well as a railway siding.

### 2.4 Topography

The site is relatively flat with a gentle slope towards the southwest. Several elevated areas are present across the site, believed to have been raised through the importation of fill material. A 1m to 3m embankment is present running along the northern boundary of the site adjacent to the Southern Railway.

### 2.5 Geology

HLA (2002c) indicate that the site is underlain by shale, carbonaceous claystone, laminate, fine grained lithic sandstones and some coal derived from the Bringelly Shale formation of the Wianamatta Group. Previous investigations (HLA 2002a) have

encountered fill material at varying depths across the site consisting of gravely sands with some clays, bricks, slag and sulphur. The fill is generally underlain by weathered siltstone and sandstone at depths ranging between 1 m below ground surface (bgs) in the north eastern portion of the site to greater than 6 m bgs in the south west portion of the site.

## 2.6 Acid Sulphate Soils

The NSW Natural Resource Atlas indicates that a low environmental risk exists of the presence of acid sulfate materials within the vicinity of the site.

## 2.7 Hydrology

It is anticipated that surface water would follow natural topography and flow over unpaved areas of the site onto the paved roadways and directed towards the concrete stormwater channel located directly south east of the site which drains to Prospect Creek, located approximately 2.5 km from the site.

## 2.8 Hydrogeology

Previous investigations at the site (Woodward Clyde 1999a)<sup>7</sup> have identified three groundwater systems beneath the site, including:

- A deep groundwater system under moderately saline conditions within the bedrock shale, with an inferred flow direction to the west;
- A shallow groundwater system under moderately saline conditions within residual clays, with an inferred west-south-westerly flow direction; and
- Perched groundwater present within areas of fill.

HLA (2004) indicates that groundwater flow within the shallow and deep aquifers appears to follow the slope of the regional geology to the south west with a low seepage velocity based on the shale and clay material present within the aquifers.

## 2.9 Previous Investigations

Historically, an extensive number of investigations have previously been conducted at the site, chronologically including:

- *Preliminary Site Assessment* (Dames and Moore 1992)<sup>8</sup>;
- *Baseline Environmental Investigation* (Dames & Moore 1996)<sup>9</sup>;
- *Phase 1 and 2 Investigation* (Woodward-Clyde 1999)<sup>10</sup>;
- *Phase 2c Assessment* (Woodward-Clyde 1999b)<sup>11</sup>;
- *Remediation Action Plan (RAP)* (HLA 2001a)<sup>12</sup>;

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<sup>7</sup> *Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill*, Woodward-Clyde, 30 August 1999 (Woodward-Clyde 1999a)

<sup>8</sup> *Preliminary Contamination Assessment, Miller Street, Chester Hill Site. Prepared for Incitec Ltd*, Dames & Moore, December 1992 (Dames & Moore 1992)

<sup>9</sup> *Data Report. Baseline Environmental Assessment, Incitec Ltd, Chester Hill. Prepared for Incitec Ltd*, Dames & Moore, May 1996 (Dames & Moore 1996)

<sup>10</sup> *Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill*, Woodward-Clyde, 30 August 1999 (Woodward Clyde 1999)

<sup>11</sup> *Phase 2c Soil Investigation of Incitec Chester Hill Site, 191 Miller Road, Chester Hill*, Woodward-Clyde, 15 December 1999 (Woodward-Clyde 1999b)

<sup>12</sup> *Remediation Action Plan, Subdivision of 191 Miller Road, Chester Hill, NSW. Prepared for Paclib Management Pty Ltd*, HLA-Envirosciences, August 2001 (HLA 2001a)

- *Characterisation of Fill Mound* (HLA 2001b)<sup>13</sup>;
- *UST Decommissioning Validation* (HLA 2002d);
- *Materials Management Plan – 191 Miller Road, Chester Hill* (HLA 2002e)<sup>14</sup>;
- *Site Validation Report, 191 Miller Road, Chester Hill* (HLA 2002a);
- *Summary Site Audit Report* (CH2MHILL 2002)<sup>15</sup>
- *Site Management Plan – 191 Miller Road, Chester Hill, NSW* (HLA 2002c)<sup>16</sup>;
- *Groundwater Investigation Final Round – 191 Miller Road, Chester Hill* (HLA 2004)<sup>17</sup>;
- *Auditor Review of Groundwater Monitoring Report, Chester Hill, NSW* (CH2MHILL 2004)<sup>18</sup>;
- *Environmental Management Plan* (JBS 2005)<sup>19</sup>; and
- *Construction Contamination Management Plan* (JBS 2006)<sup>20</sup>.

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<sup>13</sup> *Characterisation of Fill Mound – 191 Miller Road, Chester Hill, NSW. Prepared for Paclib Management Pty Ltd, HLA-Envirosciences, 18 October 2001 (HLA 2001b)*

<sup>14</sup> *Materials Management Plan – 191 Miller Road, Chester Hill. Prepared for Paclib Management Pty Ltd, HLA-Envirosciences, 27 May 2002 (HLA 2002e)*

<sup>15</sup> *Paclib Industrial Pty Ltd, 191 Miller Road, Chester Hill, Site Assessment, Remediation, Validation and Ongoing Site Management-Summary Site Audit Report (SSAR 2002/13), CH2MHILL Australia Pty Ltd, August 2002 (CH2MHILL 2002).*

<sup>16</sup> *Site Management Plan, 191 Miller Road, Chester Hill, HLA-Envirosciences, 22 August 2002 (HLA 2002c)*

<sup>17</sup> *Groundwater Monitoring Report, Final Round, 2004, 191 Miller Road, Chester Hill, NSW, HLA-Envirosciences, 30 July 2004 (HLA 2004)*

<sup>18</sup> *Auditor review of Groundwater Monitoring Report, Chester Hill, NSW, CH2MHILL 19 October 2004 (CH2MHILL 2004)*

<sup>19</sup> *Environmental Management Plan, JBS Environmental Pty Ltd, August 2005 (JBS 2005)*

<sup>20</sup> *Construction Contaminant Management Plan, JBS Environmental Pty Ltd, August 2006 (JBS 2006).*

## 3 Site History

### 3.1 Summary of Site History

A complete assessment of the site history has been provided in the Woodward-Clyde Phase 1 & 2 Assessment (1999). A summary of the history of the site is provided following:

- The site was vacant land prior to 1942;

#### **Commonwealth Government (Villawood Explosives Factory)**

- The site was developed in 1942 the Commonwealth Government operating as the Villawood Explosives Factory. Specific infrastructure located across the site with this development included:
  - Coal and sulphur dumps;
  - Oleum plant;
  - Sulphuric acid tank farm;
  - Coal fed gas producer plant;
  - Cooling tower and compressor house;
  - Contact acid plant
  - Acid regeneration plant; and
  - Administration office, laboratories, tea house and amenity building

#### **Australian Fertilisers Limited (AFL)**

- The site was leased by AFL in 1946, including the site buildings, tank farms, oleum plant and contact acid plant.
- From 1946, operations at the plant changed from nitrogen-based processes to sulphur based processes due to an increased demand for more concentrated acids with product storage in an above ground storage tank (AST) farm in the northern portion of the site.
- In 1955, the gas producer plant was removed and ownership of the site was transferred to AFL.
- In 1967, the site was jointly occupied with The George Shirley Company.
- In 1987 AFL changed its name to Incitec Ltd and the transport division of Incitec became known as Chemtrans.
- In 1996, both a site office building and warehouse were constructed in the western and central northern portion of the site respectively. The warehouse was used to store packaged liquid chemicals and compounds in 200L and smaller drums (Class 3 flammable liquids, Class 4 flammable solids, Class 5 powdered chlorine and Class 8 corrosives).

### **The George Shirley Company**

The site was partially occupied by the George Shirley Company until 1967 when Shirley Fertilisers Pty Ltd was established and maintained operations at the site. Several buildings were removed during this period.

### **CMA Corporation Pty Ltd**

In 2005 CMA Corporation Pty Ltd took physical possession of the site and operated a small scrap metal transfer facility (i.e., less than 30,000 tonnes p.a.). The operations conducted at the site included:

- Acceptance of scrap metal;
- Separation of certain components from the scrap (e.g., engines);
- Stockpiling of scrap according to material type; and
- Loading of scrap onto haulage vehicles for off-site disposal.

## **3.2 DECC Records**

A search undertaken through the DECC's public Contaminated Land Register identified three significant risk of harm (SROH) sites located within proximity to the subject site. Of the three identified SROH sites, two (2 Christina Road and 49 Miowera Road) were not located hydraulically downgradient from the investigation area. One SROH site, was identified immediately to the south west of the sit (Former Orica Factory) at 127 Orchard Road, Chester Hill. It is likely that historical site use of the 127 Orchard Road site could potentially contribute to VOC contamination of groundwater flowing beneath the south eastern region of the site. On this basis, groundwater samples were screened for VOCs during this investigation.

## 4 Remaining Contamination Issues

Historically, the site has been used for the storage and manufacturing of liquid and solid chemicals by various companies since 1942, until decommissioning in 2002. Subsequent remediation of the site followed, with several buildings onsite demolished. The remediation works were validated and the site verified as being suitable for commercial/industrial use by a NSW EPA Site Auditor (CH2MHILL 2004), subject to the implementation of the Site Management Plan (HLA 2002b). Hence, there are no areas of contamination remaining from the historical site use (i.e. prior to 2005), which are not addressed sufficiently in the ongoing site management plan prepared for the site (HLA 2002b).

### 4.1 Areas of Environmental Concern

Following review of the current activities the following potential sources of contamination have been identified related to operations associated with CMA Corporation Pty Ltd.

#### 4.1.1 Scrap Separation, Handling and Crushing Area

The area immediately east of the two storey office/administration building was utilised for the crushing, storage and loading of scrap metal onto haulage vehicles for off-site removal. Contaminants associated with the storage of scrap metal on site may include TPH, BTEX, PCBs, phenols, metals, VOCs and PAHs. This area has since been resurfaced with concrete and was found to be free of any surface staining. One sampling location (TP5) was placed adjacent to this location to characterise the area.

#### 4.1.2 Heavy Machinery and General Vehicle Movements

Several large plant items were noted during the current investigation. As such, the use of plant and equipment has the potential to result in isolated impacts to the surface soils throughout the site. The current investigation identified several areas exhibiting localized surface soil staining. These areas were targeted during the soil investigation. Sample locations are shown as locations TP1, TP6, TP8 and TP17 on **Figure 2**. Environmental data generated by these works is summarised in **Appendix A**.

### 4.2 Potentially Contaminated Media

The potentially contaminated media arising since the 2005 occupation may include:

- Potentially contaminated surface soils associated with leaks and spills from the scrap metal transfer operations;
- Potentially contaminated (natural) soils; and
- Potentially contaminated groundwater.

### 4.3 Potential for Migration

Contaminants may migrate via a combination of windblown dusts, surface water runoff, groundwater flow or via vapours (in the case of volatile compounds). The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (i.e., solid/liquid and mobility characteristics);
- The extent of the contaminants (i.e., isolated or widespread);
- The location of the contaminants (i.e., surface soils or at depth); and

- The site topography, geology, hydrology and hydrogeology.

The potential contaminants identified as part of the site history review and site inspection may be present in either solid (e.g., ash, slag or coal) or liquid form (e.g., petroleum hydrocarbons). In the former paved and lined parts of the site, contaminants (if present) would only be expected to migrate via surface water runoff, while in the unpaved parts of the site, may migrate via either windblown dusts, surface water runoff or via groundwater.

Approximately 70% of the site is unsurfaced, which to a large extent allows infiltration of rainfall and surface water to the fill material and natural soils beneath. The potential for vertical migration of contaminants via infiltration through the concrete surface is likely. Furthermore, potential does exist for the vertical migration of contaminants from the areas of environmental concern via a variety of chemical transport methods (adsorption, absorption, dispersion, diffusion, capillary pressure, gravity, etc).

Given the minimal vegetation present in the north eastern and north western regions of the site, generation of windblown dusts is likely, and may be considered to be a major potential migration pathway whilst the remaining central and southern areas of the site are well vegetated.

Given the presence of exposed soils, as well as the majority of the site being paved, the potential for contaminants to presently migrate via windblown dusts or as sediment in stormwater runoff is considered to be moderate.

#### **4.4 Constituents of Potential Concern**

Based on the review of the site history, and the findings of environmental site assessments completed to date, the following remaining constituents of potential concern (i.e. post 2005) are nominated for the site:

- Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn);
- Total petroleum hydrocarbons (TPH);
- Benzene, toluene, ethylbenzene and xylenes (BTEX);
- Phenols;
- Volatile organic compounds (VOCs);
- Polycyclic aromatic hydrocarbons (PAHs);
- Polychlorinated biphenyls; and
- Asbestos.

## 5 Sampling and Analysis Plan

### 5.1 Data Quality Objectives

Data Quality Objectives (DQOs) have been developed for the investigation, as discussed in the following sections.

#### 5.1.1 State the Problem

Surface and sub-surface environmental impact has been identified associated with the historical storage and manufacturing of liquid and solid chemicals and other industrial related activities across the 191 Miller Road site. Prior to occupation at the site by CMA Corporation Pty Ltd, a Statutory Site Audit Statement (CH2MHILL 2002) and Site Audit Review (CH2MHILL 2004) confirmed that the site was suitable for continued commercial/industrial use subject to the implementation of the Site Management Plan prepared for the site (HLA 2002b).

The site is now to be divested for continued commercial/industrial purposes. The suitability of the site (from a contamination perspective) needs to be determined prior to divestment such that conclusions can be made as to the ongoing environmental suitability for commercial / industrial uses following the use of the site as a scrap metal transfer facility.

#### 5.1.2 Identify the Decision

From a review of the potential for contamination (completed in **Section 4**) the following decisions require to be resolved for the Lot 2 area of the site:

- Is environmental impact present in fill materials underlying the site;
- Is environmental impact present in natural soils underlying the site;
- Has environmental impact migrated through groundwater into the sub-surface of the site; and
- Where environmental impact is identified does it pose a potential human health risk to future commercial / industrial occupants of the site, human users in proximity of the site or ecological risk to the environment surrounding the site.

#### 5.1.3 Identify Inputs to the Decision

Inputs identified to assess the nature and extent of contamination at the site include the delineation and assessment of the site specific geology and hydrogeology via testpitting targeted (judgemental) locations within the identified areas of environmental concern (AEC) to enable the collection and subsequent analysis of soil and groundwater samples. Specifically, sufficient data needs to be collected from the identified potentially impacted media (e.g. fill material and natural soils) in selected AECs for the associated potential contaminants of concern.

#### 5.1.4 Define the Study Boundaries

The lateral boundary of the study area is defined as the boundaries of 191 Miller Road property. This is shown shaded in grey on **Figure 2**. The vertical boundary of the assessment is the base of the shale aquifer underlying the site. This has been found to be at a maximum depth of 13.9m below the site surface. The base of the aquifer is characterised as having hard shale present. The shale is considered to act as an aquitard to any potential deeper migration of the potential contaminants.

### 5.1.5 Develop a Decision Rule

Soil and groundwater data requires to be generated to allow the identification of:

- Potentially significant levels of COPC's that may indicate the presence of source materials;
- Levels of COPCs that may indicate the presence of a potential human health hazard to users of the site; and/or
- Levels of COPCs that may indicate the presence of a potential human health hazard to users of downgradient sites or any ecological receptors.

The decision rule will be to simply identify elevated levels of COPC's by comparison to background levels of COPC's on the site which will be formed by the remainder of the site data. Assessment of human health or ecological risks will be undertaken by comparison to published criteria. It is noted that local sources of assessment criteria do not include all of the COPCs identified for the site, and reference to international literature may be required.

### 5.1.6 Specify Limits of Decision Error

Data quality indicators (DQIs) were established, specifying limits of decision error for completeness, comparability, representativeness, precision and accuracy of both field and laboratory data. The DQIs are presented in **Section 5.5**.

### 5.1.7 Optimise the Design for Obtaining Data

To optimise the design for obtaining environmental data the following sampling plan has been implemented in this study:

- Placement of 20 targeted locations in specific areas of concern associated with the operation of the scrap metal transfer facility and infill parts of the site. Soil sampling locations are shown in **Figure 2**; and
- Sampling of three existing groundwater monitoring wells across the site. Monitoring well locations (MWS6, MWS10 and MWD2) are shown on **Figure 2**.

## 5.2 Soil Sampling Methodology

Soil samples were collected via testpits from the surface (0-0.1m) and to a maximum investigation depth of 2m (unless prior refusal). Samples were collected from each distinct layer of material and sufficient sample material collected to allow both field and laboratory analyses. During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indications of contamination were noted. This information was recorded on field testpit logs, completed for each of the sampling locations (**Appendix B**).

Collected soil samples were immediately transferred to laboratory supplied sample containers of appropriate composition (glass jars) with Teflon lined lids. The sample labels included: job number and/or client name; sample identification number; and date and time of sampling.

Sample containers were transferred to a chilled ice box for sample preservation prior to and during shipment to the testing laboratory. A chain-of-custody form was completed and forwarded with the samples to the testing laboratory. Complete chain of custody forms are provided with laboratory documentation in **Appendix C**.

Not all soil samples collected during the fieldworks were analysed. Samples were analysed in accordance with the laboratory schedule (**Section 5.4**). All soil samples will remain at the primary laboratory for a period of three months if future analysis is required following the receipt of sample results (provided analysis of analytes is within holding times).

For QA/QC purposes, intra-laboratory duplicates were collected at a rate of 1 in 20 samples, while there was generally one inter-laboratory duplicate, one trip spike and one trip blank per sampling day to enable an assessment of the data quality to be undertaken.

### 5.3 Groundwater Sampling

Three existing groundwater monitoring wells were sampled during the current investigation including:

- MWS6, located in the south western region of the site;
- MWS10, located centrally adjacent to the southern site boundary; and
- MWD2, located in the south western region of the site.

Prior to sampling, monitoring wells were purged under low flow conditions until water quality parameters stabilised. Groundwater sampling sheets are presented in **Appendix D**. Samples were then collected using a low-flow peristaltic pump and collected in the following order: volatile organics, semi-volatiles, other organics, inorganic, and other parameters. Each bottle was capped immediately after being filled with minimal headspace.

Gauging and water sampling equipment such as the interface probe (IP), water quality meter (WQM) decontaminated with laboratory grade detergent solution-Extran 90 and rinsed with deionised water between each well. Dedicated tubing was used with the peristaltic pump at each well.

The sample bottles were handled, labelled and chain-of-custody forms completed, as per the soil samples (**Section 5.2**).

Each time the sample was relinquished or received, the party involved signed the form and indicated the time and date.

Samples were analysed in accordance with the Laboratory Schedule (**Section 5.4**). All other samples remain at the primary laboratory for a period of three months if future analysis (provided analysis is within holding times) is required following the receipt of sample results.

For QA/QC purposes, intra-laboratory duplicates were collected at a rate of 1 in 20 samples, while there was one trip spike and one trip blank to enable an assessment of the data quality to be undertaken.

## 5.4 Laboratory Analyses

The analysis program for soil and groundwater samples is summarised in **Table 5.1** following. Sample summary tables detailing chemical analysis of samples are also provided as **Appendix A**.

**Table 5.1: Summary of Analytical Schedule**

Sample Locations	Analytes
Soil Sample Locations: including samples of fill material; and samples of natural soils at the former site surface	Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn) Total petroleum hydrocarbons (TPH) Volatile organic compounds (VOCs) Organochlorine pesticides (OCPs) Organophosphorus pesticides (OPPs) Polychlorinated biphenyls (PCBs) Polycyclic aromatic hydrocarbons (PAHs) Total phenolics Asbestos
Groundwater monitoring wells	Heavy metals TPH BTEX VOCs PAHs

## 5.5 Quality Assurance / Quality Control

The pre-determined Data Quality Indicators (DQIs) established for the project are discussed below in relation to precision, accuracy, representativeness, comparability and completeness (PARCC parameters), and are shown in **Table 5.2**.

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD)<sup>21</sup> of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that is generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** -expresses the degree which sample data accurately and precisely represents a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.

$$^{21} RPD(\%) = \frac{|C_o - C_d|}{C_o + C_d} \times 200$$

Where  $C_o$  is the analyte concentration of the original sample  
 $C_d$  is the analyte concentration of the duplicate sample

- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** - is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.

**Table 5.2: Summary of Quality Assurance / Quality Control Program**

Data Quality Objective	Frequency	Data Quality Indicator
<i>Precision</i>		
Blind duplicates (soil intra laboratory)	1 / 20 samples	<50% RPD <sup>1</sup>
Split duplicates (soil inter laboratory)	1 / 20 samples	<50% RPD <sup>1</sup>
Blind duplicates (water intra laboratory)	1 / 20 samples	<50% RPD <sup>1</sup>
Split duplicates (water inter laboratory)	1 / 20 samples	<50% RPD <sup>2</sup>
Trip blank	1 / media	<LOR
Rinsate blank	1 - GW sampling	<LOR
Trip spike	1 / sampling event	70-130%
<i>Accuracy</i>		
Surrogate spikes	All organic samples	60-140%
Matrix spikes	1 per lab batch	60-140%
<i>Representativeness</i>		
Sampling appropriate for media and analytes	All samples	JBS procedures
Laboratory blanks	1 per lab batch	<LOR
Samples extracted and analysed within holding times.	All samples	14 days for COPC's
<i>Comparability</i>		
Standard operating procedures for sample collection & handling	All Samples	All samples
Standard analytical methods used for all analyses	All Samples	All samples
Consistent field conditions, sampling staff and laboratory analysis	All Samples	All samples
Limits of reporting appropriate and consistent	All Samples	All samples
<i>Completeness</i>		
Soil description and COCs completed and appropriate	All Samples	- All samples
Appropriate documentation	All Samples	- All samples
Satisfactory frequency and result for QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid

(1) If the RPD between duplicates is greater than the pre-determined data quality indicator, a judgement will be made as to whether the excess is critical in relation to the validation of the data set or unacceptable sampling error is occurring in the field.

## 5.6 Assessment Criteria

### 5.6.1 Regulatory Guidelines

Section 105 of the *Contaminated Land Management Act 1997* allows the DEC to “make or approve” guidelines for any purpose related to the objects of the Act. The assessment has been based on the following such guidelines:

- *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*, published by Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council (NHMRC), January 1992 (ANZECC/NHMRC 1992);
- *Contaminated Sites: Guidelines for Assessing Service Station Sites*, December 1994 (EPA 1994);
- *Contaminated Sites: Sampling Design Guidelines*, September 1995 (EPA 1995);
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*, November 1997 (EPA 1997);
- *Contaminated Sites: Guidelines for NSW Site Auditor Scheme 2<sup>nd</sup> Edition*, April 2006 (DEC 2006);
- *National Environment Protection (Assessment of Site Contamination) Measure, National Environment Protection Council*, 1999 (NEPC 1999);
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Paper No 4, 2000 (ANZECC/ARMCANZ 2000); and
- *Guidelines for the Assessment and Management of Groundwater Contamination*, March 2007 (DEC, 2007).

### 5.6.2 Soil Criteria

Given that the site is to be redeveloped for commercial/industrial purposes, soil results have been assessed against the commercial/industrial health-based criteria (HIL-F), summarised in **Table 5.3**. For the site to be considered suitable for use, the following statistical criteria was adopted:

- Either - the reported concentrations are all below the site criteria;
- Or: the upper 95% confidence limit on the average site concentration for each analyte must be below the adopted site criterion; no single analyte concentration exceeds 250% of the adopted site criterion; and the standard deviation of the results must be less than 50% of the site criteria.

**Table 5.3 Soil Criteria (all units in mg/kg)**

	Limit of Reporting	Health-Based Investigation Level
		HIL-F <sup>1</sup>
<b>METALS</b>		
Arsenic	4	500
Cadmium	1	100
Chromium (III)	1	500
Copper	1	5000
Nickel	1	3000
Lead	1	1500
Zinc	1	35000
Mercury (inorganic)	0.1	75
<b>TOTAL PETROLEUM HYDROCARBONS</b>		
C6 – C9 Fraction	25	65 <sup>2</sup>
C10 – C36 Fraction	250	1000 <sup>2</sup>
<b>BTEX</b>		
Benzene	1	1 <sup>2</sup>
Toluene	1	1.4 <sup>2</sup>
Ethylbenzene	1	3.1 <sup>2</sup>
Total Xylenes	3	14 <sup>2</sup>
<b>POLYCYCLIC AROMATIC HYDROCARBONS</b>		
Benzo(a)Pyrene	0.05	5
Total PAH's	0.1	100
<b>ORGANOCHLORINE PESTICIDES</b>		
Aldrin + Dieldrin	0.2	50
Chlordane	0.2	250
DDT + DDD + DDE	0.3	1000
Heptachlor	0.1	50
<b>PHENOLS</b>		
Total	0.1	42,500
<b>PCBs</b>		
PCBs (total)	0.5	50
<b>OTHER</b>		
Asbestos	-	No asbestos in surface soils

<sup>1</sup> Column F, Table 5-A, NEPC (1999).

<sup>2</sup> EPA (1994).

It is noted that several constituents targeted by analyses and constituents identified as COPCs are not provided in **Table 5.3**. Where detections of these constituents occur international literature will be reviewed to determine appropriate criteria. Where no criteria are present, risk assessment will be undertaken as per the guidance provided to NEPC (1999).

### 5.6.3 Groundwater Criteria

Relevant water quality criteria for the protection of aquatic ecosystems and also human health are presented in **Table 5.4**. The adopted groundwater assessment criteria have generally been chosen by selecting the most sensitive (lowest) criterion for each of the individual contaminant of concern. There are two exceptions to this general rule in accordance with DECC (2007):

1. In the case where the LOR is greater than the most sensitive criterion for an individual contaminant of concern, the LOR has been adopted as the criterion.
2. In the case where the most sensitive criterion is lower than natural background level of an individual contaminant of concern, then the natural background level has been used as the adopted criterion.

**Table 5.4 - Groundwater Criteria (all units in µg/L)**

Substance	Limit of Reporting	Laboratory Method	Drinking Water Guidelines (Human Health) <sup>1</sup>	Aquatic Ecosystem Criteria <sup>2</sup>
<b>TPH/BTEX</b>				
TPH (C <sub>10</sub> - C <sub>36</sub> )	260	GCFID (USEPA8000)	-	600 <sup>3</sup>
Benzene	1	Purge/trap (USEPA8020A)	1	950
Toluene	1	Purge/trap (USEPA8020A)	800	300
Ethylbenzene	1	Purge/trap (USEPA8020A)	300	140
Xylene (M+O+P)	3	Purge/trap (USEPA8020A)	600	350
<b>Metals</b>				
Arsenic (V)	1	ICP-MS (USEPA200.8)	7	24
Cadmium	0.1	ICP-MS (USEPA200.8)	2	0.2
Chromium (III)	1	ICP-MS (USEPA200.8)	50	1
Copper	1	ICP-MS (USEPA200.8)	2000	1.4
Lead	1	ICP-MS (USEPA200.8)	10	3.4
Mercury	0.1	ICP-MS (USEPA200.8)	1	0.6
Nickel	1	ICP-MS (USEPA200.8)	20	11
Zinc	1	ICP-MS (USEPA200.8)	3000	8
<b>PAHs</b>				
Naphthalene	1	GCMS(USEPA8270)	-	16
Phenanthrene	1	GCMS(USEPA8270)	-	2.0 <sup>4</sup>
Anthracene	1	GCMS(USEPA8270)	-	0.4 <sup>4</sup>
Fluoranthene	1	GCMS(USEPA8270)	-	1.4 <sup>4</sup>
Benzo(a)pyrene	1	GCMS(USEPA8270)	0.01	0.2 <sup>4</sup>
<b>VOCs<sup>6</sup></b>				
1,2-dichloroethane	1	GCECD(USEPA8140,8080)	3	1900 <sup>5</sup>
1,1-dichloroethane	1	GCECD(USEPA8140,8080)	30	90 <sup>5</sup>
Chloroform	1	GCECD(USEPA8140,8080)	-	370 <sup>5</sup>
Trichloroethene	1	GCECD(USEPA8140,8080)	-	330 <sup>5</sup>

<sup>1</sup> NHMRC (2004) Australian Drinking Water Guidelines

<sup>2</sup> ANZECC/ARMCANZ (2000) Trigger values for the protection of aquatic ecosystems (95% Protection – Fresh Water)

<sup>3</sup> Dutch Criterion for Mineral Oil

<sup>4</sup> Does not account for bioaccumulation/potential bioaccumulation

<sup>5</sup> Insufficient data to derive a reliable trigger value. In these instances, reference has been made to low reliability trigger levels contained in ANZECC/ARMCANZ (2000).

<sup>6</sup> Trigger values only present VOC compounds which were reported above the laboratory limit of reporting.

## 6 Quality Assurance / Quality Control

### 6.1 QA/QC Results

Assessment of quality assurance / quality control (QA/QC) has been undertaken by the calculation of data quality indicators (DQI's) and comparison to the assessment criteria nominated in **Table 6.1**. DQI's have been calculated and are summarised in **Table 6.1** following. Data generated during October 2007 only has been referenced in **Table 6.1**. Results of DQI's are discussed in detail following.

**Table 6.1: Summary of Quality Assurance / Quality Control Program**

Data Quality Indicator	Frequency	DQI Result
<i>Precision</i>		
Blind duplicates (soil intra laboratory)	2/36 samples	0-121% RPD
Split duplicates (soil inter laboratory)	2/36 samples	5-26% RPD
Blind duplicates (water intra laboratory)	1/3 samples	0-21% RPD
Laboratory duplicates	2/40 soil samples	0-67% RPD
Trip blank	1 / sampling event	<LOR
Trip spike	1 / sampling event	76-99%
<i>Accuracy</i>		
Surrogate spikes	All organic samples	60-125% (soil) 61-130% (GW)
Matrix spikes	1 per lab batch	71-142% (soil) 72-121% (GW)
<i>Representativeness</i>		
Sampling appropriate for media and analytes	All samples	All samples-
Laboratory blanks	1 per lab batch	<LOR
Samples extracted and analysed within holding times.	All samples	14 days for COPC's
<i>Comparability</i>		
Standard operating procedures for sample collection & handling	All samples	All samples
Standard analytical methods used for all analyses	All samples	All samples
Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples
Limits of reporting appropriate and consistent	All samples	All samples
<i>Completeness</i>		
Soil description and COCs completed and appropriate	All samples	All samples
Appropriate documentation	All samples	All samples
Satisfactory frequency and result for QC samples	All QA/QC samples	All samples
Data from critical samples is considered valid	Project	Critical samples valid

## **6.2 Discussion of QA/QC Results**

### **6.2.1 Precision**

#### Blind Duplicates

Two blind duplicate pairs were collected for the soil samples. Duplicates had relative percentage differences (RPDs) generally below the target of 50%, with the following exceptions:

- Copper and zinc in primary sample TP19/0.1 and duplicate sample QC3 with RPDs of 121% and 53% respectively; and
- Lead and zinc in primary sample TP18/1.0 and duplicate sample QC4 with RPDs of 115% and 87% respectively..

Variations between the sample pairs noted above may be attributed to sample heterogeneity, which is particularly common in fill material. Sample heterogeneity can lead to non-uniform distribution of contaminants which can result in elevated RPDs.

The elevated RPDs in the field and laboratory duplicate pairs are not considered to affect the conclusions of the investigation, as the contaminant concentrations are below the nominated investigation criteria.

One blind duplicate pairs have been collected for the water samples. RPDs have been found to be acceptable for all analytes.

#### Split Duplicates

Two split duplicate pairs were collected for the soil samples. RPD's were been found to be within the acceptable range of 0 to 50% for all analytes.

#### Laboratory Duplicates

Laboratory duplicates were detected slightly outside the target range for PAHs (as phenanthrene) and OCs (as pp-DDD). The duplicates outside of the target range are not considered to affect the analytical dataset, based on concentrations of these compounds being close to or below the limit of reporting in all samples analysed during this investigation.

### **6.2.2 Accuracy**

#### Surrogate Spikes

All surrogate spikes were within the laboratories NATA endorsed limits. Over-exceedances of QA/QC criteria are considered acceptable where analytes are reported below detection limits in corresponding primary samples. It is noted that the laboratories NATA endorsed limits are greater than JBS's preferred DQI's.

#### Matrix Spikes

All matrix spikes have recorded recoveries within the laboratories NATA endorsed limits with the exception of some over exceedances for some OCs. Over-exceedances of QA/QC criteria are considered acceptable where analytes are reported below detection limits in corresponding primary samples. It is noted that the laboratories NATA endorsed limits are greater than JBS's preferred DQI's.

### **6.2.3 Representativeness**

#### Sampling appropriate for media and analytes

Sampling methodologies are considered appropriate for media and analytes.

#### Trip spike

Trip spikes were reported within the laboratories NATA endorsed limits.

#### Trip blank

Trip blanks were all below the limit of reporting.

#### Laboratory blanks

No laboratory blanks have recorded analytes above detection limits.

#### Holding times

All analytes were extracted within holding times.

### **6.2.4 Comparability**

Common and consistent JBS Field Personnel have been used to collect samples throughout the project. Field works have been undertaken in accordance with JBS field operating procedures. All required field forms and sampling logs have been appropriately completed by sampling personnel. Testpit logs are provided as **Appendix B**. Copies of groundwater sampling forms are provided as **Appendix D**.

### **6.2.5 Completeness**

#### Documentation

All documentation was completed to the required standard. Testpit logs are provided as **Appendix B**. Chain of custody forms are provided with laboratory documentation included as **Appendix C**. Copies of groundwater sampling forms are provided as **Appendix D**.

#### Frequency for QC Samples

The frequency of QC samples is considered to be sufficient and meets the project DQI's.

### **6.3 Assessment of QA/QC**

Based on the assessment of QA/QC the data is found to be sufficiently precise and accurate for use in characterising soil and groundwater conditions underlying the area of the site. It is noted that the QA/QC assessment has indicated that some heterogeneity of environmental levels is likely within the fill material underlying the site. This is consequent of the inherent heterogeneity of fill based materials.

## 7 Results

### 7.1 Field Observations

Fill materials were identified at all sample locations. Fill was generally found to consist of sandy and silty clays. Inclusions of shale, sandstone, bricks, plastic and concrete were noted at several sample locations. No fibre cement sheet was identified in fill materials at any of the sample locations. It is noted at several locations that natural clays and shales had been reworked with fill material, being apparent as shale and inclusions in soils very similar in appearance to the natural soils.

It is noted that fill materials in other areas of the site have recorded the presence of asbestos containing fibre cement sheet. No fibre cement sheet was identified in any of the test pits during the current investigation.

Natural soils were found to consist of firm residual clays, and of very stiff consistency in areas of extremely weathered shale. PID analysis was undertaken on all samples, with the exception of samples collected from TP15 to TP20. No levels above 50ppm have been recorded. Testpit logs detailing soil descriptions and PID measurements are provided as **Appendix B**. The calibration certificate is provided in **Appendix E**.

Groundwater samples were found to be generally clear. Monitoring wells exhibited excellent recharge. Groundwater sampling forms are provided as **Appendix D**. Calibration and decontamination records are provided in **Appendix E**.

### 7.2 Soil Results

#### 7.2.1 Metals

There were no reported metal concentrations in exceedence of the commercial/industrial (HIL-F) health-based criteria.

#### 7.2.2 TPH/BTEX

Four locations were identified to contain localised concentrations of TPH (as TPH C<sub>10</sub>-C<sub>36</sub>) within the surface soils exceeding the adopted threshold concentration of 1000 mg/kg. Samples TP1/0.1, TP6/0.1, TP6/0.5, TP7/0.1 and TP17/0.1 reported concentrations of 8500 mg/kg, 7600 mg/kg, 4280 mg/kg, 5600 mg/kg and 2500 mg/kg respectively. Sample locations TP1, TP6, TP7 and TP17 are presented in **Figure 2** and were targeted during the current investigation due to observed surface staining during the site visit. Sample location TP1 and TP17 are located in the north western and north eastern regions of the site respectively, whilst sample locations TP6 and TP7 are located in the southern portion of the site, with TP6 located directly adjacent to the workshop area.

Additional analysis confirmed that the extent of localised contamination at sample locations TP1 and TP17 did not exceed the adopted commercial/industrial (HIL-F) health based criteria beyond 0.5m below ground surface (m bgs), whilst contamination at sample locations TP6 was identified to not extend beyond 1.0m bgs.

Additional analysis of soil from sample location TP7 reported TPH C<sub>10</sub>-C<sub>36</sub> concentrations above adopted commercial/industrial (HIL-F) health based criteria. Given that the reported concentration was found to have decreased with depth from 5600 mg/kg at 0.1m bgs to 2010 mg/kg, it is unlikely that TPH C<sub>10</sub>-C<sub>36</sub> concentrations exceeding the adopted site criteria would extend beyond 1.0m bgs.

No BTEX compounds were detected within any of the samples selected for analysis.

### **7.2.3 PAHs**

Localised concentrations of benzo(a)pyrene (BaP) and total PAHs were identified within the surface soils exceeding the adopted commercial/industrial (HIL-F) health-based criteria of 5 mg/kg and 100 mg/kg respectively at depths of 0.3m bgs at sample locations TP3 and TP5 and 0.1m bgs at TP17. Samples TP3/0.3, TP5/0.3 and TP17/0.1 reported concentrations of 16 mg/kg, 15 mg/kg and 76 mg/kg respectively for B(a)P and 214.1 mg/kg, 185.4 mg/kg and 866.4 mg/kg respectively for total PAHs.

Sample locations TP3 and TP5 are illustrated in **Figure 2**. Sample location TP3 is located at the former fuel loading point in the north eastern region of the site, whilst location TP5 is located immediately east of the truck parking area and administration building in an area formerly used for the crushing, storage and loading of scrap metal onto haulage vehicles for off-site removal.

Additional analysis confirmed that the reported B(a)P and total PAH concentrations were isolated and did not extend beyond 0.5m bgs at sample locations TP3 and TP5 or 0.1m bgs at sample location TP17.

### **7.2.4 OC/PCBs**

Concentrations of OC/PCBs were not detected above the laboratory limit of reporting (LOR).

### **7.2.5 Phenols**

Concentrations of phenols were not detected above the laboratory limit of reporting (LOR).

### **7.2.6 VOCs**

Concentrations of VOCs were not detected above the laboratory limit of reporting (LOR).

### **7.2.7 Asbestos**

There were no fibres of asbestos detected in any of the samples selected for analyses, nor any fragments of asbestos material observed within the soil or on the soil surface during the current investigation. However, previous investigations have identified asbestos in the fill materials which were placed in the 6m deep form of the Dome Void and covered with clean material (CH2MHILL 2002).

## **7.3 Groundwater Results**

### **7.3.1 Groundwater Flow Regime**

Monitoring wells were gauged and sampled on the 11<sup>th</sup> October 2007. Wells selected for this investigation were limited as the majority of existing wells could not be found and were presumed lost or damaged. Selected wells included shallow wells MWS6 and MWS10 and deep well MWD2. Groundwater was encountered in the shallow clay aquifer at depths ranging from 18.39 m AHD in MWS6 to 22.04 m AHD in MWS10. Groundwater in the deep aquifer was encountered at a depth of 19.68 m AHD. These values were found to be consistent with previous groundwater investigations (HLA 2004).

HLA (2004) indicates that groundwater flow within the shallow and deep aquifers appears to follow the slope of the regional geology to the south west with a low seepage velocity based on the shale and clay material present within the shallow and deep aquifers.

### 7.3.2 General Water Quality

Field measurements were taken from all wells at the time of purging. Redox potential and electrical conductivity (EC) measurements were not recorded during the current investigation due to instrumentation error. EC measurements have been calculated from TDS values using the formula  $EC (\mu\text{g/L}) = \text{TDS}/0.65$ . Conductivity, pH and temperature measurements were found to be consistent with previous groundwater investigations conducted at the site (HLA 2004).

Post purge groundwater quality results for the shallow wells are summarised below:

- Electrical conductivity (EC) measurements ranged between 12,846  $\mu\text{S/cm}$  (MWS6) and 15,600  $\mu\text{S/cm}$  (MWS10). The electrical conductivity results indicate that groundwater is brackish to saline.
- Total dissolved solids (TDS) concentrations ranged between 8,350 mg/L (MWS6) and 10,140 mg/L (MWS10). Based on the Australian Drinking Water Guidelines (NHMRC) 2004, the range of TDS concentrations detected in groundwater beneath the site is generally unacceptable for drinking water.
- Dissolved oxygen (DO) concentrations ranged between 1.30 mg/L (MWS10) and 2.80 mg/L (MWS6). Based on the data available, the DO concentrations in shallow groundwater beneath the site may be suitable for potential natural attenuation processes.
- pH values were recorded between 7.79 (MWS10) and 7.82 (MWS6). The pH of groundwater beneath the site is indicative of neutral conditions. Microbes are capable of breaking down hydrocarbons under favourable pH conditions, generally at a pH ranging 6 to 8. Based on the available data, the groundwater beneath the site may be suitable for potential natural attenuation processes via microbial activity.
- Temperature measurements ranged between 20.16°C (MWS6) and 22.10°C (MWS10).

Post purge groundwater quality results for the deep well (MWD2) is summarised below:

- Electrical conductivity (EC) measurements were reported at 16,338  $\mu\text{S/cm}$ . The electrical conductivity results of groundwater from the deep aquifer indicate that groundwater is brackish to saline.
- Total dissolved solids (TDS) concentrations were reported at 10,620 mg/L. Based on the Australian Drinking Water Guidelines (NHMRC) 2004, the TDS concentrations detected in deeper groundwater beneath the site is generally unacceptable for drinking water.
- Dissolved oxygen (DO) concentrations were reported at 2.50 mg/L indicating that deep groundwater beneath the site may be suitable for potential natural attenuation processes.
- pH was reported at 6.39 (MWS6). The pH of groundwater beneath the site is indicative of slightly acidic conditions. Based on the available data, the deeper groundwater beneath the site may be suitable for potential natural attenuation processes via microbial activity.
- Temperature was reported at 20.23°C.

### **7.3.3 TPH**

There were no TPH concentrations detected above the laboratory LOR in each of the three wells sampled during the current investigation, consistent with previous investigations (HLA 2004), with the exception of MWS10, which has historically reported low levels of dissolved phase TPH C<sub>6</sub>-C<sub>9</sub> concentrations.

### **7.3.4 BTEX**

There were no BTEX compounds detected in groundwater sampled from each of the three monitoring wells during the current investigation, consistent with the previous investigation conducted by HLA-Envirosciences (2004).

### **7.3.5 PAHs**

PAH compounds were not detected above the laboratory LOR during the current investigation. Historically, PAHs have not been detected in groundwater sampled in monitoring wells MWS6, MWS10 and MWD2 since their installation.

### **7.3.6 Heavy Metals**

Levels of heavy metals have been found to be below the laboratory LOR with the exception of nickel and zinc. Levels of nickel were detected below the adopted groundwater criteria with a maximum concentration of 3.5 µg/L reported in groundwater sampled from MWD2. Levels of zinc were detected slightly exceeding the adopted ANZECC/ARMCANZ (2000) freshwater ecosystem site criteria (8 µg/L) in groundwater sampled from monitoring well MWS10 (12 µg/L). The concentrations of zinc reported during the current investigation are consistent with previous groundwater monitoring events conducted by HLA-Envirosciences (2004) and are likely to be representative of regional background concentrations.

### **7.3.7 VOCs**

Low level VOC concentrations were detected above the laboratory LOR, but below the adopted site criteria in monitoring well MWS6 and below the laboratory LOR in monitoring well MWD2 during the current investigation. VOCs (as 1,2-dichloroethane) were detected above the adopted NHMRC/NRMMC (2004) Drinking Water Guidelines (3 µg/L) in monitoring well MWS10, with a concentrations of 150 µg/L. The analytical results for constituent VOCs were found to be comparable with data reported by HLA-Envirosciences (2004). Furthermore, given that TDS concentrations detected in groundwater beneath the site ranged from 10,620 mg/L (MWD2) to 12,846 µS/cm (MWS6) the groundwater beneath the site is considered unsuitable for human consumption.

## 8 Conclusions

On the basis of the results of the investigation, and subject to the limitations outlined in **Section 9**, the following conclusions were reached:

- Localised hydrocarbon impact TPH (C<sub>10</sub>-C<sub>36</sub>) was identified above the adopted site criterion (1000 mg/kg) in surface fill material at sample locations TP1, TP6, TP7 and TP17 (2500-8500mg/kg). The identified impact was generally confined to the upper 0.5m layer.
- Benzo(a)pyrene and total PAHs were reported above the adopted site criteria for commercial/ industrial use (HIL-F) in surface fill material at sample locations TP3, TP5 and TP17. The identified impact was generally confined to the upper 0.5m layer.
- Heavy metals, BTEX, VOCs, phenols, OCP and PCBs were not reported above the adopted assessment criteria (HIL-F) in any soil sample collected from the site. Asbestos fragments were not identified at the site, and asbestos fibres were not reported in any soil sample submitted for analysis. However, it is noted that asbestos was reportedly placed in a 6m deep pit and covered with clean imported material as part of the previous remedial works (CH2MHILL 2002)
- Levels of impact in groundwater were found to be below the adopted groundwater assessment criteria apart from slightly elevated concentrations of dissolved zinc and 1,2-dichloroethane. These slightly elevated levels are not considered to pose an unacceptable risk to either human health or the receiving environment. Groundwater analytical results reported for this investigation were found to be consistent with historical data pertaining to the site.
- On the basis of the results of this investigation, and subject to the limitations outlined in **Section 9**, the site is considered suitable for continued commercial/industrial use subject to the continued implementation of the Site Management Plan (HLA 2004).

## 9 Limitations

This report has been prepared for use by the client who commissioned the works in accordance with the project brief only and has been based in part on information obtained from other parties. The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

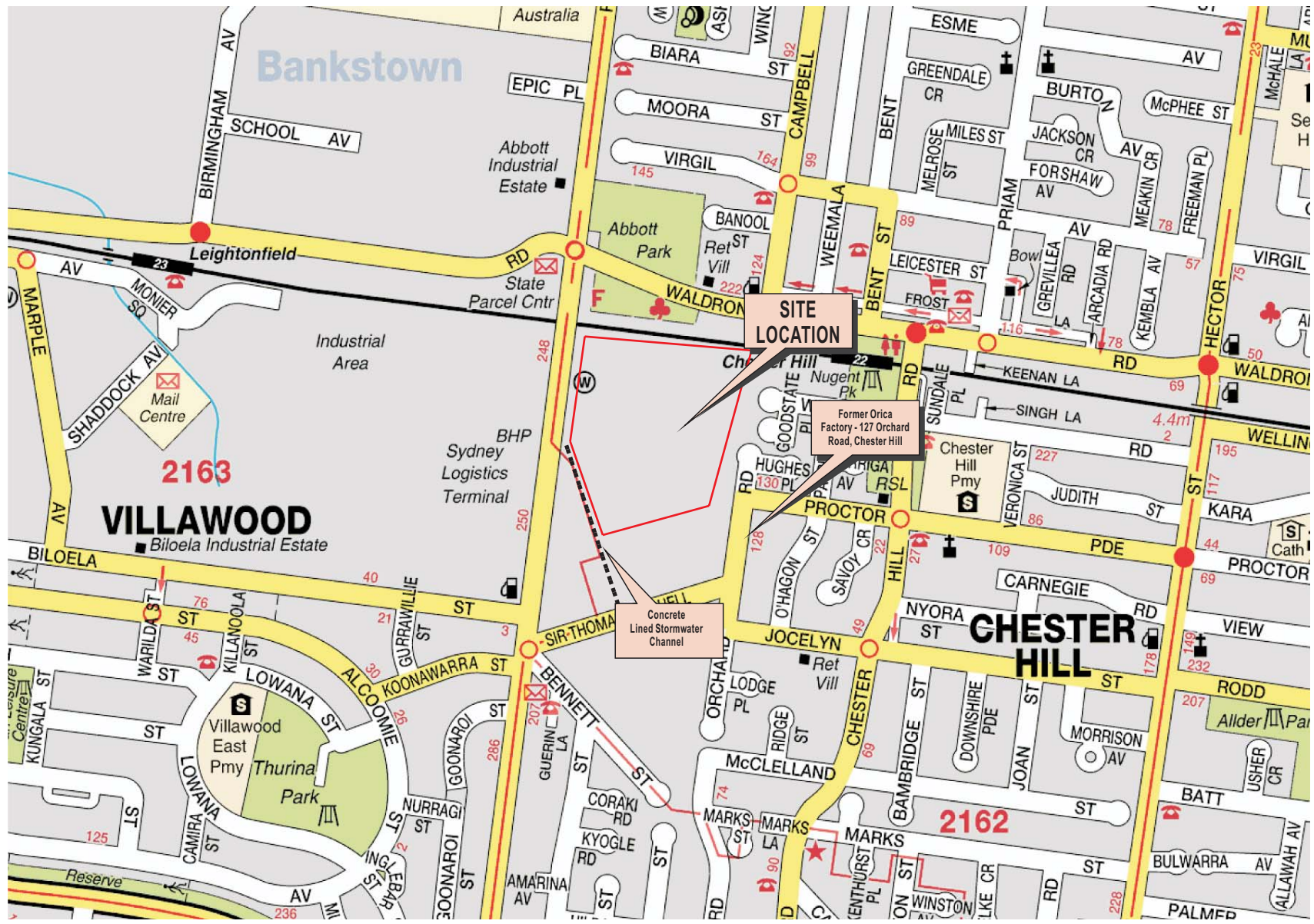
JBS Environmental Pty Ltd accepts no liability for use or interpretation by any person or body other than the client. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS Environmental Pty Ltd, and should not be relied upon by other parties, who should make their own enquires.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements and site history, not on sampling and analysis of all media at all locations for all potential contaminants.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS Environmental Pty Ltd reserves the right to review the report in the context of the additional information.

## Figures



Source: UBD

LEGEND



Figure 1 Site Location

Client: TH & TH Chung

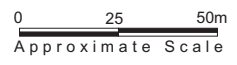
Job Number: 40414

Site Address: 191 Miller Road, Chester Hill, NSW

File Name: 40414\_01.cdr



- LEGEND**
- Site Boundary
  - ⊠ Test Pit Location
  - Monitoring Well Location



**Figure 2 Site Layout and Soil and Groundwater Sampling Locations**

Client: TH & TH Chung Job Number: 40414

Site Address: 191 Miller Road, Chester Hill, NSW

File Name: 40414\_03.cdr



TP1	Conc (mg/kg)	Depth (m)
TPH C <sub>15</sub> -C <sub>28</sub>	4,400	0.1
TPH C <sub>29</sub> -C <sub>36</sub>	4,100	0.1
TPH C <sub>10</sub> -C <sub>36</sub>	8,500	0.1

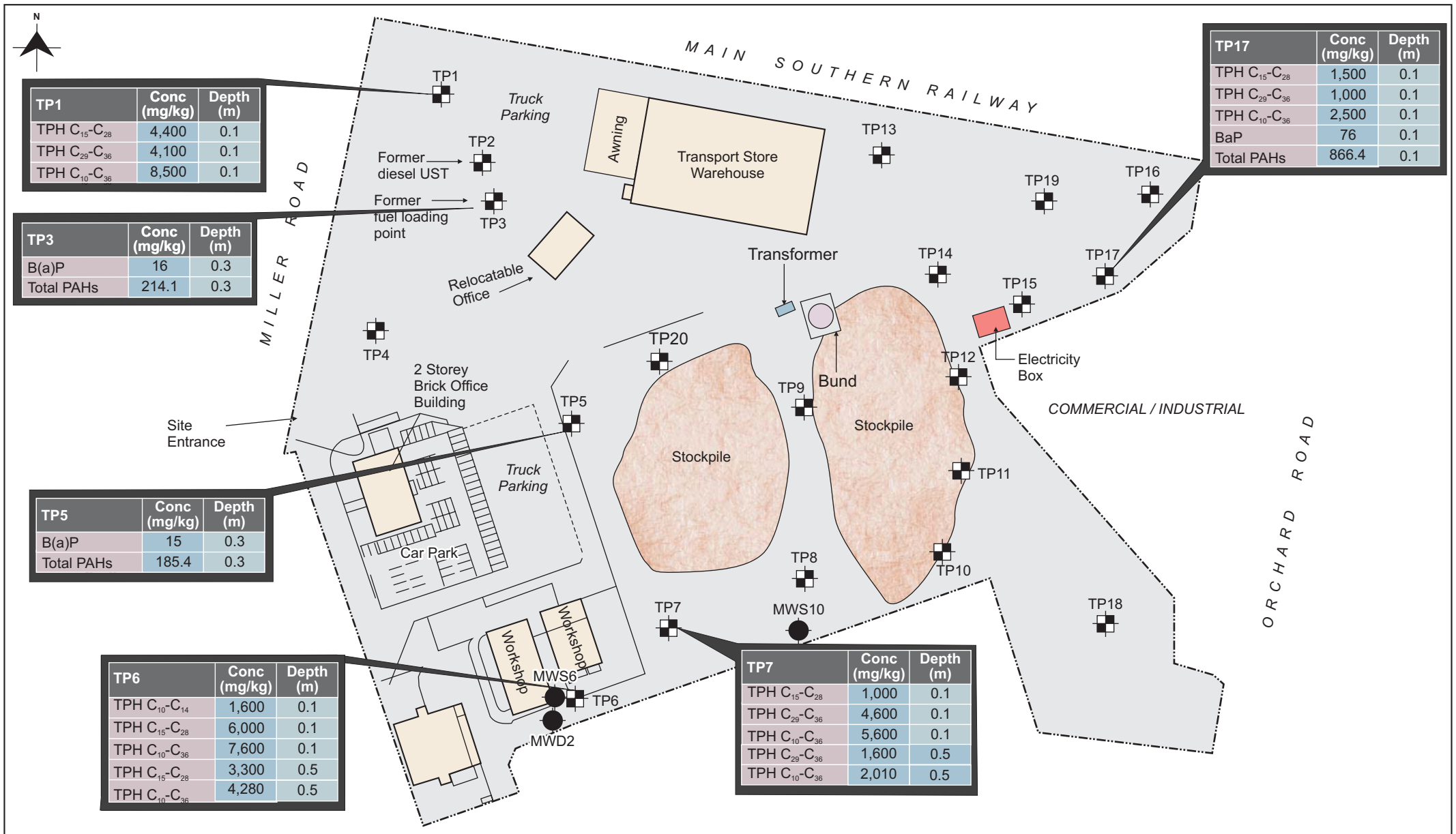
TP3	Conc (mg/kg)	Depth (m)
B(a)P	16	0.3
Total PAHs	214.1	0.3

TP5	Conc (mg/kg)	Depth (m)
B(a)P	15	0.3
Total PAHs	185.4	0.3

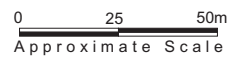
TP17	Conc (mg/kg)	Depth (m)
TPH C <sub>15</sub> -C <sub>28</sub>	1,500	0.1
TPH C <sub>29</sub> -C <sub>36</sub>	1,000	0.1
TPH C <sub>10</sub> -C <sub>36</sub>	2,500	0.1
BaP	76	0.1
Total PAHs	866.4	0.1

TP6	Conc (mg/kg)	Depth (m)
TPH C <sub>10</sub> -C <sub>14</sub>	1,600	0.1
TPH C <sub>15</sub> -C <sub>28</sub>	6,000	0.1
TPH C <sub>10</sub> -C <sub>36</sub>	7,600	0.1
TPH C <sub>15</sub> -C <sub>28</sub>	3,300	0.5
TPH C <sub>10</sub> -C <sub>36</sub>	4,280	0.5

TP7	Conc (mg/kg)	Depth (m)
TPH C <sub>15</sub> -C <sub>28</sub>	1,000	0.1
TPH C <sub>29</sub> -C <sub>36</sub>	4,600	0.1
TPH C <sub>10</sub> -C <sub>36</sub>	5,600	0.1
TPH C <sub>29</sub> -C <sub>36</sub>	1,600	0.5
TPH C <sub>10</sub> -C <sub>36</sub>	2,010	0.5



- LEGEND**
- Site Boundary
  - ⊕ Test Pit Location
  - Monitoring Well Location



**Figure 3 Soil Sample Locations Exceeding Adopted Site Criteria**

Client: TH & TH Chung Job Number: 40414

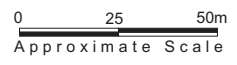
Site Address: 191 Miller Road, Chester Hill, NSW

File Name: 40414\_03.cdr



MWS10	Conc (µg/L)
Zinc	12
1,2-dichloroethane	150

- LEGEND**
- Site Boundary
  - ⊠ Test Pit Location
  - Monitoring Well Location



**Figure 4 Groundwater Sample Locations Exceeding Adopted Site Criteria**

Client: TH & TH Chung Job Number: 40414

Site Address: 191 Miller Road, Chester Hill, NSW

File Name: 40414\_03.cdr

**Appendix A**  
**Sample Results Summary Tables**

FILE REF: G:\JBS Environmental\Projects\CMA\40414 191 Miller Road Chester Hill\Report\40414 Soil Summary Tables (191 Miller Road Chester Hill).xls\Table A - Sample Descriptors

Soil Sample ID Testpit No. / Depth (m)	Sampling Date	Comments	8 Metals	TPH	BTEX	PAHs	OCs	PCBs	Phenols	VOCs	Asbestos
TP1/0.1	10-Oct-07	Fill: Sandy with fine gravels	x	x	x	x	x	x	x	x	x
TP1/0.3	10-Oct-07	Silty clay: traces of granite and sandstone cobbles		x							
TP1/0.5	10-Oct-07	Silty clay: traces of granite and sandstone cobbles									
TP1/1.0	10-Oct-07	Silty clay: traces of granite and sandstone cobbles	x	x	x	x	x	x			x
TP1/1.5	10-Oct-07	Silty clay: traces of granite									
TP1-2.0	10-Oct-07	Silty clay: traces of granite									
TP2/0.1	10-Oct-07	Fill: Sands, brown, slight sulphur odour.	x	x	x	x	x	x	x	x	x
TP2/0.3	10-Oct-07	Fill: Sands, brown, slight sulphur odour.									
TP2/0.5	10-Oct-07	Fill: Silty clay, high plasticity, black staining									
TP2/1.0	10-Oct-07	Fill: Silty clay, high plasticity, black staining									
TP2/1.5	10-Oct-07	Fill: Silty clay, high plasticity, black staining	x	x	x	x	x	x			x
TP2/2.0	10-Oct-07	Silty clay: Trace gravels									
TP3/0.1	10-Oct-07	Fill: Silty clay, traces of sandstone cobbles, siltstone and mudstone	x	x	x	x	x	x			x
TP3/0.3	10-Oct-07	Fill: Silty clay, traces of sandstone cobbles, siltstone and mudstone	x	x	x	x	x	x			x
TP3/0.5	10-Oct-07	Fill: Silty clay, traces of sandstone cobbles, siltstone and mudstone				x					
TP3/1.0	10-Oct-07	Fill: Silty clay, traces of sandstone cobbles, siltstone and mudstone									
TP3/1.5	10-Oct-07	Fill: Silty clay, traces of mudstone and black staining									
TP3/2.0	10-Oct-07	Fill: Silty clay, traces of mudstone, black staining increasing with depth.									
TP4/0.1	10-Oct-07	Fill: Silty clay.	x	x	x	x	x	x			x
TP4/0.3	10-Oct-07	Fill: Silty clay.									
TP4/0.5	10-Oct-07	Fill: Silty clay, trace sulphur and odour, some bricks									
TP4/1.0	10-Oct-07	Fill: Silty clay, trace sulphur and odour, some bricks									
TP4/1.5	10-Oct-07	Clay: Red/brown/grey, moderate plasticity.									
TP4/2.0	10-Oct-07	Clay: Red/brown/grey, moderate plasticity.									
TP5/0.1	10-Oct-07	Fill: Clayey silt, brown, non plastic.									
TP5/0.3	10-Oct-07	Fill: Clayey silt, brown, non plastic.	x	x	x	x	x	x	x	x	x
TP5/0.5	10-Oct-07	Silty clay: Brown, moderate plasticity, slight sulphur odour.				x					
TP5/1.0	10-Oct-07	Silty clay: Brown, moderate plasticity, slight sulphur odour.									
TP5/1.5	10-Oct-07	Silty clay: Brown, moderate plasticity, slight sulphur odour.	x	x	x	x	x	x			x
TP5/2.0	10-Oct-07	Silty clay: Brown, moderate plasticity, slight sulphur odour.									
TP6/0.1	10-Oct-07	Fill: Clayey silt, dark brown, some concrete pipe fragments, black staining. HC odour.	x	x	x	x	x	x	x	x	x
TP6/0.3	10-Oct-07	Fill: Clayey silt, dark brown, some concrete pipe fragments, black staining. HC odour.									
TP6/0.5	10-Oct-07	Fill: Sandy clay, light brown, no staining, slight HC odour.	x	x	x	x	x	x			x
TP6/1.0	10-Oct-07	Fill: Silty clay, light brown, slight HC odour.		x							
TP6/1.5	10-Oct-07	Fill: Silty clay, light brown, slight HC odour.									
TP7/0.1	10-Oct-07	Fill: Clayey silt with black gravels.	x	x	x	x	x	x			x
TP7/0.3	10-Oct-07	Fill: Silty clay, brown/orange, firm.									
TP7/0.5	10-Oct-07	Fill: Silty clay, yellow/grey, firm.									
TP7/1.0	10-Oct-07	Fill: Silty clay, yellow/grey, firm.									
TP7/1.5	10-Oct-07	Fill: Silty clay, yellow/grey, firm.									
TP7/2.0	10-Oct-07	Clay: Shale inclusions, firm, high plasticity .									
TP8/0.1	10-Oct-07	Fill: Clayey silt, soft non plastic with some bricks.	x	x	x	x	x	x	x	x	x
TP8/0.3	10-Oct-07	Fill: Clayey silt, soft non plastic with some bricks.									
TP9/0.1	10-Oct-07	Fill: Clayey silt, soft non plastic with trace sandstone cobbles.	x	x	x	x	x	x			x
TP9/0.3	10-Oct-07	Fill: Clayey silt, soft non plastic with trace sandstone cobbles.									
TP9/0.5	10-Oct-07	Fill: Clayey silt, soft non plastic with trace sandstone cobbles.	x	x	x	x	x	x			x
TP10/0.1	10-Oct-07	Fill: Sandy clay, dry, moderate plasticity, trace sandstone cobbles.									
TP10/0.3	10-Oct-07	Fill: Sandy clay, dry, moderate plasticity, trace sandstone cobbles.	x	x	x	x	x	x			x
TP10/0.5	10-Oct-07	Fill: Sandy clay, dry, moderate plasticity, trace sandstone cobbles.									
TP10/1.0	10-Oct-07	Fill: Silty clay, some black staining, firm, moderate plasticity.									
TP10/1.5	10-Oct-07	Fill: Silty clay, some black staining, firm, moderate plasticity.									
TP10/2.0	10-Oct-07	Shale: some silty clay, firm, homogenous.									
TP11/0.1	10-Oct-07	Fill: clayey silt, dry, very low plasticity.	x	x	x	x	x	x			x
TP11/0.3	10-Oct-07	Fill: clayey silt, dry, very low plasticity.									
TP11/0.5	10-Oct-07	Fill: clayey silt, traces of ash, moist, very low plasticity.									
TP11/1.0	10-Oct-07	Fill: silty clay, red/brown, firm, moderate plasticity.									
TP11/1.5	10-Oct-07	Fill: silty clay, red/brown, firm, moderate plasticity.									
TP11/2.0	10-Oct-07	Fill: silty clay, grey, firm, moderate plasticity.	x	x	x	x	x	x			x
TP12/0.1	10-Oct-07	Fill: Clayey silt, some bricks, wood and plastic.	x	x	x	x	x	x			x
TP12/0.3	10-Oct-07	Fill: Clayey silt, some bricks, wood and plastic.									
TP12/0.5	10-Oct-07	Fill: Clayey silt, yellow sulphur present, sulphur odour.									
TP12/1.0	10-Oct-07	Clay: Red, dry, firm, homogenous, moderate plasticity.	x	x	x	x	x	x			x
TP12/1.5	10-Oct-07	Clay: Red/yellow, some silt, dry, firm, homogenous, low plasticity.									
TP12/2.0	10-Oct-07	Clay: Red/yellow, some silt, dry, firm, homogenous, low plasticity.									
TP13/0.1	10-Oct-07	Fill: Silty clay with trace sands, brown, dry, firm, moderate plasticity.	x	x	x	x	x	x			x
TP13/0.3	10-Oct-07	Fill: Silty clay with trace sands, brown, dry, firm, moderate plasticity.									
TP13/0.5	10-Oct-07	Fill: Silty clay with trace sands, brown, dry, firm, moderate plasticity.	x	x	x	x	x	x			x
TP13/1.0	10-Oct-07	Fill: Silty clay with trace sands, brown, dry, firm, moderate plasticity.									
TP13/1.5	10-Oct-07	Fill: Silty clay, brown, dry, firm, moderate plasticity.									
TP13/2.0	10-Oct-07	Clay: Some silt, grey/orange, dry, soft, low plasticity.									
TP14/0.1	10-Oct-07	Fill: Coarse gravel, poorly sorted.	x	x	x	x	x	x			x
TP14/0.3	10-Oct-07	Fill: Silty clay with traces of ash, dry, firm, moderate plasticity.									
TP14/0.5	10-Oct-07	Fill: Silty clay with traces of ash, dry, firm, moderate plasticity.									
TP14/1.0	10-Oct-07	Fill: Silty clay, red/grey, dry, firm, moderate plasticity.	x	x	x	x	x	x			x
TP14/1.5	10-Oct-07	Fill: Silty clay, red/grey, dry, firm, moderate plasticity.									
TP14/1.9	10-Oct-07	Shale									
TP15/0.1	11-Oct-07	Fill: Sand, some clay, coarse gravel, bricks, concrete, slag and coal fragments	x	x	x	x	x	x			x
TP15/0.3	11-Oct-07	Fill: Sand, some clay, coarse gravel, bricks, concrete, slag and coal fragments									
TP15/0.5	11-Oct-07	Fill: Sandy clay, trace weathered shale, brown/orange, dry, stiff.									
TP15/1.0	11-Oct-07	Fill: Sandy clay, trace weathered shale, brown/orange, dry, stiff.									
TP15/1.5	11-Oct-07	Weatherd shale: some stiff clay and fine sand, brown/grey, dry.									
TP15/2.0	11-Oct-07	Weatherd shale: some stiff clay and fine sand, brown/grey, dry.	x	x	x	x	x	x			x

FILE REF: G:\JBS Environmental\Projects\CMA\40414 191 Miller Road Chester Hill\Report\40414 Soil Summary Tables (191 Miller Road Chester Hill).xls|Table A - Sample Descriptio

Soil Sample ID Testpit No. / Depth (m)	Sampling Date	Comments	8 Metals	TPH	BTEX	PAHs	OCs	PCBs	Phenols	VOCs	Asbestos
TP16/0.1	11-Oct-07	Fill: Clay, some sand, coal and slag, brown, orange, firm, non plastic.	x	x	x	x	x	x			x
TP16/0.3	11-Oct-07	Fill: Clay, some sand, coal and slag, brown, orange, firm, non plastic.									
TP16/0.5	11-Oct-07	Fill: Clay, some sand, coal and slag, brown, orange, firm, non plastic.									
TP16/1.0	11-Oct-07	Fill: Clay, some sand, coal and slag, brown, orange, firm, non plastic.									
TP16/1.5	11-Oct-07	Weatherd shale: Brown, dry, with traces of sand and clay.	x	x	x	x	x	x			x
TP17/0.1	11-Oct-07	Fill: Sandy clay, brown, homogenous, dry, stiff, non plastic.	x	x	x	x	x	x	x	x	x
TP17/0.3	11-Oct-07	Fill: Sandy clay, brown, homogenous, dry, stiff, non plastic.									
TP17/0.5	11-Oct-07	Fill: Sandy clay, brown, homogenous, dry, stiff, non plastic.	x	x	x	x	x	x			x
TP17/1.0	11-Oct-07	Weatherd shale: Brown, dry, with traces of sand and clay.									
TP18/0.1	11-Oct-07	Fill: Sand, brown, homogenous, dry, loose, trace fine to coarse gravels.	x	x	x	x	x	x			x
TP18/0.3	11-Oct-07	Fill: Sand, brown, homogenous, dry, loose, trace fine to coarse gravels.									
TP18/0.5	11-Oct-07	Fill: Sand, some clay and trace fine to coarse gravels, dry, loose.									
TP18/1.0	11-Oct-07	Fill: Sand, some clay and trace fine to coarse gravels, dry, loose.	x	x	x	x	x	x			x
TP18/1.5	11-Oct-07	Clay: Orange, dry, firm, non plastic, traces of shale.									
TP18/2.0	11-Oct-07	Clay: Orange, dry, firm, non plastic, traces of shale.									
TP19/0.1	11-Oct-07	Fill: Sand, some fine to coarse gravels, brown, dry, loose.	x	x	x	x	x	x			x
TP19/0.3	11-Oct-07	Fill: Sand, some clay, traces of fine gravels. dry, well sorted.									
TP19/0.5	11-Oct-07	Fill: Sand, some clay, traces of fine gravels. dry, well sorted.									
TP19/1.0	11-Oct-07	Fill: Sandy clay, traces of fine gravels, dry, soft, moderate plasticity.									
TP19/1.5	11-Oct-07	Fill: Sandy clay, traces of fine gravels, dry, soft, moderate plasticity, some weathered shale inclusions.									
TP19/1.7	11-Oct-07	Weatherd shale: brown, dry, some traces of sand.	x	x	x	x	x	x			x
TP20/0.1	11-Oct-07	Fill: Sand and coarse gravel, some clay, brow, red, dry, loose.	x	x	x	x	x	x			x
TP20/0.3	11-Oct-07	Fill: Sand and coarse gravel, some clay, brow, red, dry, loose.									
TP20/0.5	11-Oct-07	Fill: Sandy clay, some coarse gravels, dry, stiff.	x	x	x	x	x	x			x
TP20/1.0	11-Oct-07	Fill: Sandy clay, some coarse gravels, dry, stiff.									
TP20/1.5	11-Oct-07	Clay: Yellow/brown, dry, firm, low pasticity.									
TP20/2.0	11-Oct-07	Clay: Red, dry, firm, low pasticity.									
<b>Primary Total</b>			<b>36</b>	<b>38</b>	<b>36</b>	<b>38</b>	<b>36</b>	<b>36</b>	<b>6</b>	<b>6</b>	<b>36</b>
<b>QA/QC Sample ID</b>											
QC3	11-Oct-07	Duplicate of TP19/0.1	x	x	x	x	x	x			x
QC3A	11-Oct-07	Triplicate of TP19/0.1	x	x	x	x	x	x			x
QC4	11-Oct-07	Duplicate of TP18/1.0	x	x	x	x	x	x			x
QC4A	11-Oct-07	Triplicate of TP18/1.0	x	x	x	x	x	x			x
Trip Blank	11-Oct-07	Water			x						
Trip Spike	11-Oct-07	Water			x						
<b>QA/QC Total</b>			<b>4</b>	<b>4</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>
<b>Groundwater Sample/ Well ID</b>	<b>Sampling Date</b>	<b>Comments</b>	<b>8 Metals</b>	<b>TPH</b>	<b>BTEX</b>	<b>PAHs</b>	<b>OC/OPs</b>	<b>PCBs</b>	<b>Phenols</b>	<b>VOCs</b>	<b>Asbestos</b>
MWS6	11-Oct-07	Water	x	x	x	x				x	
MWS10	11-Oct-07	Water	x	x	x	x				x	
MWD2	11-Oct-07	Water	x	x	x	x				x	
Duplicate A	11-Oct-07	Water	x	x	x	x				x	
Trip Blank	11-Oct-07	Water			x						
Trip Spike	11-Oct-07	Water			x						
<b>QA/QC Total</b>			<b>4</b>	<b>4</b>	<b>6</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>

**Job No. 40414**  
**T H & T H Chung - 191 Miller Road, Chester Hill**  
**Table B - Summary Soil Results**



**Notes:**

- (1) Commercial./Industrial (Column 4, DEC 2006)
- (2) NSW EPA (1994)

**bold** above HIL (F) / Threshold Concentrations

FILE REF: G:\JBS Environmental\Projects\CMA\40414 191 Miller Road Chester Hill\Report\40414 Soil Summary Tables (191 Miller Road Chester Hill).xls Table B - Summary Results So

Sample number	Metals								Total Petroleum Hydrocarbons					BTEX				PAHs		Phenols	Organochlorine Pesticides				PCBs	VOCs	Asbestos	
	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc	C6 - C9	C10 - C14	C15 - C28	C29 - C36	C10 - C36	Benzene	Toluene	Ethyl-benzene	Xylenes	Benzo (a) pyrene	Total +ve PAHs		Total Phenolics	Aldrin + Dieldrin	Chlordane	Heptachlor				DDT + DDD + DDE
LOR	4.0	1.0	1.0	1.0	1.0	0.1	1.0	1.0	25	50	100	100	275	0.5	0.5	1.0	3.0	0.05	1.55	5	0.2	0.2	0.1	0.3	0.6	107	-	
<b>Landuse criteria (mg/kg)</b>																												
<b>Commercial/Industrial (HIL - F) <sup>(1)</sup></b>	500	100	500 (CrVI)	5000	1500	75	3000	35000	-	1000			1 <sup>2</sup>	1.4 <sup>2</sup>	3.1 <sup>2</sup>	14 <sup>2</sup>	5	100	42500	50	250	50	1000	50	-	-	NIL	
TP1/0.1	<4.0	<1.0	26	73	6.7	<0.10	170	76	<25	<50	<b>4400</b>	<b>4100</b>	<b>8500</b>	<0.5	<0.5	<1.0	<3.0	0.08	0.38	<5.0	<0.2	<0.2	<0.2	<0.3	<0.1	<107	NIL	
TP1/0.5	-	-	-	-	-	-	-	-	-	<50	110	<100	110	<0.5	<0.5	<1.0	<3.0	-	-	-	-	-	-	-	-	-	-	
TP1/1.0	11	<1.0	17	27	25	<0.10	8.1	32	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP2/0.1	4	3.3	140	1200	670	<0.10	140	5400	<25	<50	<100	130	130	<0.5	<0.5	<1.0	<3.0	0.7	7.3	<5.0	<0.2	<0.2	<0.2	<0.3	<0.1	<107	NIL	
TP2/1.5	<4.0	<1.0	2.3	12	230	<0.10	1.7	53	<25	<50	190	<100	190	<0.5	<0.5	<1.0	<3.0	0.3	4	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP3/0.1	8.6	1.4	66	900	310	<0.10	33	2500	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	1.2	12.7	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP3/0.3	4.8	<1.0	37	390	160	<0.10	28	1000	<25	<50	440	350	790	<0.5	<0.5	<1.0	<3.0	<b>16</b>	<b>214.1</b>	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP3/0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	2.5	-	-	-	-	-	-	-	-	
TP4/0.1	5.9	<1.0	50	210	140	<0.10	68	550	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.5	5.6	-	<0.2	<0.2	<0.2	2.3	<0.1	-	NIL	
TP5/0.3	7.9	<1.0	22	45	62	0.18	13	130	<25	<50	370	290	660	<0.5	<0.5	<1.0	<3.0	<b>15</b>	<b>185.4</b>	<5.0	<0.2	<0.2	<0.2	0.2	<0.1	<107	NIL	
TP5/0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6	35.2	-	-	-	-	-	-	-	-	
TP5/1.5	8.3	<1.0	12	21	17	<0.10	5.8	15	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP6/0.1	4.7	<1.0	13	75	98	<0.10	11	96	<25	<b>1600</b>	<b>6000</b>	<100	<b>7600</b>	<0.5	<0.5	<1.0	<3.0	0.1	2.1	<5.0	<0.2	<0.2	<0.2	<0.3	<0.1	<107	NIL	
TP6/0.5	12	<1.0	18	26	34	<0.10	10	110	<25	<b>980</b>	<b>3300</b>	<100	<b>4280</b>	<0.5	<0.5	<1.0	<3.0	<0.05	3.8	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP6/1.0	-	-	-	-	-	-	-	-	-	210	610	<100	820	<0.5	<0.5	<1.0	<3.0	-	-	-	-	-	-	-	-	-	-	
TP7/0.1	7.2	<1.0	21	57	46	<0.10	61	170	<25	<50	<b>1000</b>	<b>4600</b>	<b>5600</b>	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP7/0.5	-	-	-	-	-	-	-	-	-	<50	410	<b>1600</b>	<b>2010</b>	<0.5	<0.5	<1.0	<3.0	-	-	-	-	-	-	-	-	-	-	
TP8/0.1	14	<1.0	11	26	31	<0.10	13	84	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.1	0.9	<5.0	<0.2	<0.2	<0.2	<0.3	<0.1	<107	NIL	
TP9/0.1	7.7	<0.1	15	44	52	<0.10	11	170	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.1	0.5	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP9/0.5	9	<1.0	23	77	150	<0.10	9.8	260	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.1	1	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP10/0.3	<4.0	<1.0	10	10	26	<0.10	2.1	27	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.7	6.3	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP11/0.1	8	<1.0	11	27	33	<0.10	12	63	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.1	0.5	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP11/2.0	4.8	<1.0	9.9	23	10	<0.10	15	68	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP12/0.1	6.9	<1.0	18	29	97	<0.10	16	74	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.2	2.3	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP12/1.0	7.6	<1.0	20	21	19	<0.10	9.1	36	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP13/0.1	15	<0.1	31	89	73	<0.10	16	120	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.3	3.4	-	<0.2	<0.2	<0.2	0.4	<0.1	-	NIL	
TP13/0.5	<4.0	<1.0	10	27	25	<0.10	13	81	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.5	6	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP14/0.1	4.4	<1.0	120	120	58	<0.10	92	330	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.5	5	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP14/1.0	<4.0	<1.0	7.7	16	7.5	<0.10	5.8	36	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP15/0.1	5.8	<1.0	24	45	63	<0.10	34	130	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	2	22.3	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP15/2.0	24	<1.0	11	48	22	0.1	36	130	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP16/0.1	6.4	<1.0	19	71	25	<0.10	53	460	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	1.3	19.4	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP16/1.5	<4.0	<1.0	15	45	19	<0.10	28	110	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.6	6.1	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP17/0.1	5.4	<1.0	31	25	78	<0.10	15	92	<25	<50	<b>1500</b>	<b>1000</b>	<b>2500</b>	<0.5	<0.5	<1.0	<3.0	<b>76</b>	<b>866.4</b>	<5.0	<0.2	<0.2	<0.2	<0.3	<0.1	<107	NIL	
TP17/0.5	6.4	<1.0	15	44	26	<0.10	24	100	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.5	4.7	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP18/0.1	10	<1.0	38	27	75	<0.10	11	130	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.4	5.4	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP18/1.0	8.8	<1.0	16	13	15	<0.10	3	9.8	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP19/0.1	5.9	<1.0	14	11	40	<1.0	4.7	29	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	0.7	8.3	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP19/1.7	<4.0	<1.0	10	56	18	0.12	17	88	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP20/0.1	10	<0.1	25	70	38	<0.10	3.2	82	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
TP20/0.5	7.6	<1.0	20	45	36	<0.10	6.5	50	<25	<50	<100	<100	<275	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
<b>QA/QC</b>																												
QC3	<4.0	<1.0	20	45	36	<0.10	6.5	50	<25	<50	<100	<100	<250	<0.5	<0.5	<1.0	<3.0	0.8	9.1	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
QC4	<4.0	<1.0	11	14	56	<0.10	4.2	25	<25	<50	<100	<100	<250	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	-	<0.2	<0.2	<0.2	<0.3	<0.1	-	NIL	
QC3A	5	0.5	13	10	38	0.05	3	28	<20	<20	<50	<50	<140	<0.5	<0.5	<1.5	<1.5	10.79	-	<0.2	<0.2	<0.2	<0.3	&				

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 Table C - Relative Percentage Difference Calculations



FILE REF: G:\JBS Environmental\Projects\Boral\40276 Bombo Quarry\Tables\40276 Soil Summary Tables (Bombo Quarry).xls]Table E - RPDs

Sample ID	Metals									Total Petroleum Hydrocarbons					BTEX				PAHs		Organochlorine Pesticides				PCBs
	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc	C6 - C9	C10 - C14	C15 - C28	C29 - C36	C10 - C36	Benzene	Toluene	Ethyl-benzene	Xylenes	Benzo (a) pyrene	Total PAHs	Aldrin + Dieldrin	Chlordane	Heptachlor	DDT + DDD + DDE	Total PCBs	
Laboratory LOR	3.0	1.0	1.0	1.0	1.0	0.05	1.0	1.0	25	50	100	100	-	0.5	0.5	0.5	1.5	0.05	1.55	0.2	0.2	0.1	0.3	0.6	
<b>Blind Duplicate Pairs</b>																									
Original	TP19/0.1	5.9	<1.0	14	11	40	<1.0	4.7	29	<25	<50	<100	<100	<250	<0.5	<0.5	<1.0	<3.0	0.7	8.3	<0.2	<0.2	<0.2	<0.3	<0.1
Duplicate	QC3	<4.0	<1.0	20	45	36	<0.10	6.5	50	<25	<50	<100	<100	<250	<0.5	<0.5	<1.0	<3.0	0.8	9.1	<0.2	<0.2	<0.2	<0.3	<0.1
RPDs (Dup.)		NA	NA	35%	<b>121%</b>	11%	NA	32%	<b>53%</b>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Original	TP18/1.0	8.8	<1.0	16	13	15	<0.10	3	9.8	<25	<50	<100	<100	<250	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	<0.2	<0.2	<0.2	<0.3	<0.1
Duplicate	QC4	<4.0	<1.0	11	14	56	<0.10	4.2	25	<25	<50	<100	<100	<250	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	<0.2	<0.2	<0.2	<0.3	<0.1
RPDs (Dup.)		NA	NA	37%	7%	<b>115%</b>	NA	33%	<b>87%</b>	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Split Duplicate Pairs</b>																									
Original	TP19/0.1	5.9	<1.0	14	11	40	<1.0	4.7	29	<25	<50	<100	<100	<250	<0.5	<0.5	<1.0	<3.0	0.7	8.3	<0.2	<0.2	<0.2	<0.3	<0.1
Duplicate	QC3A	5	0.5	13	10	38	0.05	3	28	<20	<20	<50	<50	<140	<0.5	<0.5	<0.5	<1.5	<0.89	10.79	<0.2	<0.2	<0.2	<0.3	<0.1
RPDs (Dup.)		17%	NA	7%	10%	5%	NA	18%	6%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	26%	NA	NA	NA	NA	NA
Original	TP18/1.0	8.8	<1.0	16	13	15	<0.10	3	9.8	<25	<50	<100	<100	<250	<0.5	<0.5	<1.0	<3.0	<0.05	<1.55	<0.2	<0.2	<0.2	<0.3	<0.1
Duplicate	QC4A	7	0.4	19	11	13	<0.05	2.5	9.4	<20	<20	<50	<50	<140	<0.5	<0.5	<0.5	<1.6	<0.05	<1.55	<0.2	<0.2	<0.2	<0.3	<0.1
RPDs (Dup.)		15%	NA	17%	17%	22%	NA	18%	4%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**bold** Exceeds target of 50%  
 Note: RPDs were not calculated for analytes which had reported results below detection limits

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Table D - Groundwater Quality Parameters and Monitoring Well Details



FILE REF: G:\JBS Environmental\Projects\CMA\40414 191 Miller Road Chester Hill\Report\[40414 Soil Summary Tables (191 Miller Road Chester Hill).xls]Table D - GW Water Quality

Well Number	Date Sampled	Well Location	Well Status	Top of Well Casing Elevation (m AHD)	Measured Depth to Water (m)	Corrected Water Elevation (m AHD)	DO (mg/L)	pH	Temp (°C)	Redox (mV)	TDS (ppm)	EC (µS/cm)*	Observations
MWS6	11-Oct-07	South western region of site	Active	20.79	2.40	18.39	2.80	7.82	20.16	NR	8,350	12,846	
MWS10	11-Oct-07	South western region of site	Active	22.04	1.11	20.93	1.30	7.79	22.10	NR	10,140	15,600	
MWD2	11-Oct-07	South western region of site	Active	21.09	1.41	19.68	2.50	6.39	20.23	NR	10,620	16,338	

Notes:

NA = Monitoring well not surveyed

DO = Dissolved Oxygen

EC = Electrical Conductivity

Redox = Oxidation/Reduction Potential

Temp = Temperature

TDS = Total Dissolved Solids

\* Field parameter not representative of groundwater conditions due to instrumentation malfunction. Proximate value calculated using the following equation:  $EC (\mu S/cm) = TDS / 0.65$ .

NR = Field parameter not reported due to instrumentation error.

FILE REF: G:\JBS Environmental\Projects\CMA\40414 191 Miller Road Chester Hill\Report\40414 Soil Summary Tables (191 Miller Road Chester Hill).xls]Table E - Water Result:

Sample number	Metals								BTEX				TPH		VOCs						PAHs				
	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylenes	TPH C6-C9	TPHC10-C36	Trans-1,2-dichloroethene	1,1-dichloroethane	Cis-1,2-dichloroethene	Chloroform	1,2-dichloroethane	Trichloroethene	Naphthalene	Phenanthrene	Anthracene	Fluoranthene	Benzo(a)pyrene
LOR	1	0.1	1	1	1	0.5	1	1	1	1	1	3	10	250	1	1	1	1	1	1	1	1	1	1	1
Adopted Groundwater Criteria (µg/L)																									
NHMRC/NRMMC (2004) <sup>1</sup>	7	2	50	2,000	10	1	20	3,000	1	800	300	600	-	-	30	-	30	-	3	-	-	-	-	-	0.01
ANZECC/ARMCANZ (2000) <sup>2</sup>	24	0.2	1	1.4	3.4	0.1	11	8	950	300	140	350	-	600 <sup>4</sup>	1900 <sup>3</sup>	90 <sup>3</sup>	1900 <sup>3</sup>	370 <sup>3</sup>	1900 <sup>3</sup>	330 <sup>3</sup>	16	2 <sup>3</sup>	0.4 <sup>3</sup>	1.4 <sup>3</sup>	0.2 <sup>3</sup>
MWS6	<1	<0.1	<1	<1	<1	<0.5	2.9	4.2	<1	<1	<1	<3	<10	<250	1.4	3	<1.0	<1.0	<1.0	<1.0	<1	<1	<1	<1	<1
MWS10	<1	<0.1	<1	<1	<1	<0.5	2.9	<b>12</b>	<1	<1	<1	<3	<10	<250	18	16	5.1	2.6	<b>150</b>	5.6	<1	<1	<1	<1	<1
MWD2	<1	<0.1	<1	<1	<1	<0.5	3.5	4.5	<1	<1	<1	<3	<10	<250	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Duplicate A (Duplicate of MWS6)	<1	<0.1	<1	<1	<1	<0.5	3.0	3.4	<1	<1	<1	<3	<10	<250	1.3	2.8	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trip Blank	-	-	-	-	-	-	-	-	<1.0	<1.0	<1.0	<3.0	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	-	-	-	-	-	-	-	-	99%	76%	76%	76%	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. NHMRC/NRMMC (2004) Australian Drinking Water Guidelines
2. ANZECC/ ARMCANZ (2000) Trigger values for the protection of aquatic ecosystems (95% Protection - Fresh Water)
3. ANZECC/ARMCANZ (2000) Low Reliability Figure
4. Dutch Criteria for Mineral Oil

All units in µg/L unless indicated.

<b>bold</b>	Concentration exceeds NHMRC/NRMMC (2004) Australian Drinking Water Guidelines
<b>bold</b>	ANZECC/ ARMCANZ (2000) Trigger values for the protection of aquatic ecosystems (95% Protection - Fresh Water)

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Table F- Water Relative Percentage Difference Calculations



All units in µg/L, except RPDs

Sample ID	Metals								BTEX				TPH		VOCs						PAHs					
	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylenes	TPH C6-C9	TPHC10-C36	Trans-1,2-dichloroethene	1,1-dichloroethane	Cis-1,2-dichloroethene	Chloroform	1,2-dichloroethane	Trichloroethene	Naphthalene	Phenanthrene	Anthracene	Fluoranthene	Benzo(a)pyrene	
Original	MW3	<1	<0.1	<1	<1	<1	<0.5	2.9	4.2	<1	<1	<1	<3	<10	<250	1.4	3	<1	<1	<1	<1	<1	<1	<1	<1	<1
Duplicate	Duplicate A (Duplicate of MWS6)	<1	<0.1	<1	<1	<1	<0.5	3.0	3.4	<1	<1	<1	<3	<10	<250	1.3	2.8	<1	<1	<1	<1	<1	<1	<1	<1	<1
	RPDs (Dup.)	NA	NA	NA	NA	NA	NA	3%	21%	NA	NA	NA	NA	NA	NA	7%	7%	NA	NA	NA	NA	NA	NA	NA	NA	NA

**bold** Exceeds target of 50%

Note: NA = RPDs were not calculated for analytes which had reported results below detection limit.

**Appendix B**  
**Test Pit Logs**



**Borehole No.:** TP1

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 2.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

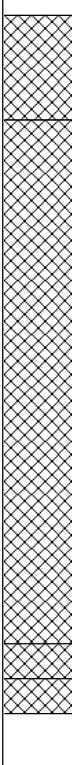
SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations		
0.0		Ground Surface						
		<b>FILL</b> Sandy with fine gravels, grey, homogenous, dry, dense.	TP1/0.1		0			
		<b>FILL</b> Silty clay, homogenous, red/brown, damp, firm, moderate plasticity with some granite and sandstone cobbles.	TP1/0.3		0			
			TP1/0.5		0.9			
1.0				TP1/1.0		0		
		<b>FILL</b> Silty clay, homogenous, dark brown, damp, firm, moderate plasticity.		TP1/1.5		0		
2.0			TP1/2.0		0			
3.0								

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		

Project: Supplementary Contamination Assessment  
 Project No.: 40414  
 Client: TH & TH Chung  
 Project Manager: Greg Bartlett

Total Hole Depth: 2.0m  
 Longitude: NA  
 Latitude: NA  
 Date: 10 October 2007

Driller and Co.: NA  
 Drill Method: Backhoe  
 Log By: Shonelle Gleeson  
 Bore Diameter: NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
		<b>FILL</b> Sands, brown, homogenous, dry, firm, slight sulphur odour.	TP2/0.1		0		
		<b>FILL</b> Silty clay, homogenous, red/brown, damp, firm, high plasticity with some black staining.	TP2/0.3		0		
			TP2/0.5		0		
1.0			TP2/1.0		0		
			TP2/1.5		2.2		
2.0			<b>FILL</b> Silty clay with some gravels, grey homogenous, wet, soft, moderate plasticity, yellow staining and sulphur odour..	TP2/2.0		0	
			<b>FILL</b> Silty clay, brown, red, grey, homogenous, damp, stiff, high plasticity with some black staining.				
3.0							

Sample Method	Sample Condition		
HA - Hand Auger SFA - Solid Flight Auger HFA - Hollow Flight Auger PT - Push Tubing	U - undisturbed tube sample D - disturbed sample CS - core sample		



**Borehole No.:** TP3

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 2.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
		<b>FILL</b> Silty clay, brown, grey, homogenous, dry, soft, non plastic, with some cobbles of sandstone, siltstone and mudstone.	TP3/0.1		0		
			TP3/0.3		0		
			TP3/0.5		0		
1.0			<b>FILL</b> Silty clay, homogenous, brown, black, homogenous, wet, soft, moderate plasticity with some black staining and traces of mudstone.	TP3/1.0		0	
		<b>FILL</b> Silty clay, brown, red, grey, homogenous, damp, stiff, high plasticity with increasing black staining.	TP3/1.5		0		
2.0			TP3/2.0		0		
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP4

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 2.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
	[Cross-hatched pattern]	<b>FILL</b> Silty clay, brown, homogenous, dry, soft, non plastic.	TP4/0.1		0.4		
			TP4/0.3		0		
	[Cross-hatched pattern]	<b>FILL</b> Silty clay, brown, red, homogenous, dry, soft, yellow sulphur fragments and bricks present, slight sulphur odour.	TP4/0.5		0		
1.0	[Horizontal dashed pattern]	<b>CLAY</b> Red, brown, grey, homogenous, damp, soft, moderate plasticity.	TP4/1.0		0		
			TP4/1.5		0		
2.0			TP4/2.0		0		
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP5

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 2.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
		<b>FILL</b> Clayey silt, brown, homogenous, dry, soft, non plastic.	TP5/0.1		1.0		
			TP5/0.3		0		
		<b>FILL</b> Silty clay, brown, homogenous, moist, soft, moderate plasticity, slight sulphur odour and black staining.	TP5/0.5		0		
1.0			TP5/1.0		0		
			TP5/1.5		0		
2.0				TP5/2.0		0	
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP6

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 1.5m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
		<b>FILL</b> Clayey silt, dark brown, homogenous, dry, soft, low plasticity, some large concrete pipe fragments. Black staining present and strong hydrocarbon odour evident.	TP6/0.1		43.1	End of hole - possible UST and pipe present.	
			TP6/0.3		0		
		<b>FILL</b> Sandy clay, light brown, homogenous, moist, soft, low plasticity, no staining, slight hydrocarbon odour.	TP6/0.5		0		
1.0		<b>FILL</b> Silty clay, light brown, homogenous, damp, firm, moderate plasticity, slight hydrocarbon odour.	TP6/1.0		0		
			TP6/1.5		0		
2.0					0		
3.0							

Sample Method	Sample Condition
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>



**Borehole No.:** TP7

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 2.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations		
0.0		Ground Surface						
		<b>FILL</b> Clayey silt with trace gravels, brown, homogenous, dry, soft, moderate plasticity.	TP7/0.1		1.4			
		<b>FILL</b> Silty clay, brown, homogenous, dry, soft, moderate plasticity.	TP7/0.3		1.3			
		<b>FILL</b> Silty clay, brown, orange, homogenous, moist, firm.	TP7/0.5		1.6			
		<b>FILL</b> Silty clay, yellow, grey, homogenous, moist, firm, high plasticity.			0			
1.0				TP7/1.0				
				TP7/1.5		0		
2.0		<b>CLAY</b> Shale present, yellow, orange, homogenous, moist, firm, high plasticity.	TP7/2.0		0			
3.0								

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP8

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 0.3m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
	X	<b>FILL</b> Clayey silt, brown, homogenous, dry, soft, non plastic, some lbrick fragments present.	TP8/0.1		0		
			TP8/0.3		0.4	End of hole - refusal on concrete slab.	
1.0							
2.0							
3.0							

Sample Method	Sample Condition
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>



**Borehole No.:** TP9

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 0.5m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					End of hole - refusal at 0.5m on concrete slab.
	FILL	Clayey silt, brown, homogenous, dry, soft, non plastic, small sandstone cobbles increasing with depth.	TP9/0.1		5.0		
			TP9/0.3		1.3		
			TP9/0.5		0		
1.0							
2.0							
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP10

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 2.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations		
0.0		Ground Surface						
		<b>FILL</b> Sandy clay, brown, homogenous, dry, soft, moderate plasticity, some sandstone inclusions.	TP10/0.1		0			
			TP10/0.3		1.9			
				TP10/0.5		0.7		
			<b>FILL</b> Sandy clay, brown, homogenous, dry, soft, moderate plasticity, traces of sandstone and shale.					
				TP10/1.0		0		
1.0			<b>FILL</b> Silty clay, red, brown, some black staining, homogenous, moist, firm, moderate plasticity.					
			TP10/1.5		0			
2.0		<b>SHALE</b> Some silty clay, orange, grey, homogenous, moist, firm.	TP10/2.0		0			
3.0								

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP11

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 2.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details	
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations		
0.0		Ground Surface						
	FILL	FILL Clayey silt, brown, homogenous, dry, soft, very low plasticity.	TP11/0.1		0			
				TP11/0.3		1.6		
		FILL Clayey silt with traces of ash, brown, homogenous, dry, soft, very low plasticity and shale.	TP11/0.5		0			
1.0		FILL	FILL Silty clay, red, brown, homogenous, firm, moderate plasticity.	TP11/1.0		0		
					TP11/1.5		0	
2.0			TP11/2.0		0			
3.0								

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP12

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment  
**Project No.:** 40414  
**Client:** TH & TH Chung  
**Project Manager:** Greg Bartlett

**Total Hole Depth:** 2.0m  
**Longitude:** NA  
**Latitude:** NA  
**Date:** 10 October 2007

**Driller and Co.:** NA  
**Drill Method:** Backhoe  
**Log By:** Shonelle Gleeson  
**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
	[Cross-hatched pattern]	<b>FILL</b> Clayey silt, brown, homogenous, dry, soft, non plastic, brick, wood and plastic fragments present.	TP12/0.1		1.2		
			TP12/0.3		0		
	[Cross-hatched pattern]	<b>FILL</b> Clayey silt, brown, homogenous, dry, soft, non plastic, traces of yellow sulphur and sulphur odour.	TP12/0.5		1.5		
1.0	[Horizontal dashed pattern]	<b>CLAY</b> Red, homogenous, moist, firm, moderate plasticity.	TP12/1.0		0		
			TP12/1.5		0		
2.0	[Horizontal dashed pattern]	<b>CLAY</b> Red, yellow, homogenous, dry, firm, low plasticity.	TP12/2.0		0		
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP13

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 2.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA












SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
		<b>FILL</b> Silty clay, trace sands, brown, homogenous, dry, firm, moderate plasticity.	TP13/0.1		1.5		
			TP13/0.3		0.3		
			TP13/0.5		0		
1.0			TP13/1.0		0		
		<b>FILL</b> Silty clay, brown, homogenous, dry, firm, moderate plasticity, some black staining.	TP13/1.5		0		
2.0		<b>CLAY</b> Some silt and traces of shale, grey, orange, homogenous, dry, low plasticity.	TP13/2.0		0		
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		

**Project:** Supplementary Contamination Assessment  
**Project No.:** 40414  
**Client:** TH & TH Chung  
**Project Manager:** Greg Bartlett

**Total Hole Depth:** 2.0m  
**Longitude:** NA  
**Latitude:** NA  
**Date:** 10 October 2007

**Driller and Co.:** NA  
**Drill Method:** Backhoe  
**Log By:** Shonelle Gleeson  
**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
		<b>FILL</b> Coarse gravel, white, grey, heterogeneous, dry, loose, poorly sorted.	TP14/0.1		0.8		
					0.5		
		<b>FILL</b> Silty clay, grey, brown, homogenous, dry, firm, moderate plasticity, some traces of ash.	TP14/0.3				
					0.8		
			TP14/0.5				
1.0		<b>SHALE</b> Some silt and clay, red, brown, dry.	TP14/1.0		0		
							
					0		
			TP14/1.5				
2.0			TP14/1.9		0		
							
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP15

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 2.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Greg Bartlett

**Project Manager:** Greg Bartlett

**Date:** 11 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
	FILL	<b>FILL</b> Sand, some clay and coarse gravel, brown, dry, loose, traces of bricks,, concrete, slag and coal fragments.	TP15/0.1				
			TP15/0.3				
		<b>FILL</b> Sandy clay, some shale inclusions, brown, orange, dry, stiff.	TP15/0.5				
1.0			<b>FILL</b> Clay, some sand and traces of weathered shale, orangem brown, dry, stiff.	TP15/1.0			
	SHALE		TP15/1.5				
2.0				TP15/1.9			
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP16

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 1.5m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Greg Bartlett

**Project Manager:** Greg Bartlett

**Date:** 11 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
		<b>FILL</b> Clay, some sand, brown, orange, homogenous, firm, non plastic, some coal and slag fragments.	TP16/0.1			End of hole - refusal on weathered shale.	
			TP16/0.3				
			TP16/0.5				
1.0			TP16/1.0				
		<b>SHALE</b> Some clay and trace sands, brown, dry.	TP16/1.5				
2.0							
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP17

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 1.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

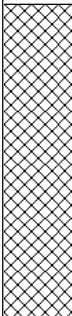

**Latitude:** NA

**Log By:** Greg Bartlett

**Project Manager:** Greg Bartlett

**Date:** 11 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
		<b>FILL</b> Sandy clay, brown, homogenous, dry, stiff, non plastic.	TP17/0.1				
			TP17/0.3				
			TP17/0.5				
1.0		<b>SHALE</b> Some clay and trace sands, brown, dry.	TP17/1.0			End of hole - refusal on weathered shale.	
2.0							
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP18

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 2.0m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Shonelle Gleeson

**Project Manager:** Greg Bartlett

**Date:** 10 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
	[Cross-hatched pattern]	<b>FILL</b> Sand, brown, homogenous, dry, loose with traces of fine to coarse gravels..	TP18/0.1				
		<b>FILL</b> Sand, some clay and fine to coarse gravels, dry, homogenous, loose.	TP18/0.3				
			TP18/0.5				
1.0			TP18/1.0				
	[Horizontal dashed pattern]	<b>CLAY</b> Orange, dry, firm, non plastic, some shale inclusions.	TP18/1.5				
2.0			TP18/2.0				
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP19

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment

**Total Hole Depth:** 1.9m

**Driller and Co.:** NA

**Project No.:** 40414

**Longitude:** NA

**Drill Method:** Backhoe

**Client:** TH & TH Chung

**Latitude:** NA

**Log By:** Greg Bartlett

**Project Manager:** Greg Bartlett

**Date:** 11 October 2007

**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
	[Cross-hatched pattern]	<b>FILL</b> Sand, some fine to coarse gravels, brown, dry, very loose, well sorted.	TP19/0.1				
		<b>FILL</b> Sand, some clay and traces of gravel, dry, well sorted, homogenous, loose.	TP19/0.3				
			TP19/0.5				
1.0		<b>FILL</b> Sandy clay, brown, dry, soft, moderate plasticity, some gravels and shale inclusions.	TP19/1.0				
		<b>SHALE</b> traces of sand, brown, dry, poorly sorted.	TP19/1.5				
			TP19/1.7			End of hole - refusal on weathered shale at 1.7m.	
2.0							
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		



**Borehole No.:** TP20

**Location:** 191 Miller Road, Chester Hill, NSW, 2162

**Project:** Supplementary Contamination Assessment  
**Project No.:** 40414  
**Client:** TH & TH Chung  
**Project Manager:** Greg Bartlett

**Total Hole Depth:** 2.0m  
**Longitude:** NA  
**Latitude:** NA  
**Date:** 10 October 2007

**Driller and Co.:** NA  
**Drill Method:** Backhoe  
**Log By:** Shonelle Gleeson  
**Bore Diameter:** NA

SUBSURFACE PROFILE			SAMPLE				Well Completion Details
Depth	Visual	Description	Number	Condition	PID (ppm)	Observations	
0.0		Ground Surface					
	[Cross-hatched pattern]	<b>FILL</b> Sand, some coarse gravels, brown, red, dry. homogenous, loose, well sorted.	TP20/0.1				
			TP20/0.3				
	[Cross-hatched pattern]	<b>FILL</b> Sandy clay, traces of coarse gravel, brown, orange, dry, stiff, non plastic.	TP20/0.5				
1.0			TP20/1.0				
	[Horizontal dashed pattern]	<b>CLAY</b> Yellow, brown, dry, firm, low plasticity.					
	[Horizontal dashed pattern]	<b>CLAY</b> Grey, red, dry, firm, low plasticity.	TP20/1.5				
2.0			TP20/2.0				
3.0							

Sample Method	Sample Condition		
<b>HA - Hand Auger</b> <b>SFA - Solid Flight Auger</b> <b>HFA - Hollow Flight Auger</b> <b>PT - Push Tubing</b>	<b>U - undisturbed tube sample</b> <b>D - disturbed sample</b> <b>CS - core sample</b>		

**Appendix C**

**Laboratory Certificates and Chain of Custody Documentation**



2 of 7



# CHAIN OF CUSTODY

PROJECT NO.: 40411		LABORATORY BATCH NO.				
PROJECT NAME: English Quarry + Long Hong Quarry		SAMPLERS: SGB				
SEND REPORT TO: JBS		PHONE:				
DATE NEEDED BY: 12/10/07		EMAIL:				
COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL: TZWR TMT PLEASE		QC LEVEL: NEPM 1999 ( )				
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	PH	NOTES
TP4-0.1	soil	10/10/07		1XJ + ice		Sq. HOLD
TP4-0.3						
TP4-0.5						
TP4-1.0						
TP4-1.5						
TP4-2.0						
TP5-0.1						
TP5-0.3						
TP5-0.5						
TP5-1.0						
TP5-1.5						
TP5-2.0						
TP6-0.1						
TP6-0.3						
TP6-0.5						
TP6-1.0						
TP6-1.5						
TP7-0.1						

RELINQUISHED BY: [Signature]	RECEIVED BY: NAME: AJL
DATE: 11/10/07	DATE: 12/10/07
CONSIGNMENT NOTE NO. TRANSPORT CC.	FOR RECEIVING LAB USE ONLY:
CONSIGNMENT NOTE NO. TRANSPORT CC.	COOLER SEAL - Yes: No
CONSIGNMENT NOTE NO. TRANSPORT CC.	COOLER TEMP - deg C
	COOLER SEAL - Yes: No
	COOLER TEMP - deg C

Contaminant & Preservative Codes: P = Plastic; J = Soil Jar; B = Glass Bottle; N = Nitric Acid Preserv.; C = Sodium Hydroxide Preserv.; VC = Hydrochloric Acid Preserv.; V = Sulfuric Acid Preserv.; Z = Zinc Preserv.; E = EDTA Preserv.; ST = Sealed Bottle; O = Other  
 JBS Environmental Pty Ltd ABX 67 071 842 638  
 Phone: (02) 8338-1011  
 Fax: (02) 8338-1700  
 JMSO Forms 013 - Chain of Custody  
 Suite 2, 555 Gardeners Road MASCOT NSW 2020  
 PO Box 940 MASCOT NSW 1460  
 www.jbsenv.com.au



# CHAIN OF CUSTODY

PROJECT NO.: 40414  
 PROJECT NAME: Kingfisher Quarry + Longfellow Quarry  
 SEND REPORT TO: G. Bartlett  
 SEND INVOICE TO: A. Warth  
 DATE NEEDED BY:  
 COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:  
 72 hr TAT please

LABORATORY BATCH NO. \_\_\_\_\_  
 SAMPLERS: SB  
 PHONE: \_\_\_\_\_  
 EMAIL: \_\_\_\_\_

QC LEVEL: NEPM 1999 (✓)

SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	pH	Notes
TP1-0.3	Soil	11/16/07		1 x 0.15 L		HOLD
TP1-0.5						
TP1-1.0						
TP1-1.5						
TP1-2.0						
TP8-0.1						7g
TP8-0.3						HOLD
TP9-0.1						Sg
TP9-0.3						HOLD
TP9-0.5						Sg
TP10-0.1						HOLD
TP10-0.3						Sg
TP10-0.5						HOLD
TP10-1.0						Sg
TP10-1.5						
TP10-2.0						
TP11-0.1						
TP11-0.3						Sg

RELINQUISHED BY: G. Bartlett DATE: 11/16/07  
 RECEIVED BY: NAME: AW DATE: 12/10/07  
 TRANSPORT CO. CONSIGNMENT NOTE NO.  
 NAME: OF: ENVIROlab DATE:  
 TRANSPORT CO. CONSIGNMENT NOTE NO.  
 NAME: OF:

FOR RECEIVING LAB USE ONLY:  
 COOLER SEAL - Yes..... No..... Intact..... Broken.....  
 COOLER TEMP ..... deg C  
 COOLER SEAL - Yes..... No..... Intact..... Broken.....  
 COOLER TEMP ..... deg C

4077



# CHAIN OF CUSTODY

PROJECT NO.: 4077  
 PROJECT NAME: TUNNUNG TONG HONG CHINA  
 SEND REPORT TO: G. BOALBA  
 SEND INVOICE TO: A. WORTH  
 DATE NEEDED BY:  
 COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:  
 12 hrs TAT please

LABORATORY BATCH NO.:  
 SAMPLERS: G. BOALBA  
 PHONE:  
 EMAIL:

QC LEVEL: NEPM 1999 ( )

SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	PH	RECEIVED BY:	DATE:	FOR RECEIVING LAB USE ONLY:
TP11-0.5	soil	11/10/07		1 x J + ice		NAME: AHL	DATE: 12/10/07	COOLER SEAL - Yes No Intact Broken
TP11-1.0						OF: ENVIROLAB	DATE:	COOLER TEMP deg C
TP11-1.5						NAME:	DATE:	COOLER SEAL - Yes No Intact Broken
TP11-2.0						OF:	DATE:	COOLER TEMP deg C
TP12-0.1								
TP12-0.3								
TP12-0.5								
TP12-1.0								
TP12-1.5								
TP12-2.0								
TP13-0.1								
TP13-0.3								
TP13-0.5								
TP13-1.0								
TP13-1.5								
TP13-2.0								
TP14-0.1								
TP14-0.3								

RELINQUISHED BY: G. BOALBA  
 DATE: 11/10/07

METHOD OF SHIPMENT:  
 CONSIGNMENT NOTE NO.  
 TRANSPORT CO.  
 CONSIGNMENT NOTE NO.  
 TRANSPORT CO

Container & Preservative Codes: F = Seal Jar; B = Glass Bottle; N = Nitric Acid Presv.; C = Sodium Hydroxide Presv.; VC = Hydrochloric Acid Presv.; VS = Sulfuric Acid Presv.; VAS = Sulfuric Acid Presv.; VAS2 = Sulfuric Acid Presv.; ST = Sterile Bottle; 0 = Other





# CHAIN OF CUSTODY

PROJECT NO.: 408714  
 PROJECT NAME: Lung Hygiene + Tong Hoang Chung  
 SEND REPORT TO: G. Benthall  
 SEND INVOICE TO: A. Worth  
 DATE NEEDED BY:  
 COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:  
 12hr TAT please.

LABORATORY BATCH NO.:  
 SAMPLERS:  
 PHONE:  
 EMAIL:

QC LEVEL: NERM 1999 ( )

SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	pH	Notes
TP17-1.0	SSL	11/10/07		1x5+ice		HOLD
TP18-0.1						HOLD
TP18-0.2						Sg
TP18-0.3						
TP18-0.5						
TP18-1.0						
TP18-1.5						Sg
TP18-2.0						
TP19-0.1						
TP19-0.3						
TP19-0.5						Sg
TP19-1.0						
TP19-1.5						
TP19-1.7						
TP20-0.1						Sg
TP20-0.3						Sg
TP20-0.5						
TP20-1.0						Sg

RELINQUISHED BY: NAME: G. Benthall DATE: 11/10/07  
 RECEIVED BY: NAME: AUL DATE: 12/10/07

FOR RECEIVING LAB USE ONLY:  
 COOLER SEAL - Yes: No: Initialed: Broken:  
 COOLER TEMP: deg C  
 COOLER SEAL - Yes: No: Initialed: Broken:  
 COOLER TEMP: deg C

Container & Preservative Codes: P = Plastic; J = Soil Jar; B = Glass Bottle; K = Nitric Acid Preserv.; C = Sodium Hydroxide Preserv.; VC = Hydrochloric Acid Preserv.; V5 = Sulfuric Acid Preserv.; V6 = Hydrochloric Acid Preserv.; V7 = Nitric Acid Preserv.; V8 = Sulfuric Acid Preserv.; V9 = Hydrochloric Acid Preserv.; V10 = Hydrochloric Acid Preserv.; V11 = Hydrochloric Acid Preserv.; V12 = Hydrochloric Acid Preserv.; V13 = Hydrochloric Acid Preserv.; V14 = Hydrochloric Acid Preserv.; V15 = Hydrochloric Acid Preserv.; V16 = Hydrochloric Acid Preserv.; V17 = Hydrochloric Acid Preserv.; V18 = Hydrochloric Acid Preserv.; V19 = Hydrochloric Acid Preserv.; V20 = Hydrochloric Acid Preserv.

Surite 2, 595 Gardeners Road MASCOOT NSW 2020  
 PO Box 940 MASCOOT NSW 1460  
 www.jbsgroup.com.au

JBS Environmental Pty Ltd ABN 67 071 842 638  
 Phone: (02) 8538-1011  
 Fax: (02) 8538-1700

RMSO Form 50.13 - Chain of Custody



CHAIN OF CUSTODY

PROJECT NO.: 40514  
 PROJECT NAME: Tungtong Mining + Tong Hong Chuang  
 SEND REPORT TO: B. BOMBERD  
 SEND INVOICE TO: ANSARA  
 DATE NEEDED BY:  
 COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:  
 TP20-1.5  
 TP20-2.0  
 QC3  
 TP3A  
 TP5B  
 P5A  
 TP3B  
 Trip spike  
 Trip Blank

LABORATORY BATCH NO.:  
 SAMPLERS: B. BOMBERD  
 PHONE:  
 EMAIL:  
 QC LEVEL: NERM: 999 (S)

SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	PH	TP20-1.5	TP20-2.0	QC3	TP3A	TP5B	P5A	TP3B	Trip spike	Trip Blank	NOTES
TP20-1.5	SOIL	11/10/07		1 x J + ICE		X	X	X	X	X	X	X	X	X	
TP20-2.0	SOIL					X	X	X	X	X	X	X	X	X	
QC3	SOIL					X	X	X	X	X	X	X	X	X	
TP3A	SOIL					X	X	X	X	X	X	X	X	X	
TP5B	SOIL					X	X	X	X	X	X	X	X	X	
P5A	SOIL					X	X	X	X	X	X	X	X	X	
TP3B	SOIL					X	X	X	X	X	X	X	X	X	
Trip spike															Send to SGS
Trip Blank															Send to SGS

RECEIVED BY: NAME: ABL DATE: 12/10/07  
 OF: ENVIALAB  
 NAME: DATE:  
 OF: METHOD OF SHIPMENT: TRANSPORT CO. CONSIGNMENT NOTE NO. TRANSPORT CO. CONSIGNMENT NOTE NO. TRANSPORT CO. CONSIGNMENT NOTE NO.

FOR RECEIVING LAB USE ONLY:  
 CODLER SEAL - Yes No Intact Broken  
 COOLER TEMP deg C  
 COOLER SEAL - Yes No Intact Broken  
 COOLER TEMP deg C

Container & Preservative Code: P = Plastic, B = Glass, C = Sodium Hydroxide Presv., N = Nitric Acid Presv., S = Sulfuric Acid Presv., V = Volatile Acid Presv., W = Water, X = Sealed Bag, Y = Sealed Bag, Z = Sealed Bag, E = EDTA Presv., ST = Sealed Bag, O = Other

Suite 2, 595 Gardeners Road MASCOOT NSW 2020  
 PO Box 940 MASCOOT NSW 1460  
 www.jbsgroup.com.au

JBS Environmental Pty Ltd ABN 67 071 842 638  
 Phone: (02) 8339-1011  
 Fax: (02) 8338-1700

JMSO Forms013 - Chain of Custody



## EnviroLab Services Pty Ltd

ABN 37 112 535 645

54 Frenchs Rd Willoughby NSW 2068

ph 02 9958 5801 fax 02 9958 5803

email: tnotaras@envirolabservices.com.au

### CERTIFICATE OF ANALYSIS 14317

**Client:**

**JBS Environmental**

P.O. Box 940

MASCOT

NSW 1460

**Attention:** Greg Bartlett

**Sample log in details:**

Your Reference:

**40414, Tung Hui Chung & Tung Hong Chung**

No. of samples:

112 Soils, 2 Waters

Date samples received:

12/10/07

Date completed instructions received:

12/10/07

**Analysis Details:**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

***Please refer to the last page of this report for any comments relating to the results.***

**Report Details:**

Date results requested by:

16/10/07

Date of Preliminary Report:

Not Issued

Issue Date:

16/10/07

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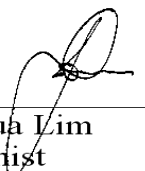
This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

**Tests not covered by NATA are denoted with \*.**

**Results Approved By:**

  
\_\_\_\_\_  
Jacinta Hurst  
Operations Manager

  
\_\_\_\_\_  
Joshua Lim  
Chemist

EnviroLab Reference: 14317  
Revision No: R 00



VOC's in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-1 TP1 0.1 10/10/2007 Soil	14317-7 TP2 0.1 10/10/2007 Soil	14317-26 TP5 0.3 10/10/2007 Soil	14317-31 TP6 0.1 10/10/2007 Soil	14317-42 TP8 0.1 10/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Dichlorodifluoromethane	mg/kg	<10	<10	<10	<10	<10
Chloromethane	mg/kg	<10	<10	<10	<10	<10
Vinyl Chloride	mg/kg	<10	<10	<10	<10	<10
Bromomethane	mg/kg	<10	<10	<10	<10	<10
Chloroethane	mg/kg	<10	<10	<10	<10	<10
Trichlorofluoromethane	mg/kg	<10	<10	<10	<10	<10
1,1-Dichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-dichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
bromochloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
chloroform	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2,2-dichloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1-trichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-dichloropropene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
carbon tetrachloride	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
dibromomethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dichloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
trichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
bromodichloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,3-dichloropropene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-dichloropropene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-trichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
dibromochloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dibromoethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
tetrachloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1,2-tetrachloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
chlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
bromoform	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
styrene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-tetrachloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0

VOC's in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-1 TP1 0.1 10/10/2007 Soil	14317-7 TP2 0.1 10/10/2007 Soil	14317-26 TP5 0.3 10/10/2007 Soil	14317-31 TP6 0.1 10/10/2007 Soil	14317-42 TP8 0.1 10/10/2007 Soil
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,3-trichloropropane*	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
isopropylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
bromobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
n-propyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2-chlorotoluene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
4-chlorotoluene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,3,5-trimethyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
tert-butyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-trimethyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
sec-butyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
4-isopropyl toluene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
n-butyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dibromo-3-chloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-trichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
naphthalene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
hexachlorobutadiene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,3-trichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluorometha	%	99	94	91	92	105
Surrogate aaa-Trifluorotoluene	%	80	84	87	84	67
Surrogate Toluene-d8	%	83	89	83	89	82
Surrogate 4-Bromofluorobenzene	%	66	66	67	87	69

VOC's in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-87 TP17 0.1 11/10/2007 Soil
Date extracted	-	15/10/2007
Date analysed	-	15/10/2007
Dichlorodifluoromethane	mg/kg	<10
Chloromethane	mg/kg	<10
Vinyl Chloride	mg/kg	<10
Bromomethane	mg/kg	<10
Chloroethane	mg/kg	<10
Trichlorofluoromethane	mg/kg	<10
1,1-Dichloroethene	mg/kg	<1.0
trans-1,2-dichloroethene	mg/kg	<1.0
1,1-dichloroethane	mg/kg	<1.0
cis-1,2-dichloroethene	mg/kg	<1.0
bromochloromethane	mg/kg	<1.0
chloroform	mg/kg	<1.0
2,2-dichloropropane	mg/kg	<1.0
1,2-dichloroethane	mg/kg	<1.0
1,1,1-trichloroethane	mg/kg	<1.0
1,1-dichloropropene	mg/kg	<1.0
carbon tetrachloride	mg/kg	<1.0
Benzene	mg/kg	<0.5
dibromomethane	mg/kg	<1.0
1,2-dichloropropane	mg/kg	<1.0
trichloroethene	mg/kg	<1.0
bromodichloromethane	mg/kg	<1.0
trans-1,3-dichloropropene	mg/kg	<1.0
cis-1,3-dichloropropene	mg/kg	<1.0
1,1,2-trichloroethane	mg/kg	<1.0
Toluene	mg/kg	<0.5
1,3-dichloropropane	mg/kg	<1.0
dibromochloromethane	mg/kg	<1.0
1,2-dibromoethane	mg/kg	<1.0
tetrachloroethene	mg/kg	<1.0
1,1,1,2-tetrachloroethane	mg/kg	<1.0
chlorobenzene	mg/kg	<1.0
Ethylbenzene	mg/kg	<1.0
bromoform	mg/kg	<1.0
m + p-Xylene	mg/kg	<2.0
styrene	mg/kg	<1.0
1,1,2,2-tetrachloroethane	mg/kg	<1.0

VOC's in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-87 TP17 0.1 11/10/2007 Soil
o-Xylene	mg/kg	<1.0
1,2,3-trichloropropane*	mg/kg	<1.0
isopropylbenzene	mg/kg	<1.0
bromobenzene	mg/kg	<1.0
n-propyl benzene	mg/kg	<1.0
2-chlorotoluene	mg/kg	<1.0
4-chlorotoluene	mg/kg	<1.0
1,3,5-trimethyl benzene	mg/kg	<1.0
tert-butyl benzene	mg/kg	<1.0
1,2,4-trimethyl benzene	mg/kg	<1.0
1,3-dichlorobenzene	mg/kg	<1.0
sec-butyl benzene	mg/kg	<1.0
1,4-dichlorobenzene	mg/kg	<1.0
4-isopropyl toluene	mg/kg	<1.0
1,2-dichlorobenzene	mg/kg	<1.0
n-butyl benzene	mg/kg	<1.0
1,2-dibromo-3-chloropropane	mg/kg	<1.0
1,2,4-trichlorobenzene	mg/kg	<1.0
naphthalene	mg/kg	2.5
hexachlorobutadiene	mg/kg	<1.0
1,2,3-trichlorobenzene	mg/kg	<1.0
Surrogate Dibromofluorometha	%	70
Surrogate aaa-Trifluorotoluene	%	78
Surrogate Toluene-d8	%	85
Surrogate 4-Bromofluorobenzene	%	81

vTPH & BTEX in Soil						
Our Reference:	UNITS	14317-1	14317-4	14317-7	14317-11	14317-13
Your Reference	-----	TP1	TP1	TP2	TP2	TP3
Depth	-----	0.1	1.0	0.1	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	80	87	84	81	83

vTPH & BTEX in Soil						
Our Reference:	UNITS	14317-14	14317-19	14317-26	14317-29	14317-31
Your Reference	-----	TP3	TP4	TP5	TP5	TP6
Depth	-----	0.3	0.1	0.3	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	76	74	87	94	84

vTPH & BTEX in Soil						
Our Reference:	UNITS	14317-33	14317-36	14317-42	14317-44	14317-46
Your Reference	-----	TP6	TP7	TP8	TP9	TP9
Depth	-----	0.5	0.1	0.1	0.1	0.5
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	78	71	67	75	70

vTPH & BTEX in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-48 TP10 0.3 10/10/2007 Soil	14317-53 TP11 0.1 10/10/2007 Soil	14317-58 TP11 2.0 10/10/2007 Soil	14317-59 TP12 0.1 10/10/2007 Soil	14317-62 TP12 1.0 10/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	68	69	71	76	74

vTPH & BTEX in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-65 TP13 0.1 10/10/2007 Soil	14317-67 TP13 0.5 10/10/2007 Soil	14317-71 TP14 0.1 10/10/2007 Soil	14317-74 TP14 1.0 10/10/2007 Soil	14317-76 TP15 0.1 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	60	73	73	71	71

vTPH & BTEX in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-81 TP15 2.0 11/10/2007 Soil	14317-82 TP16 0.1 11/10/2007 Soil	14317-86 TP16 1.5 11/10/2007 Soil	14317-87 TP17 0.1 11/10/2007 Soil	14317-89 TP17 0.5 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	76	75	76	78	84

vTPH & BTEX in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-91 TP18 0.1 11/10/2007 Soil	14317-94 TP18 1.0 11/10/2007 Soil	14317-97 TP19 0.1 11/10/2007 Soil	14317-102 TP19 1.7 11/10/2007 Soil	14317-103 TP20 0.1 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	82	74	81	82	79

vTPH & BTEX in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-105 TP20 0.5 11/10/2007 Soil	14317-109 QC3 - 11/10/2007 Soil	14317-110 QC4 - 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	67	79	76

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	14317-1	14317-4	14317-7	14317-11	14317-13
Your Reference	-----	TP1	TP1	TP2	TP2	TP3
Depth	-----	0.1	1.0	0.1	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
TPH C10 - C14	mg/kg	<50	<50	<50	<50	<50
TPH C15 - C28	mg/kg	4,400	<100	<100	190	<100
TPH C29 - C36	mg/kg	4,100	<100	130	<100	<100
Surrogate o-Terphenyl	%	#	120	122	#	121

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	14317-14	14317-19	14317-26	14317-29	14317-31
Your Reference	-----	TP3	TP4	TP5	TP5	TP6
Depth	-----	0.3	0.1	0.3	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
TPH C10 - C14	mg/kg	<50	<50	<50	<50	1,600
TPH C15 - C28	mg/kg	440	<100	370	<100	6,000
TPH C29 - C36	mg/kg	350	<100	290	<100	<100
Surrogate o-Terphenyl	%	#	115	130	124	#

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	14317-33	14317-36	14317-42	14317-44	14317-46
Your Reference	-----	TP6	TP7	TP8	TP9	TP9
Depth	-----	0.5	0.1	0.1	0.1	0.5
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
TPH C10 - C14	mg/kg	980	<50	<50	<50	<50
TPH C15 - C28	mg/kg	3,300	1,000	<100	<100	<100
TPH C29 - C36	mg/kg	<100	4,600	<100	<100	<100
Surrogate o-Terphenyl	%	#	#	117	112	110

sTPH in Soil (C10-C36)	UNITS	14317-48	14317-53	14317-58	14317-59	14317-62
Our Reference:	-----	TP10	TP11	TP11	TP12	TP12
Your Reference	-----	0.3	0.1	2.0	0.1	1.0
Depth						
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
TPH C10 - C14	mg/kg	<50	<50	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100	<100	<100
TPH C29 - C36	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	109	115	114	110	108

sTPH in Soil (C10-C36)	UNITS	14317-65	14317-67	14317-71	14317-74	14317-76
Our Reference:	-----	TP13	TP13	TP14	TP14	TP15
Your Reference	-----	0.1	0.5	0.1	1.0	0.1
Depth						
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	11/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
TPH C10 - C14	mg/kg	<50	<50	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100	<100	<100
TPH C29 - C36	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	118	114	117	121	119

sTPH in Soil (C10-C36)	UNITS	14317-81	14317-82	14317-86	14317-87	14317-89
Our Reference:	-----	TP15	TP16	TP16	TP17	TP17
Your Reference	-----	2.0	0.1	1.5	0.1	0.5
Depth						
Date Sampled		11/10/2007	11/10/2007	11/10/2007	11/10/2007	11/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
TPH C10 - C14	mg/kg	<50	<50	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100	1,500	<100
TPH C29 - C36	mg/kg	<100	<100	<100	1,000	<100
Surrogate o-Terphenyl	%	117	118	117	#	119

sTPH in Soil (C10-C36)	UNITS	14317-91	14317-94	14317-97	14317-102	14317-103
Our Reference:	-----	TP18	TP18	TP19	TP19	TP20
Your Reference	-----	0.1	1.0	0.1	1.7	0.1
Depth		11/10/2007	11/10/2007	11/10/2007	11/10/2007	11/10/2007
Date Sampled		Soil	Soil	Soil	Soil	Soil
Type of sample						
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
TPH C10 - C14	mg/kg	<50	<50	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100	<100	<100
TPH C29 - C36	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	119	117	119	115	120

sTPH in Soil (C10-C36)	UNITS	14317-105	14317-109	14317-110
Our Reference:	-----	TP20	QC3	QC4
Your Reference	-----	0.5	-	-
Depth		11/10/2007	11/10/2007	11/10/2007
Date Sampled		Soil	Soil	Soil
Type of sample				
Date extracted	-	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007
TPH C10 - C14	mg/kg	<50	<50	<50
TPH C15 - C28	mg/kg	<100	<100	<100
TPH C29 - C36	mg/kg	<100	<100	<100
Surrogate o-Terphenyl	%	121	117	119

PAHs in Soil		14317-1	14317-4	14317-7	14317-11	14317-13
Our Reference:	UNITS	14317-1	14317-4	14317-7	14317-11	14317-13
Your Reference	-----	TP1	TP1	TP2	TP2	TP3
Depth	-----	0.1	1.0	0.1	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.6	<1	1.0
Anthracene	mg/kg	<0.1	<0.1	0.1	<1	0.2
Fluoranthene	mg/kg	0.1	<0.1	1.3	1.0	2.5
Pyrene	mg/kg	0.2	<0.1	1.2	0.8	2.3
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.5	0.3	0.9
Chrysene	mg/kg	<0.1	<0.1	0.6	0.5	1.0
Benzo(b,k)fluoranthene	mg/kg	<0.2	<0.2	1.0	0.7	1.9
Benzo(a)pyrene	mg/kg	0.08	<0.05	0.7	0.3	1.2
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.5	0.2	0.8
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.7	0.2	0.8
Surrogate p-Terphenyl-d14	%	113	114	122	112	114

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-14 TP3 0.3 10/10/2007 Soil	14317-19 TP4 0.1 10/10/2007 Soil	14317-26 TP5 0.3 10/10/2007 Soil	14317-29 TP5 1.5 10/10/2007 Soil	14317-31 TP6 0.1 10/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Naphthalene	mg/kg	0.3	<0.1	1.3	<0.1	<1
Acenaphthylene	mg/kg	1.0	<0.1	1.0	<0.1	<1
Acenaphthene	mg/kg	2.4	<0.1	0.8	<0.1	<1
Fluorene	mg/kg	2.7	<0.1	2.6	<0.1	<1
Phenanthrene	mg/kg	33	0.6	27	<0.1	1.9
Anthracene	mg/kg	6.7	0.1	3.2	<0.1	<1
Fluoranthene	mg/kg	43	1.1	38	<0.1	<1
Pyrene	mg/kg	39	1.0	33	<0.1	<1
Benzo(a)anthracene	mg/kg	13	0.4	10	<0.1	<0.1
Chrysene	mg/kg	13	0.5	12	<0.1	0.1
Benzo(b,k)fluoranthene	mg/kg	23	0.8	22	<0.2	<0.2
Benzo(a)pyrene	mg/kg	16	0.5	15	<0.05	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	9.9	0.3	9.2	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	1.6	<0.1	1.4	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	9.5	0.3	8.9	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	114	115	113	116	118

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-33 TP6 0.5 10/10/2007 Soil	14317-36 TP7 0.1 10/10/2007 Soil	14317-42 TP8 0.1 10/10/2007 Soil	14317-44 TP9 0.1 10/10/2007 Soil	14317-46 TP9 0.5 10/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Naphthalene	mg/kg	<1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	2.0	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	1.8	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<1	<0.1	0.2	0.2	0.2
Pyrene	mg/kg	<1	<0.1	0.2	0.2	0.2
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.1	<0.1	0.1
Benzo(b,k)fluoranthene	mg/kg	<0.2	<0.2	0.2	<0.2	0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.1	0.1	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Surrogate p-Terphenyl-d14	%	116	117	120	117	116

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-48 TP10 0.3 10/10/2007 Soil	14317-53 TP11 0.1 10/10/2007 Soil	14317-58 TP11 2.0 10/10/2007 Soil	14317-59 TP12 0.1 10/10/2007 Soil	14317-62 TP12 1.0 10/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	16/10/2007	16/10/2007
Naphthalene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.4	<0.1	<0.1	0.2	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.9	0.1	<0.1	0.3	<0.1
Pyrene	mg/kg	1.0	0.2	<0.1	0.4	<0.1
Benzo(a)anthracene	mg/kg	0.6	<0.1	<0.1	0.2	<0.1
Chrysene	mg/kg	0.7	0.1	<0.1	0.2	<0.1
Benzo(b,k)fluoranthene	mg/kg	1.0	<0.2	<0.2	0.4	<0.2
Benzo(a)pyrene	mg/kg	0.7	0.1	<0.05	0.2	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	<0.1	<0.1	0.2	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.3	<0.1	<0.1	0.2	<0.1
Surrogate p-Terphenyl-d14	%	116	117	113	115	115

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-65 TP13 0.1 10/10/2007 Soil	14317-67 TP13 0.5 10/10/2007 Soil	14317-71 TP14 0.1 10/10/2007 Soil	14317-74 TP14 1.0 10/10/2007 Soil	14317-76 TP15 0.1 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	16/10/2007	16/10/2007	16/10/2007	16/10/2007	16/10/2007
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Acenaphthylene	mg/kg	<0.1	<0.1	0.2	<0.1	0.2
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Phenanthrene	mg/kg	0.2	0.7	0.1	<0.1	2.2
Anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	0.5
Fluoranthene	mg/kg	0.4	1.3	0.4	<0.1	4.2
Pyrene	mg/kg	0.4	1.2	0.5	<0.1	3.9
Benzo(a)anthracene	mg/kg	0.2	0.3	0.3	<0.1	1.4
Chrysene	mg/kg	0.3	0.5	0.4	<0.1	1.6
Benzo(b,k)fluoranthene	mg/kg	0.8	0.8	1.2	<0.2	3.1
Benzo(a)pyrene	mg/kg	0.3	0.5	0.5	<0.05	2.0
Indeno(1,2,3-c,d)pyrene	mg/kg	0.4	0.3	0.7	<0.1	1.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Benzo(g,h,i)perylene	mg/kg	0.4	0.3	0.8	<0.1	1.4
Surrogate p-Terphenyl-d14	%	113	114	114	115	112

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-81 TP15 2.0 11/10/2007 Soil	14317-82 TP16 0.1 11/10/2007 Soil	14317-86 TP16 1.5 11/10/2007 Soil	14317-87 TP17 0.1 11/10/2007 Soil	14317-89 TP17 0.5 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	16/10/2007	16/10/2007	16/10/2007	16/10/2007	16/10/2007
Naphthalene	mg/kg	<0.1	<0.1	<0.1	4.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.1	<0.1	6.0	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	3.2	<0.1
Fluorene	mg/kg	<0.1	0.1	<0.1	7.4	<0.1
Phenanthrene	mg/kg	<0.1	3.1	0.4	100	0.5
Anthracene	mg/kg	<0.1	0.5	<0.1	20	0.1
Fluoranthene	mg/kg	<0.1	4.2	1.3	170	0.9
Pyrene	mg/kg	<0.1	3.8	1.3	160	0.8
Benzo(a)anthracene	mg/kg	<0.1	1.2	0.4	56	0.3
Chrysene	mg/kg	<0.1	1.4	0.6	59	0.3
Benzo(b,k)fluoranthene	mg/kg	<0.2	2.1	0.9	110	0.7
Benzo(a)pyrene	mg/kg	<0.05	1.3	0.6	76	0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.8	0.3	46	0.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	7.7	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.8	0.3	41	0.3
Surrogate p-Terphenyl-d14	%	115	116	116	118	120

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-91 TP18 0.1 11/10/2007 Soil	14317-94 TP18 1.0 11/10/2007 Soil	14317-97 TP19 0.1 11/10/2007 Soil	14317-102 TP19 1.7 11/10/2007 Soil	14317-103 TP20 0.1 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	16/10/2007	16/10/2007	16/10/2007	16/10/2007	16/10/2007
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.8	<0.1	1.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	0.1	<0.1	<0.1
Fluoranthene	mg/kg	1.1	<0.1	1.8	<0.1	<0.1
Pyrene	mg/kg	1.0	<0.1	1.7	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.3	<0.1	0.4	<0.1	<0.1
Chrysene	mg/kg	0.4	<0.1	0.6	<0.1	<0.1
Benzo(b,k)fluoranthene	mg/kg	0.7	<0.2	1.0	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.4	<0.05	0.7	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	<0.1	0.4	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.3	<0.1	0.5	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	118	112	118	116	118

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-105 TP20 0.5 11/10/2007 Soil	14317-109 QC3 - 11/10/2007 Soil	14317-110 QC4 - 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	16/10/2007	16/10/2007	16/10/2007
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	1.1	<0.1
Anthracene	mg/kg	<0.1	0.1	<0.1
Fluoranthene	mg/kg	<0.1	1.9	<0.1
Pyrene	mg/kg	<0.1	1.8	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.5	<0.1
Chrysene	mg/kg	<0.1	0.7	<0.1
Benzo(b,k)fluoranthene	mg/kg	<0.2	1.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.8	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.5	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.5	<0.1
Surrogate p-Terphenyl-d14	%	119	119	116

Organochlorine Pesticides in soil		14317-1	14317-4	14317-7	14317-11	14317-13
Our Reference:	UNITS	14317-1	14317-4	14317-7	14317-11	14317-13
Your Reference	-----	TP1	TP1	TP2	TP2	TP3
Depth	-----	0.1	1.0	0.1	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
HCB	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Surrogate TCLMX	%	102	98	105	105	101

Organochlorine Pesticides in soil	UNITS	14317-14	14317-19	14317-26	14317-29	14317-31
Our Reference:	-----	TP3	TP4	TP5	TP5	TP6
Your Reference	-----	0.3	0.1	0.3	1.5	0.1
Depth						
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
pp-DDE	mg/kg	<0.1	0.4	<0.1	<0.1	<1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
pp-DDD	mg/kg	<0.1	0.4	<0.1	<0.1	<1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
pp-DDT	mg/kg	<0.1	1.5	0.2	<0.1	<1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Surrogate TCLMX	%	106	105	110	109	97

Organochlorine Pesticides in soil	UNITS	14317-33	14317-36	14317-42	14317-44	14317-46
Our Reference:	-----	TP6	TP7	TP8	TP9	TP9
Your Reference	-----	0.5	0.1	0.1	0.1	0.5
Depth		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Date Sampled		Soil	Soil	Soil	Soil	Soil
Type of sample						
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	101	108	109	109	125

Organochlorine Pesticides in soil	UNITS	14317-48	14317-53	14317-58	14317-59	14317-62
Our Reference:	-----	TP10	TP11	TP11	TP12	TP12
Your Reference	-----	0.3	0.1	2.0	0.1	1.0
Depth						
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	113	111	106	107	108

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-65 TP13 0.1 10/10/2007 Soil	14317-67 TP13 0.5 10/10/2007 Soil	14317-71 TP14 0.1 10/10/2007 Soil	14317-74 TP14 1.0 10/10/2007 Soil	14317-76 TP15 0.1 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
pp-DDD	mg/kg	0.4	<0.1	<0.1	<0.1	<1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Surrogate TCLMX	%	111	112	106	110	107

Organochlorine Pesticides in soil	UNITS	14317-81	14317-82	14317-86	14317-87	14317-89
Our Reference:	-----	TP15	TP16	TP16	TP17	TP17
Your Reference	-----	2.0	0.1	1.5	0.1	0.5
Depth						
Date Sampled		11/10/2007	11/10/2007	11/10/2007	11/10/2007	11/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
HCB	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Surrogate TCLMX	%	110	111	112	109	107

Organochlorine Pesticides in soil	UNITS	14317-91	14317-94	14317-97	14317-102	14317-103
Our Reference:	-----	TP18	TP18	TP19	TP19	TP20
Your Reference	-----	0.1	1.0	0.1	1.7	0.1
Depth						
Date Sampled		11/10/2007	11/10/2007	11/10/2007	11/10/2007	11/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	109	112	108	109	115

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-105 TP20 0.5 11/10/2007 Soil	14317-109 QC3 - 11/10/2007 Soil	14317-110 QC4 - 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	113	118	116

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-1 TP1 0.1 10/10/2007 Soil	14317-4 TP1 1.0 10/10/2007 Soil	14317-7 TP2 0.1 10/10/2007 Soil	14317-11 TP2 1.5 10/10/2007 Soil	14317-13 TP3 0.1 10/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Surrogate TCLMX	%	102	98	105	105	101

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-14 TP3 0.3 10/10/2007 Soil	14317-19 TP4 0.1 10/10/2007 Soil	14317-26 TP5 0.3 10/10/2007 Soil	14317-29 TP5 1.5 10/10/2007 Soil	14317-31 TP6 0.1 10/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arochlor 1016	mg/kg	<1	<0.1	<0.1	<0.1	<1
Arochlor 1232	mg/kg	<1	<0.1	<0.1	<0.1	<1
Arochlor 1242	mg/kg	<1	<0.1	<0.1	<0.1	<1
Arochlor 1248	mg/kg	<1	<0.1	<0.1	<0.1	<1
Arochlor 1254	mg/kg	<1	<0.1	<0.1	<0.1	<1
Arochlor 1260	mg/kg	<1	<0.1	<0.1	<0.1	<1
Surrogate TCLMX	%	106	105	110	109	97

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-33 TP6 0.5 10/10/2007 Soil	14317-36 TP7 0.1 10/10/2007 Soil	14317-42 TP8 0.1 10/10/2007 Soil	14317-44 TP9 0.1 10/10/2007 Soil	14317-46 TP9 0.5 10/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	101	109	109	109	125

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-48 TP10 0.3 10/10/2007 Soil	14317-53 TP11 0.1 10/10/2007 Soil	14317-58 TP11 2.0 10/10/2007 Soil	14317-59 TP12 0.1 10/10/2007 Soil	14317-62 TP12 1.0 10/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	113	111	106	107	108

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-65 TP13 0.1 10/10/2007 Soil	14317-67 TP13 0.5 10/10/2007 Soil	14317-71 TP14 0.1 10/10/2007 Soil	14317-74 TP14 1.0 10/10/2007 Soil	14317-76 TP15 0.1 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<1
Surrogate TCLMX	%	111	112	106	110	107

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-81 TP15 2.0 11/10/2007 Soil	14317-82 TP16 0.1 11/10/2007 Soil	14317-86 TP16 1.5 11/10/2007 Soil	14317-87 TP17 0.1 11/10/2007 Soil	14317-89 TP17 0.5 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<1	<0.1
Surrogate TCLMX	%	110	111	112	109	107

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-91 TP18 0.1 11/10/2007 Soil	14317-94 TP18 1.0 11/10/2007 Soil	14317-97 TP19 0.1 11/10/2007 Soil	14317-102 TP19 1.7 11/10/2007 Soil	14317-103 TP20 0.1 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	109	112	108	109	115

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-105 TP20 0.5 11/10/2007 Soil	14317-109 QC3 - 11/10/2007 Soil	14317-110 QC4 - 11/10/2007 Soil
Date extracted	-	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	113	118	116

Total Phenolics in Soil						
Our Reference:	UNITS	14317-1	14317-7	14317-26	14317-31	14317-42
Your Reference	-----	TP1	TP2	TP5	TP6	TP8
Depth	-----	0.1	0.1	0.3	0.1	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Total Phenolics (as Phenol)	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0

Total Phenolics in Soil		
Our Reference:	UNITS	14317-87
Your Reference	-----	TP17
Depth	-----	0.1
Date Sampled		11/10/2007
Type of sample		Soil
Date extracted	-	12/10/2007
Date analysed	-	15/10/2007
Total Phenolics (as Phenol)	mg/kg	<5.0

Acid Extractable metals in soil						
Our Reference:	UNITS	14317-1	14317-4	14317-7	14317-11	14317-13
Your Reference	-----	TP1	TP1	TP2	TP2	TP3
Depth	-----	0.1	1.0	0.1	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arsenic	mg/kg	<4.0	11	4.0	<4.0	8.6
Cadmium	mg/kg	<1.0	<1.0	3.3	<1.0	1.4
Chromium	mg/kg	26	17	140	2.3	66
Copper	mg/kg	73	27	1,200	12	900
Lead	mg/kg	6.7	25	670	230	310
Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	170	8.1	140	1.7	33
Zinc	mg/kg	76	32	5,400	53	2,500

Acid Extractable metals in soil						
Our Reference:	UNITS	14317-14	14317-19	14317-26	14317-29	14317-31
Your Reference	-----	TP3	TP4	TP5	TP5	TP6
Depth	-----	0.3	0.1	0.3	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arsenic	mg/kg	4.8	5.9	7.9	8.3	4.7
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	37	50	22	12	13
Copper	mg/kg	390	210	45	21	75
Lead	mg/kg	160	140	62	17	98
Mercury	mg/kg	<0.10	<0.10	0.18	<0.10	<0.10
Nickel	mg/kg	28	68	13	5.8	11
Zinc	mg/kg	1,000	550	130	15	96

Acid Extractable metals in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-33 TP6 0.5 10/10/2007 Soil	14317-36 TP7 0.1 10/10/2007 Soil	14317-42 TP8 0.1 10/10/2007 Soil	14317-44 TP9 0.1 10/10/2007 Soil	14317-46 TP9 0.5 10/10/2007 Soil
Date digested	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arsenic	mg/kg	12	7.2	14	7.7	9.0
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	18	21	11	15	23
Copper	mg/kg	26	57	26	44	77
Lead	mg/kg	34	46	31	52	150
Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	10	61	13	11	9.8
Zinc	mg/kg	110	170	84	170	260

Acid Extractable metals in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-48 TP10 0.3 10/10/2007 Soil	14317-53 TP11 0.1 10/10/2007 Soil	14317-58 TP11 2.0 10/10/2007 Soil	14317-59 TP12 0.1 10/10/2007 Soil	14317-62 TP12 1.0 10/10/2007 Soil
Date digested	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arsenic	mg/kg	<4.0	8.0	4.8	6.9	7.6
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	10	11	9.9	18	20
Copper	mg/kg	10	27	23	29	21
Lead	mg/kg	26	33	10	97	19
Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	2.1	12	15	16	9.1
Zinc	mg/kg	27	63	68	74	36

Acid Extractable metals in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-65 TP13 0.1 10/10/2007 Soil	14317-67 TP13 0.5 10/10/2007 Soil	14317-71 TP14 0.1 10/10/2007 Soil	14317-74 TP14 1.0 10/10/2007 Soil	14317-76 TP15 0.1 11/10/2007 Soil
Date digested	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arsenic	mg/kg	15	<4.0	4.4	<4.0	5.8
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	31	10	120	7.7	24
Copper	mg/kg	89	27	120	16	45
Lead	mg/kg	73	25	58	7.5	63
Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	16	13	92	5.8	34
Zinc	mg/kg	120	81	330	36	130

Acid Extractable metals in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-81 TP15 2.0 11/10/2007 Soil	14317-82 TP16 0.1 11/10/2007 Soil	14317-86 TP16 1.5 11/10/2007 Soil	14317-87 TP17 0.1 11/10/2007 Soil	14317-89 TP17 0.5 11/10/2007 Soil
Date digested	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arsenic	mg/kg	24	6.4	<4.0	5.4	6.4
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	11	19	15	31	15
Copper	mg/kg	48	71	45	25	44
Lead	mg/kg	22	25	19	78	26
Mercury	mg/kg	0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	36	53	28	15	24
Zinc	mg/kg	130	460	110	92	100

Acid Extractable metals in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-91 TP18 0.1 11/10/2007 Soil	14317-94 TP18 1.0 11/10/2007 Soil	14317-97 TP19 0.1 11/10/2007 Soil	14317-102 TP19 1.7 11/10/2007 Soil	14317-103 TP20 0.1 11/10/2007 Soil
Date digested	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arsenic	mg/kg	10	8.8	5.9	<4.0	10
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	38	16	14	10	25
Copper	mg/kg	27	13	11	56	70
Lead	mg/kg	75	15	40	18	38
Mercury	mg/kg	<0.10	<0.10	<0.10	0.12	<0.10
Nickel	mg/kg	11	3.0	4.7	17	3.2
Zinc	mg/kg	130	9.8	29	88	82

Acid Extractable metals in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-105 TP20 0.5 11/10/2007 Soil	14317-109 QC3 - 11/10/2007 Soil	14317-110 QC4 - 11/10/2007 Soil
Date digested	-	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007
Arsenic	mg/kg	7.6	<4.0	9.8
Cadmium	mg/kg	<1.0	<1.0	<1.0
Chromium	mg/kg	20	11	21
Copper	mg/kg	45	14	12
Lead	mg/kg	36	56	18
Mercury	mg/kg	<0.10	<0.10	<0.10
Nickel	mg/kg	6.5	4.2	3.3
Zinc	mg/kg	50	25	8.9

Moisture						
Our Reference:	UNITS	14317-1	14317-4	14317-7	14317-11	14317-13
Your Reference	-----	TP1	TP1	TP2	TP2	TP3
Depth	-----	0.1	1.0	0.1	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Moisture	%	8.3	24	5.3	21	20

Moisture						
Our Reference:	UNITS	14317-14	14317-19	14317-26	14317-29	14317-31
Your Reference	-----	TP3	TP4	TP5	TP5	TP6
Depth	-----	0.3	0.1	0.3	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Moisture	%	30	30	14	23	11

Moisture						
Our Reference:	UNITS	14317-33	14317-36	14317-42	14317-44	14317-46
Your Reference	-----	TP6	TP7	TP8	TP9	TP9
Depth	-----	0.5	0.1	0.1	0.1	0.5
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Moisture	%	19	17	21	24	33

Moisture						
Our Reference:	UNITS	14317-48	14317-53	14317-58	14317-59	14317-62
Your Reference	-----	TP10	TP11	TP11	TP12	TP12
Depth	-----	0.3	0.1	2.0	0.1	1.0
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Moisture	%	25	26	19	15	26

Moisture						
Our Reference:	UNITS	14317-65	14317-67	14317-71	14317-74	14317-76
Your Reference	-----	TP13	TP13	TP14	TP14	TP15
Depth	-----	0.1	0.5	0.1	1.0	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	11/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Moisture	%	22	18	15	22	11

Moisture						
Our Reference:	UNITS	14317-81	14317-82	14317-86	14317-87	14317-89
Your Reference	-----	TP15	TP16	TP16	TP17	TP17
Depth	-----	2.0	0.1	1.5	0.1	0.5
Date Sampled		11/10/2007	11/10/2007	11/10/2007	11/10/2007	11/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Moisture	%	11	13	10	10	10

Moisture						
Our Reference:	UNITS	14317-91	14317-94	14317-97	14317-102	14317-103
Your Reference	-----	TP18	TP18	TP19	TP19	TP20
Depth	-----	0.1	1.0	0.1	1.7	0.1
Date Sampled		11/10/2007	11/10/2007	11/10/2007	11/10/2007	11/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Moisture	%	8.6	18	9.3	9.6	10

Moisture				
Our Reference:	UNITS	14317-105	14317-109	14317-110
Your Reference	-----	TP20	QC3	QC4
Depth	-----	0.5	-	-
Date Sampled		11/10/2007	11/10/2007	11/10/2007
Type of sample		Soil	Soil	Soil
Date prepared	-	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007
Moisture	%	13	9.8	19

Asbestos ID - soils						
Our Reference:	UNITS	14317-1	14317-4	14317-7	14317-11	14317-13
Your Reference	-----	TP1	TP1	TP2	TP2	TP3
Depth	-----	0.1	1.0	0.1	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Sample Description	-	30g soil	30g soil	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	14317-14	14317-19	14317-26	14317-29	14317-31
Your Reference	-----	TP3	TP4	TP5	TP5	TP6
Depth	-----	0.3	0.1	0.3	1.5	0.1
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Sample Description	-	30g soil	30g soil	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	14317-33	14317-36	14317-42	14317-44	14317-46
Your Reference	-----	TP6	TP7	TP8	TP9	TP9
Depth	-----	0.5	0.1	0.1	0.1	0.5
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Sample Description	-	30g soil	30g soil	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	14317-48	14317-53	14317-58	14317-59	14317-62
Your Reference	-----	TP10	TP11	TP11	TP12	TP12
Depth	-----	0.3	0.1	2.0	0.1	1.0
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Sample Description	-	30g soil	30g soil	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-65 TP13 0.1 10/10/2007 Soil	14317-67 TP13 0.5 10/10/2007 Soil	14317-71 TP14 0.1 10/10/2007 Soil	14317-74 TP14 1.0 10/10/2007 Soil	14317-76 TP15 0.1 11/10/2007 Soil
Sample Description	-	30g soil	30g soil	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-81 TP15 2.0 11/10/2007 Soil	14317-82 TP16 0.1 11/10/2007 Soil	14317-86 TP16 1.5 11/10/2007 Soil	14317-87 TP17 0.1 11/10/2007 Soil	14317-89 TP17 0.5 11/10/2007 Soil
Sample Description	-	30g soil	30g soil	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-91 TP18 0.1 11/10/2007 Soil	14317-94 TP18 1.0 11/10/2007 Soil	14317-97 TP19 0.1 11/10/2007 Soil	14317-102 TP19 1.7 11/10/2007 Soil	14317-103 TP20 0.1 11/10/2007 Soil
Sample Description	-	30g soil	30g soil	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ----- -----	14317-105 TP20 0.5 11/10/2007 Soil	14317-109 QC3 - 11/10/2007 Soil	14317-110 QC4 - 11/10/2007 Soil
Sample Description	-	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

BTEX in Water			
Our Reference:	UNITS	14317-113	14317-114
Your Reference	-----	Trip Spike	Trip Blank
Depth	-----	-	-
Date Sampled		11/10/2007	11/10/2007
Type of sample		Water	Water
Date extracted	-	12/10/2007	12/10/2007
Date analysed	-	12/10/2007	12/10/2007
Benzene	µg/L	99%	<1.0
Toluene	µg/L	76%	<1.0
Ethylbenzene	µg/L	76%	<1.0
m+p-xylene	µg/L	94%	<2.0
o-xylene	µg/L	76%	<1.0
Surrogate Dibromofluoromethane	%	135	77
Surrogate toluene-d8	%	102	89
Surrogate 4-BFB	%	101	108

Method ID	Methodology Summary
<b>GC.14</b>	Soil samples extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
<b>GC.16</b>	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS.
<b>GC.3</b>	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
<b>GC.12</b>	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
<b>GC-5</b>	Soil samples are extracted with hexane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
<b>GC-6</b>	Soil samples are extracted with hexane/acetone and waters with dichloromethane and analysed by GC-ECD.
<b>LAB.30</b>	Total Phenolics - determined colorimetrically following distillation.
<b>Metals.20 ICP-AES</b>	Determination of various metals by ICP-AES.
<b>Metals.21 CV-AAS</b>	Determination of Mercury by Cold Vapour AAS.
<b>LAB.8</b>	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.
<b>ASB.1</b>	Qualitative identification of asbestos type fibres in bulk using Polarised Light Microscopy and Dispersion Staining Techniques.
<b>GC.13</b>	Water samples are analysed directly by purge and trap GC-MS.

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
VOC's in soil						Base II Duplicate II %RPD		
Date extracted	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
Date analysed	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
Dichlorodifluoromethane	mg/kg	10	GC.14	<10	14317-1	<10    <10	[NR]	[NR]
Chloromethane	mg/kg	10	GC.14	<10	14317-1	<10    <10	[NR]	[NR]
Vinyl Chloride	mg/kg	10	GC.14	<10	14317-1	<10    <10	[NR]	[NR]
Bromomethane	mg/kg	10	GC.14	<10	14317-1	<10    <10	[NR]	[NR]
Chloroethane	mg/kg	10	GC.14	<10	14317-1	<10    <10	[NR]	[NR]
Trichlorofluoromethane	mg/kg	10	GC.14	<10	14317-1	<10    <10	[NR]	[NR]
1,1-Dichloroethene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
trans-1,2-dichloroethene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,1-dichloroethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	LCS-1	80%
cis-1,2-dichloroethene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
bromochloromethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
chloroform	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	LCS-1	84%
2,2-dichloropropane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,2-dichloroethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	LCS-1	99%
1,1,1-trichloroethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	LCS-1	74%
1,1-dichloropropene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
carbon tetrachloride	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
Benzene	mg/kg	0.5	GC.14	<0.5	14317-1	<0.5    <0.5	[NR]	[NR]
dibromomethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,2-dichloropropane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
trichloroethene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	LCS-1	100%
bromodichloromethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	LCS-1	99%
trans-1,3-dichloropropene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
Toluene	mg/kg	0.5	GC.14	<0.5	14317-1	<0.5    <0.5	[NR]	[NR]
1,3-dichloropropane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
dibromochloromethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	LCS-1	114%
1,2-dibromoethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
tetrachloroethene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	LCS-1	97%
1,1,1,2-tetrachloroethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
chlorobenzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
Ethylbenzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
bromoform	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
m + p-Xylene	mg/kg	2	GC.14	<2.0	14317-1	<2.0    <2.0	[NR]	[NR]
styrene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
VOC's in soil						Base II Duplicate II %RPD		
o-Xylene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,2,3-trichloropropane*	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
isopropylbenzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
bromobenzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
n-propyl benzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
2-chlorotoluene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
4-chlorotoluene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
tert-butyl benzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
sec-butyl benzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
4-isopropyl toluene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
n-butyl benzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,2,4-trichlorobenzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
napthalene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
hexachlorobutadiene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	[NR]	[NR]
Surrogate Dibromofluorometha	%		GC.14	79	14317-1	99    100    RPD: 1	LCS-1	88%
Surrogate aaa-Trifluorotoluene	%		GC.14	83	14317-1	80    80    RPD: 0	LCS-1	95%
Surrogate Toluene-d8	%		GC.14	84	14317-1	83    89    RPD: 7	LCS-1	93%
Surrogate 4-Bromofluorobenzene	%		GC.14	66	14317-1	66    65    RPD: 2	LCS-1	71%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
<b>vTPH &amp; BTEX in Soil</b>						<b>Base II Duplicate II %RPD</b>		
Date extracted	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
Date analysed	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	25	GC.16	<25	14317-1	<25    <25	LCS-1	72%
Benzene	mg/kg	0.5	GC.14	<0.5	14317-1	<0.5    <0.5	LCS-1	96%
Toluene	mg/kg	0.5	GC.14	<0.5	14317-1	<0.5    <0.5	LCS-1	82%
Ethylbenzene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	LCS-1	74%
m + p-Xylene	mg/kg	2	GC.14	<2.0	14317-1	<2.0    <2.0	LCS-1	78%
o-Xylene	mg/kg	1	GC.14	<1.0	14317-1	<1.0    <1.0	LCS-1	73%
Surrogate aaa-Trifluorotoluene	%		GC.14	83	14317-1	80    80    RPD: 0	LCS-1	88%
<b>sTPH in Soil (C10-C36)</b>						<b>Base II Duplicate II %RPD</b>		
Date extracted	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
Date analysed	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
TPH C <sub>10</sub> - C <sub>14</sub>	mg/kg	50	GC.3	<50	14317-1	<50    <50	LCS-1	93%
TPH C <sub>15</sub> - C <sub>28</sub>	mg/kg	100	GC.3	<100	14317-1	4400    3700    RPD: 17	LCS-1	86%
TPH C <sub>29</sub> - C <sub>36</sub>	mg/kg	100	GC.3	<100	14317-1	4100    4400    RPD: 7	LCS-1	90%
Surrogate o-Terphenyl	%		GC.3	108	14317-1	#    #	LCS-1	116%
<b>PAHs in Soil</b>						<b>Base II Duplicate II %RPD</b>		
Date extracted	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
Date analysed	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
Naphthalene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	LCS-1	80%
Acenaphthylene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	LCS-1	84%
Phenanthrene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	LCS-1	82%
Anthracene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	GC.12	<0.1	14317-1	0.1    0.1    RPD: 0	LCS-1	83%
Pyrene	mg/kg	0.1	GC.12	<0.1	14317-1	0.2    0.2    RPD: 0	LCS-1	85%
Benzo(a)anthracene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	LCS-1	106%
Benzo(b,k)fluoranthene	mg/kg	0.2	GC.12	<0.2	14317-1	<0.2    <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	GC.12	<0.05	14317-1	0.08    0.07    RPD: 13	LCS-1	92%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Benzo(g,h,i)perylene	mg/kg	0.1	GC.12	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		GC.12	126	14317-1	113    117    RPD: 3	LCS-1	119%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organochlorine Pesticides in soil						Base II Duplicate II %RPD		
Date extracted	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
Date analysed	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
HCB	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	LCS-1	117%
gamma-BHC	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	LCS-1	126%
Heptachlor	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	LCS-1	112%
delta-BHC	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	LCS-1	111%
Heptachlor Epoxide	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	LCS-1	113%
gamma-Chlordane	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	LCS-1	129%
Dieldrin	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	LCS-1	125%
Endrin	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	LCS-1	138%
pp-DDD	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	LCS-1	125%
Endosulfan II	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	LCS-1	137%
Methoxychlor	mg/kg	0.1	GC-5	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Surrogate TCLMX	%		GC-5	111	14317-1	102    103    RPD: 1	LCS-1	112%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
<b>PCBs in Soil</b>						<b>Base II Duplicate II %RPD</b>		
Date extracted	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
Date analysed	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-1	15/10/07%
Arochlor 1016	mg/kg	0.1	GC-6	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	GC-6	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	GC-6	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	GC-6	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	GC-6	<0.1	14317-1	<0.1    <0.1	LCS-1	104%
Arochlor 1260	mg/kg	0.1	GC-6	<0.1	14317-1	<0.1    <0.1	[NR]	[NR]
Surrogate TCLMX	%		GC-6	111	14317-1	102    103    RPD: 1	LCS-1	78%
<b>QUALITY CONTROL</b>	<b>UNITS</b>	<b>PQL</b>	<b>METHOD</b>	<b>Blank</b>	<b>Duplicate Sm#</b>	<b>Duplicate results</b>	<b>Spike Sm#</b>	<b>Spike % Recovery</b>
<b>Total Phenolics in Soil</b>						<b>Base II Duplicate II %RPD</b>		
Date extracted	-			12/10/07	[NT]	[NT]	LCS-1	15/10/07%
Date analysed	-			15/10/07	[NT]	[NT]	LCS-1	15/10/07%
Total Phenolics (as Phenol)	mg/kg	5	LAB.30	<5.0	[NT]	[NT]	LCS-1	76%
<b>QUALITY CONTROL</b>	<b>UNITS</b>	<b>PQL</b>	<b>METHOD</b>	<b>Blank</b>	<b>Duplicate Sm#</b>	<b>Duplicate results</b>	<b>Spike Sm#</b>	<b>Spike % Recovery</b>
<b>Acid Extractable metals in soil</b>						<b>Base II Duplicate II %RPD</b>		
Date digested	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-3	15/10/07%
Date analysed	-			15/10/07	14317-1	15/10/2007    15/10/2007	LCS-3	15/10/07%
Arsenic	mg/kg	4	Metals.20 ICP-AES	<4.0	14317-1	<4.0    <4.0	LCS-3	99%
Cadmium	mg/kg	1	Metals.20 ICP-AES	<1.0	14317-1	<1.0    <1.0	LCS-3	102%
Chromium	mg/kg	1	Metals.20 ICP-AES	<1.0	14317-1	26    29    RPD: 11	LCS-3	103%
Copper	mg/kg	1	Metals.20 ICP-AES	<1.0	14317-1	73    76    RPD: 4	LCS-3	103%
Lead	mg/kg	1	Metals.20 ICP-AES	<1.0	14317-1	6.7    7.7    RPD: 14	LCS-3	101%
Mercury	mg/kg	0.1	Metals.21 CV-AAS	<0.10	14317-1	<0.10    <0.10	LCS-3	105%
Nickel	mg/kg	1	Metals.20 ICP-AES	<1.0	14317-1	170    190    RPD: 11	LCS-3	102%
Zinc	mg/kg	1	Metals.20 ICP-AES	<1.0	14317-1	76    85    RPD: 11	LCS-3	101%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results		
<b>Moisture</b>						<b>Base    Duplicate    %RPD</b>		
Date prepared	-			15/10/07	14317-1	15/10/2007    15/10/2007		
Date analysed	-			15/10/07	14317-1	15/10/2007    15/10/2007		
Moisture	%	0.1	LAB.8	<0.10	14317-1	8.3    8.3    RPD: 0		
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
<b>BTEX in Water</b>						<b>Base    Duplicate    %RPD</b>		
Date extracted	-			12/10/07	[NT]	[NT]	LCS-W1	12/10/07%
Date analysed	-			12/10/07	[NT]	[NT]	LCS-W1	12/10/07%
Benzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	113%
Toluene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	86%
Ethylbenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	85%
m+p-xylene	µg/L	2	GC.13	<2.0	[NT]	[NT]	LCS-W1	83%
o-xylene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	85%
Surrogate	%		GC.13	90	[NT]	[NT]	LCS-W1	129%
Dibromofluoromethane								
Surrogate toluene-d8	%		GC.13	98	[NT]	[NT]	LCS-W1	104%
Surrogate 4-BFB	%		GC.13	97	[NT]	[NT]	LCS-W1	101%
QUALITY CONTROL	UNITS	Dup. Sm#		Duplicate		Spike Sm#	Spike % Recovery	
<b>VOC's in soil</b>				<b>Base + Duplicate + %RPD</b>				
Date extracted	-		[NT]	[NT]		14317-7	15/10/07%	
Date analysed	-		[NT]	[NT]		14317-7	15/10/07%	
Dichlorodifluoromethane	mg/kg		[NT]	[NT]		[NR]	[NR]	
Chloromethane	mg/kg		[NT]	[NT]		[NR]	[NR]	
Vinyl Chloride	mg/kg		[NT]	[NT]		[NR]	[NR]	
Bromomethane	mg/kg		[NT]	[NT]		[NR]	[NR]	
Chloroethane	mg/kg		[NT]	[NT]		[NR]	[NR]	
Trichlorofluoromethane	mg/kg		[NT]	[NT]		[NR]	[NR]	
1,1-Dichloroethene	mg/kg		[NT]	[NT]		[NR]	[NR]	
trans-1,2-dichloroethene	mg/kg		[NT]	[NT]		[NR]	[NR]	
1,1-dichloroethane	mg/kg		[NT]	[NT]		14317-7	78%	
cis-1,2-dichloroethene	mg/kg		[NT]	[NT]		[NR]	[NR]	
bromochloromethane	mg/kg		[NT]	[NT]		[NR]	[NR]	
chloroform	mg/kg		[NT]	[NT]		14317-7	86%	
2,2-dichloropropane	mg/kg		[NT]	[NT]		[NR]	[NR]	
1,2-dichloroethane	mg/kg		[NT]	[NT]		14317-7	96%	
1,1,1-trichloroethane	mg/kg		[NT]	[NT]		14317-7	72%	
1,1-dichloropropene	mg/kg		[NT]	[NT]		[NR]	[NR]	
carbon tetrachloride	mg/kg		[NT]	[NT]		[NR]	[NR]	

QUALITY CONTROL VOC's in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
dibromomethane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
trichloroethene	mg/kg	[NT]	[NT]	14317-7	93%
bromodichloromethane	mg/kg	[NT]	[NT]	14317-7	90%
trans-1,3-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Toluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
dibromochloromethane	mg/kg	[NT]	[NT]	14317-7	108%
1,2-dibromoethane	mg/kg	[NT]	[NT]	[NR]	[NR]
tetrachloroethene	mg/kg	[NT]	[NT]	14317-7	91%
1,1,1,2-tetrachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
chlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromoform	mg/kg	[NT]	[NT]	[NR]	[NR]
m + p-Xylene	mg/kg	[NT]	[NT]	[NR]	[NR]
styrene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
o-Xylene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,3-trichloropropane*	mg/kg	[NT]	[NT]	[NR]	[NR]
isopropylbenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	mg/kg	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
tert-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
sec-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
e					
1,2,4-trichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
naphthalene	mg/kg	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL VOC's in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
hexachlorobutadiene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
<i>Surrogate</i> Dibromofluorometha	%	[NT]	[NT]	14317-7	96%
<i>Surrogate</i> aaa-Trifluorotoluene	%	[NT]	[NT]	14317-7	96%
<i>Surrogate</i> Toluene-d8	%	[NT]	[NT]	14317-7	90%
<i>Surrogate</i> 4-Bromofluorobenzene	%	[NT]	[NT]	14317-7	68%
QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-33	15/10/2007    15/10/2007	14317-7	15/10/07%
Date analysed	-	14317-33	15/10/2007    15/10/2007	14317-7	15/10/07%
vTPH C6 - C9	mg/kg	14317-33	<25    <25	14317-7	74%
Benzene	mg/kg	14317-33	<0.5    <0.5	14317-7	96%
Toluene	mg/kg	14317-33	<0.5    <0.5	14317-7	85%
Ethylbenzene	mg/kg	14317-33	<1.0    <1.0	14317-7	72%
m + p-Xylene	mg/kg	14317-33	<2.0    <2.0	14317-7	80%
o-Xylene	mg/kg	14317-33	<1.0    <1.0	14317-7	76%
<i>Surrogate</i> aaa-Trifluorotoluene	%	14317-33	78    71    RPD: 9	14317-7	102%
QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-33	15/10/2007    15/10/2007	14317-7	15/10/07%
Date analysed	-	14317-33	15/10/2007    15/10/2007	14317-7	15/10/07%
TPH C10 - C14	mg/kg	14317-33	980    1200    RPD: 20	14317-7	95%
TPH C15 - C28	mg/kg	14317-33	3300    4000    RPD: 19	14317-7	140%
TPH C29 - C36	mg/kg	14317-33	<100    <100	14317-7	#
<i>Surrogate</i> o-Terphenyl	%	14317-33	#    #	14317-7	125%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-33	15/10/2007    15/10/2007	14317-7	15/10/07%
Date analysed	-	14317-33	15/10/2007    15/10/2007	14317-7	18/10/07%
Naphthalene	mg/kg	14317-33	<1    <1	14317-7	70%
Acenaphthylene	mg/kg	14317-33	<1    <1	[NR]	[NR]
Acenaphthene	mg/kg	14317-33	<1    <1	[NR]	[NR]
Fluorene	mg/kg	14317-33	2.0    2.2    RPD: 10	14317-7	122%
Phenanthrene	mg/kg	14317-33	1.8    2.0    RPD: 11	14317-7	70%
Anthracene	mg/kg	14317-33	<1    <1	[NR]	[NR]
Fluoranthene	mg/kg	14317-33	<1    <1	14317-7	#

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	14317-33	<1    <1	14317-7	73%
Benzo(a)anthracene	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Chrysene	mg/kg	14317-33	<0.1    <0.1	14317-7	87%
Benzo(b,k)fluoranthene	mg/kg	14317-33	<0.2    <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	14317-33	<0.05    <0.05	14317-7	136%
Indeno(1,2,3-c,d)pyrene	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	14317-33	116    114    RPD: 2	14317-7	125%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-33	15/10/2007    15/10/2007	14317-7	15/10/07%
Date analysed	-	14317-33	15/10/2007    15/10/2007	14317-7	15/10/07%
HCB	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
alpha-BHC	mg/kg	14317-33	<0.1    <0.1	14317-7	102%
gamma-BHC	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
beta-BHC	mg/kg	14317-33	<0.1    <0.1	14317-7	109%
Heptachlor	mg/kg	14317-33	<0.1    <0.1	14317-7	97%
delta-BHC	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Aldrin	mg/kg	14317-33	<0.1    <0.1	14317-7	97%
Heptachlor Epoxide	mg/kg	14317-33	<0.1    <0.1	14317-7	98%
gamma-Chlordane	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Endosulfan I	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
pp-DDE	mg/kg	14317-33	<0.1    <0.1	14317-7	112%
Dieldrin	mg/kg	14317-33	<0.1    <0.1	14317-7	109%
Endrin	mg/kg	14317-33	<0.1    <0.1	14317-7	119%
pp-DDD	mg/kg	14317-33	<0.1    <0.1	14317-7	107%
Endosulfan II	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
pp-DDT	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	14317-33	<0.1    <0.1	14317-7	111%
Methoxychlor	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Surrogate TCLMX	%	14317-33	101    95    RPD: 6	14317-7	104%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-33	15/10/2007    15/10/2007	14317-7	15/10/07%
Date analysed	-	14317-33	15/10/2007    15/10/2007	14317-7	15/10/07%
Arochlor 1016	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	14317-33	<0.1    <0.1	14317-7	116%
Arochlor 1260	mg/kg	14317-33	<0.1    <0.1	[NR]	[NR]
Surrogate TCLMX	%	14317-33	101    108    RPD: 7	14317-7	81%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	14317-33	15/10/2007    15/10/2007	14317-4	15/10/07%
Date analysed	-	14317-33	15/10/2007    15/10/2007	14317-4	15/10/07%
Arsenic	mg/kg	14317-33	12    12    RPD: 0	14317-4	102%
Cadmium	mg/kg	14317-33	<1.0    <1.0	14317-4	104%
Chromium	mg/kg	14317-33	18    24    RPD: 29	14317-4	109%
Copper	mg/kg	14317-33	26    21    RPD: 21	14317-4	116%
Lead	mg/kg	14317-33	34    40    RPD: 16	14317-4	99%
Mercury	mg/kg	14317-33	<0.10    <0.10	14317-4	100%
Nickel	mg/kg	14317-33	10    9.7    RPD: 3	14317-4	106%
Zinc	mg/kg	14317-33	110    97    RPD: 13	14317-4	109%
QUALITY CONTROL Moisture	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD		
Date prepared	-	14317-33	15/10/2007    15/10/2007		
Date analysed	-	14317-33	15/10/2007    15/10/2007		
Moisture	%	14317-33	19    19    RPD: 0		
QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-65	15/10/2007    15/10/2007	LCS-2	15/10/07%
Date analysed	-	14317-65	15/10/2007    15/10/2007	LCS-2	15/10/07%
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	14317-65	<25    <25	LCS-2	80%
Benzene	mg/kg	14317-65	<0.5    <0.5	LCS-2	113%
Toluene	mg/kg	14317-65	<0.5    <0.5	LCS-2	93%
Ethylbenzene	mg/kg	14317-65	<1.0    <1.0	LCS-2	88%
m + p-Xylene	mg/kg	14317-65	<2.0    <2.0	LCS-2	91%
o-Xylene	mg/kg	14317-65	<1.0    <1.0	LCS-2	87%
Surrogate aaa-Trifluorotoluene	%	14317-65	60    74    RPD: 21	LCS-2	90%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-65	15/10/2007    15/10/2007	LCS-2	15/10/07%
Date analysed	-	14317-65	15/10/2007    15/10/2007	LCS-2	15/10/07%
TPH C <sub>10</sub> - C <sub>14</sub>	mg/kg	14317-65	<50    <50	LCS-2	95%
TPH C <sub>15</sub> - C <sub>28</sub>	mg/kg	14317-65	<100    <100	LCS-2	103%
TPH C <sub>29</sub> - C <sub>36</sub>	mg/kg	14317-65	<100    <100	LCS-2	102%
Surrogate o-Terphenyl	%	14317-65	118    114    RPD: 3	LCS-2	115%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-65	15/10/2007    15/10/2007	LCS-2	15/10/07%
Date analysed	-	14317-65	16/10/2007    16/10/2007	LCS-2	15/10/07%
Naphthalene	mg/kg	14317-65	<0.1    <0.1	LCS-2	78%
Acenaphthylene	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Acenaphthene	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Fluorene	mg/kg	14317-65	<0.1    <0.1	LCS-2	84%
Phenanthrene	mg/kg	14317-65	0.2    0.1    RPD: 67	LCS-2	82%
Anthracene	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Fluoranthene	mg/kg	14317-65	0.4    0.4    RPD: 0	LCS-2	83%
Pyrene	mg/kg	14317-65	0.4    0.3    RPD: 29	LCS-2	86%
Benzo(a)anthracene	mg/kg	14317-65	0.2    0.3    RPD: 40	[NR]	[NR]
Chrysene	mg/kg	14317-65	0.3    0.4    RPD: 29	LCS-2	103%
Benzo(b,k)fluoranthene	mg/kg	14317-65	0.8    0.9    RPD: 12	[NR]	[NR]
Benzo(a)pyrene	mg/kg	14317-65	0.3    0.3    RPD: 0	LCS-2	93%
Indeno(1,2,3-c,d)pyrene	mg/kg	14317-65	0.4    0.4    RPD: 0	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	14317-65	0.4    0.4    RPD: 0	[NR]	[NR]
Surrogate p-Terphenyl-d <sub>14</sub>	%	14317-65	113    113    RPD: 0	LCS-2	118%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-65	15/10/2007    15/10/2007	LCS-2	15/10/07%
Date analysed	-	14317-65	15/10/2007    15/10/2007	LCS-2	15/10/07%
HCB	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
alpha-BHC	mg/kg	14317-65	<0.1    <0.1	LCS-2	119%
gamma-BHC	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
beta-BHC	mg/kg	14317-65	<0.1    <0.1	LCS-2	129%
Heptachlor	mg/kg	14317-65	<0.1    <0.1	LCS-2	115%
delta-BHC	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Aldrin	mg/kg	14317-65	<0.1    <0.1	LCS-2	114%
Heptachlor Epoxide	mg/kg	14317-65	<0.1    <0.1	LCS-2	116%
gamma-Chlordane	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Endosulfan I	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
pp-DDE	mg/kg	14317-65	<0.1    <0.1	LCS-2	132%
Dieldrin	mg/kg	14317-65	<0.1    <0.1	LCS-2	128%
Endrin	mg/kg	14317-65	<0.1    <0.1	LCS-2	142%
pp-DDD	mg/kg	14317-65	0.4    0.2    RPD: 67	LCS-2	128%
Endosulfan II	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
pp-DDT	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	14317-65	<0.1    <0.1	LCS-2	141%
Methoxychlor	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Surrogate TCLMX	%	14317-65	111    110    RPD: 1	LCS-2	120%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-65	15/10/2007    15/10/2007	LCS-2	15/10/07%
Date analysed	-	14317-65	15/10/2007    15/10/2007	LCS-2	15/10/07%
Arochlor 1016	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	14317-65	<0.1    <0.1	LCS-2	115%
Arochlor 1260	mg/kg	14317-65	<0.1    <0.1	[NR]	[NR]
Surrogate TCLMX	%	14317-65	111    110    RPD: 1	LCS-2	82%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	14317-65	15/10/2007    15/10/2007	LCS-4	15/10/07%
Date analysed	-	14317-65	15/10/2007    15/10/2007	LCS-4	15/10/07%
Arsenic	mg/kg	14317-65	15    14    RPD: 7	LCS-4	105%
Cadmium	mg/kg	14317-65	<1.0    <1.0	LCS-4	109%
Chromium	mg/kg	14317-65	31    26    RPD: 18	LCS-4	109%
Copper	mg/kg	14317-65	89    77    RPD: 14	LCS-4	109%
Lead	mg/kg	14317-65	73    78    RPD: 7	LCS-4	107%
Mercury	mg/kg	14317-65	<0.10    <0.10	LCS-4	99%
Nickel	mg/kg	14317-65	16    20    RPD: 22	LCS-4	108%
Zinc	mg/kg	14317-65	120    120    RPD: 0	LCS-4	107%
QUALITY CONTROL Moisture	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD		
Date prepared	-	14317-65	15/10/2007    15/10/2007		
Date analysed	-	14317-65	15/10/2007    15/10/2007		
Moisture	%	14317-65	22    22    RPD: 0		
QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-91	15/10/2007    15/10/2007	14317-67	15/10/07%
Date analysed	-	14317-91	15/10/2007    15/10/2007	14317-67	15/10/07%
vTPH C <sub>6</sub> - C <sub>9</sub>	mg/kg	14317-91	<25    <25	14317-67	70%
Benzene	mg/kg	14317-91	<0.5    <0.5	14317-67	102%
Toluene	mg/kg	14317-91	<0.5    <0.5	14317-67	76%
Ethylbenzene	mg/kg	14317-91	<1.0    <1.0	14317-67	76%
m + p-Xylene	mg/kg	14317-91	<2.0    <2.0	14317-67	70%
o-Xylene	mg/kg	14317-91	<1.0    <1.0	14317-67	72%
Surrogate aaa-Trifluorotoluene	%	14317-91	82    83    RPD: 1	14317-67	75%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-91	15/10/2007    15/10/2007	14317-67	15/10/07%
Date analysed	-	14317-91	15/10/2007    15/10/2007	14317-67	15/10/07%
TPH C10 - C14	mg/kg	14317-91	<50    <50	14317-67	118%
TPH C15 - C28	mg/kg	14317-91	<100    <100	14317-67	119%
TPH C29 - C36	mg/kg	14317-91	<100    <100	14317-67	128%
Surrogate o-Terphenyl	%	14317-91	119    115    RPD: 3	14317-67	118%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-91	15/10/2007    15/10/2007	14317-67	15/10/07%
Date analysed	-	14317-91	16/10/2007    16/10/2007	14317-67	15/10/07%
Naphthalene	mg/kg	14317-91	<0.1    <0.1	14317-67	74%
Acenaphthylene	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Acenaphthene	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Fluorene	mg/kg	14317-91	<0.1    <0.1	14317-67	108%
Phenanthrene	mg/kg	14317-91	0.8    0.6    RPD: 29	14317-67	#
Anthracene	mg/kg	14317-91	0.1    <0.1	[NR]	[NR]
Fluoranthene	mg/kg	14317-91	1.1    1.0    RPD: 10	14317-67	#
Pyrene	mg/kg	14317-91	1.0    0.9    RPD: 11	14317-67	#
Benzo(a)anthracene	mg/kg	14317-91	0.3    0.3    RPD: 0	[NR]	[NR]
Chrysene	mg/kg	14317-91	0.4    0.4    RPD: 0	14317-67	79%
Benzo(b,k)fluoranthene	mg/kg	14317-91	0.7    0.6    RPD: 15	[NR]	[NR]
Benzo(a)pyrene	mg/kg	14317-91	0.4    0.4    RPD: 0	14317-67	123%
Indeno(1,2,3-c,d)pyrene	mg/kg	14317-91	0.3    0.3    RPD: 0	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	14317-91	0.3    0.3    RPD: 0	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	14317-91	118    119    RPD: 1	14317-67	113%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-91	15/10/2007    15/10/2007	14317-67	15/10/07%
Date analysed	-	14317-91	15/10/2007    15/10/2007	14317-67	15/10/07%
HCB	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
alpha-BHC	mg/kg	14317-91	<0.1    <0.1	14317-67	114%
gamma-BHC	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
beta-BHC	mg/kg	14317-91	<0.1    <0.1	14317-67	123%
Heptachlor	mg/kg	14317-91	<0.1    <0.1	14317-67	105%
delta-BHC	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Aldrin	mg/kg	14317-91	<0.1    <0.1	14317-67	108%
Heptachlor Epoxide	mg/kg	14317-91	<0.1    <0.1	14317-67	109%
gamma-Chlordane	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Endosulfan I	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
pp-DDE	mg/kg	14317-91	0.2    0.2    RPD: 0	14317-67	125%
Dieldrin	mg/kg	14317-91	<0.1    <0.1	14317-67	121%
Endrin	mg/kg	14317-91	<0.1    <0.1	14317-67	131%
pp-DDD	mg/kg	14317-91	<0.1    <0.1	14317-67	119%
Endosulfan II	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
pp-DDT	mg/kg	14317-91	0.2    0.3    RPD: 40	[NR]	[NR]
Endrin Aldehyde	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	14317-91	<0.1    <0.1	14317-67	127%
Methoxychlor	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Surrogate TCLMX	%	14317-91	109    108    RPD: 1	14317-67	112%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	14317-91	15/10/2007    15/10/2007	14317-67	15/10/07%
Date analysed	-	14317-91	15/10/2007    15/10/2007	14317-67	15/10/07%
Arochlor 1016	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	14317-91	<0.1    <0.1	14317-67	105%
Arochlor 1260	mg/kg	14317-91	<0.1    <0.1	[NR]	[NR]
Surrogate TCLMX	%	14317-91	109    108    RPD: 1	14317-67	74%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	14317-91	15/10/2007    15/10/2007	14317-67	14/10/07%
Date analysed	-	14317-91	15/10/2007    15/10/2007	14317-67	14/10/07%
Arsenic	mg/kg	14317-91	10    9.6    RPD: 4	14317-67	105%
Cadmium	mg/kg	14317-91	<1.0    <1.0	14317-67	105%
Chromium	mg/kg	14317-91	38    30    RPD: 24	14317-67	111%
Copper	mg/kg	14317-91	27    31    RPD: 14	14317-67	106%
Lead	mg/kg	14317-91	75    68    RPD: 10	14317-67	99%
Mercury	mg/kg	14317-91	<0.10    <0.10	14317-67	102%
Nickel	mg/kg	14317-91	11    14    RPD: 24	14317-67	107%
Zinc	mg/kg	14317-91	130    130    RPD: 0	14317-67	104%
QUALITY CONTROL Moisture	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD		
Date prepared	-	14317-91	15/10/2007    15/10/2007		
Date analysed	-	14317-91	15/10/2007    15/10/2007		
Moisture	%	14317-91	8.6    8.6    RPD: 0		

**Report Comments:**

Asbestos: A portion of the supplied sample was sub-sampled for asbestos according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sub-sample. Envirolab recommends supplying 30-40g of sample in it's own container.

Total Petroleum Hydrocarbons in soil:# Percent recovery not available due to significant background levels of analyte in the sample.

PAH's in soil: # due to sample matrix interference, and PQL raised for some of samples due to sample matrix interference.

OC/PCB's in Soil: PQL raised due to sample matrix.

Asbestos analysed by: Joshua Lim

INS: Insufficient sample for this test

NT: Not tested

PQL: Practical Quantitation Limit

RPD: Relative Percent Difference

NA: Test not required

LCS: Laboratory Control Sample

NR: Not requested

<: Less than

>: Greater than

**Quality Control Definitions**

**Blank:** This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

**Duplicate:** This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

**Matrix Spike:** A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

**LCS (Laboratory Control Sample):** This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

**Surrogate Spike:** Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

**Laboratory Acceptance Criteria:**

Duplicates: <5xPQL - any RPD is acceptable;

>5xPQL - 0-50% RPD is acceptable.

Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for

SVOC and speciated phenols is acceptable.

Surrogates: Generally 60-140% is acceptable.

**Aileen Hie**

---

**From:** Jacinta Hurst  
**Sent:** Wednesday, 17 October 2007 9:33 AM  
**To:** Aileen Hie  
**Subject:** FW: Additional Analysis

Envirolab Ref: 14317 A  
Due: Fri 19/10/07  
48hr TIA.

Regards

**Jacinta Hurst**  
Envirolab Services Pty Ltd  
54 Frenchs Rd Willoughby NSW 2068  
ph 02 9958 5801 mob 0407 003 037  
fax 02 9958 5803

---

**From:** Greg Bartlett [mailto:GBartlett@JBSGroup.com.au]  
**Sent:** Wednesday, 17 October 2007 09:27  
**To:** Jacinta Hurst  
**Subject:** Additional Analysis

Hi Jacinta,

As per our phone conversation, could I please have some additional samples analysed on 48 hour TAT for our Job # 40414 (your Ref# 14317). Could you please analyse samples:

- 3 TP1/0.5 for TPH C10-C36,
- 15 TP3/0.5 for PAHs,
- 21 TP5/0.5 for PAHs,
- 34 TP6/1.0 for TPH C10-C36, and
- 38 TP7/0.5 for TPH C10-C36.

Thank you

Greg Bartlett  
Environmental Scientist  
JBS Environmental Pty Ltd  
Ph: 02 8338 1011  
Fax: 02 8338 1700  
M: 0439 994 599  
www.jbsgroup.com.au



## EnviroLab Services Pty Ltd

ABN 37 112 535 645

54 Frenchs Rd Willoughby NSW 2068

ph 02 9958 5801 fax 02 9958 5803

email: tnotaras@envirolabservices.com.au

### CERTIFICATE OF ANALYSIS 14317-A

**Client:**

**JBS Environmental**

P.O. Box 940

MASCOT

NSW 1460

**Attention:** Greg Bartlett

**Sample log in details:**

Your Reference:

**40414, Tung Hui Chung & Tung Hong Chung**

No. of samples:

Additional Testing on 5 Soils

Date samples received:

12/10/07

Date completed instructions received:

17/10/07

**Analysis Details:**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

***Please refer to the last page of this report for any comments relating to the results.***

**Report Details:**

Date results requested by:

19/10/07

Date of Preliminary Report:

Not Issued

Issue Date:

19/10/07

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Accredited for compliance with ISO/IEC 17025.

**Tests not covered by NATA are denoted with \*.**

**Results Approved By:**

Tania Notaras  
Manager

EnviroLab Reference: 14317-A  
Revision No: R 00



sTPH in Soil (C10-C36)		14317-A-3	14317-A-34	14317-A-38
Our Reference:	UNITS	14317-A-3	14317-A-34	14317-A-38
Your Reference	-----	TP1	TP6	TP7
Depth	-----	0.5	1.0	0.5
Date Sampled		10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil
Date extracted	-	18/10/2007	18/10/2007	18/10/2007
Date analysed	-	19/10/2007	19/10/2007	19/10/2007
TPH C <sub>10</sub> - C <sub>14</sub>	mg/kg	<50	210	<50
TPH C <sub>15</sub> - C <sub>28</sub>	mg/kg	110	610	410
TPH C <sub>29</sub> - C <sub>36</sub>	mg/kg	<100	<100	1,600
Surrogate o-Terphenyl	%	106	#	104

PAHs in Soil			
Our Reference:	UNITS	14317-A-15	14317-A-27
Your Reference	-----	TP3	TP5
Depth	-----	0.5	0.5
Date Sampled		10/10/2007	10/10/2007
Type of sample		Soil	Soil
Date extracted	-	17/10/2007	17/10/2007
Date analysed	-	17/10/2007	17/10/2007
Naphthalene	mg/kg	<0.1	0.2
Acenaphthylene	mg/kg	<0.1	0.2
Acenaphthene	mg/kg	<0.1	0.1
Fluorene	mg/kg	<0.1	0.4
Phenanthrene	mg/kg	0.3	4.9
Anthracene	mg/kg	<0.1	0.7
Fluoranthene	mg/kg	0.5	7.4
Pyrene	mg/kg	0.5	6.5
Benzo(a)anthracene	mg/kg	0.2	2.0
Chrysene	mg/kg	0.2	2.3
Benzo(b,k)fluoranthene	mg/kg	0.4	4.2
Benzo(a)pyrene	mg/kg	0.3	2.6
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	1.9
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	1.7
Surrogate p-Terphenyl-d14	%	122	123

Moisture						
Our Reference:	UNITS	14317-A-3	14317-A-15	14317-A-27	14317-A-34	14317-A-38
Your Reference	-----	TP1	TP3	TP5	TP6	TP7
Depth	-----	0.5	0.5	0.5	1.0	0.5
Date Sampled		10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	18/10/2007	18/10/2007	18/10/2007	18/10/2007	18/10/2007
Date analysed	-	18/10/2007	18/10/2007	18/10/2007	18/10/2007	18/10/2007
Moisture	%	21	16	17	19	23

Method ID	Methodology Summary
<b>GC.3</b>	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
<b>GC.12</b>	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
<b>LAB.8</b>	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
sTPH in Soil (C10-C36)						Base II Duplicate II %RPD		
Date extracted	-			18/10/07	[NT]	[NT]	LCS-6	18/10/07%
Date analysed	-			19/10/07	[NT]	[NT]	LCS-6	19/10/07%
TPH C10 - C14	mg/kg	50	GC.3	<50	[NT]	[NT]	LCS-6	87%
TPH C15 - C28	mg/kg	100	GC.3	<100	[NT]	[NT]	LCS-6	98%
TPH C29 - C36	mg/kg	100	GC.3	<100	[NT]	[NT]	LCS-6	102%
Surrogate o-Terphenyl	%		GC.3	106	[NT]	[NT]	LCS-6	102%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Date extracted	-			17/10/07	[NT]	[NT]	LCS-3	17/10/07%
Date analysed	-			17/10/07	[NT]	[NT]	LCS-3	17/10/07%
Naphthalene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	LCS-3	91%
Acenaphthylene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	LCS-3	101%
Phenanthrene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	LCS-3	110%
Anthracene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	LCS-3	113%
Pyrene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	LCS-3	115%
Benzo(a)anthracene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	LCS-3	110%
Benzo(b,k)fluoranthene	mg/kg	0.2	GC.12	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	GC.12	<0.05	[NT]	[NT]	LCS-3	111%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	GC.12	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		GC.12	118	[NT]	[NT]	LCS-3	113%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			18/10/0 7
Date analysed	-			18/10/0 7
Moisture	%	0.1	LAB.8	<0.10

**Report Comments:**

Total Petroleum Hydrocarbons in soil:# Percent recovery not available due to significant background levels of analyte in the sample.

Asbestos analysed by: Not applicable for this job

INS: Insufficient sample for this test

NT: Not tested

PQL: Practical Quantitation Limit

RPD: Relative Percent Difference

NA: Test not required

LCS: Laboratory Control Sample

NR: Not requested

<: Less than

>: Greater than

**Quality Control Definitions**

**Blank:** This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

**Duplicate:** This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

**Matrix Spike:** A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

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**Surrogate Spike:** Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

**Laboratory Acceptance Criteria:**

Duplicates: <5xPQL - any RPD is acceptable;

>5xPQL - 0-50% RPD is acceptable.

Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for

SVOC and speciated phenols is acceptable.

Surrogates: Generally 60-140% is acceptable.



CHAIN OF CUSTODY

PROJECT NO.: 140414  
 LABORATORY BATCH NO.:  
 PROJECT NAME: WORTHINGTON + THE HONG KONG  
 SAMPERS: GS  
 SEND REPORT TO: G. BENTON SEND INVOICE TO: A. WATKINS  
 PHONE: 02 8338 1700  
 EMAIL: gibson@jbsgroup.com.au  
 DATE NEEDED BY: 12/10/07 NEPI 1999 (✓)  
 QC LEVEL: 1

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:  
72W TAT PLEASE  
PLEASE FORWARD TO SES. THANK YOU.

SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	pH	NOTES
5A	SOIL	10/10/07		1 X 5 + ice		HOLD
3B		↓				↓
QC3A		11/10/07				
QC4A		↓				

RECEIVED BY: G. Benton DATE: 12/10/07  
 VAME: 559 DATE: 15/10  
 OF: JBS  
 NAME: G. Benton DATE: 12/10/07  
 NAME: JBS  
 DATE: 12/10/07  
 OF: JBS

FOR RECEIVING LAB USE ONLY:  
 COOLER SEAL - Yes..... No..... Intact..... Broken.....  
 COOLER TEMP ..... deg C  
 COOLER SEAL - Yes..... No..... Intact..... Broken.....  
 COOLER TEMP ..... deg C

Received 15/10/07  
 By SM  
 Time any Sat  
 Samples intact (yes/no)  
 Ice/Cooler Pack (yes/no)  
 Comments: 558/6

Container & Preservatives Contact P = Plastic; J = Seal Jar; B = Glass Bottle; N = Nitric Acid Presv; C = Sodium Hydroxide Presv; AC = Hydrochloric Acid Presv; Vial; VS = Sulphuric Acid Presv; Vial; S = Sulfate; NH Presv; Z = Zinc Presv; E = EDTA Presv; ST = Sterile bottle; O = Other

JBS Environmental Pty Ltd ABA 67 071 842 638  
 Phone: (02) 8338-1011  
 Fax: (02) 8338-1700  
 INISO Form 9013 - Chain of Custody

Suite 2, 595 Gardeners Road MASCOT NSW 2020  
 PO Box 940 MASCOT NSW 1460  
 www.jbsgroup.com.au



SGS Environmental Services  
Unit 16, 33 Maddox St. Alexandria NSW 2015  
Telephone Number : (+61 2) 8594 0400  
Fax Number : (+61 2) 8594 0499

### **SAMPLE RECEIPT CONFIRMATION**

COMPANY : JBS Environmental Pty Ltd FAX NO. : 02 8338 1700  
ATTENTION : Greg Bartlett PAGES : 1  
FROM : Sample Receipt DATE : 15/10/07

This is to confirm that samples for Project **40414, Tung Hui Chung/Tong Hong Chung** were received on **15/10/07** the results are expected to be ready on **18/10/2007**. Please quote SGS Reference: **55816** when making enquiries regarding this project. Please refer to below which details information about the integrity of the samples and other useful information.

Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples, unless otherwise instructed.

Samples received in good order:	YES
Samples received in correct containers:	YES
Samples received without headspace:	YES
Sufficient quantity supplied:	YES
Upon receipt sample temperature:	Cool
Cooling Method:	Ice Pack
Sample containers provided by:	Other Lab
Samples Clearly Labelled:	YES
Turnaround time requested:	72hr
Completed documentation received:	YES

Comments:

Terms and conditions are available from [www.au.sgs.com](http://www.au.sgs.com)

***The signed chain of custody will be returned to you with the original report.***

The contents of this facsimile (including attachments) are privileged and confidential. Any unauthorised use of the contents is expressly prohibited. If you have received the document in error, please advise by telephone (reverse charges) immediately then shred the document. Thank you.

18 October 2007

## TEST REPORT

### JBS Environmental Pty Ltd

PO Box 940  
MASCOT  
NSW 1460

Your Reference: 40414, Tung Hui Chung/Tong Hong Chung  
Report Number: 55816

**Attention:** Greg Bartlett

Dear Greg

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

Samples:	Qty.	4 Soils
Date of Receipt of Samples:		15/10/07
Date of Receipt of Instructions:		15/10/07
Date Preliminary Report Emailed:		Not Issued

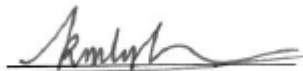
These samples were analysed in accordance with your written instructions.  
A copy of the instructions is attached with the analytical report.

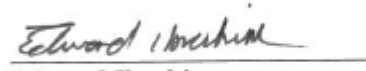
The results and associated quality control are contained in the following pages of this report.  
Unless otherwise stated, solid samples are expressed on a dry weight basis (moisture has been supplied for your information only), air and liquid samples as received.

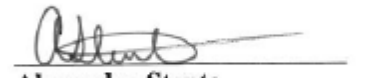
Should you have any queries regarding this report please contact the undersigned.

Yours faithfully

SGS ENVIRONMENTAL SERVICES

  
Ly Kim Ha  
Senior Organic Chemist

  
Edward Ibrahim  
Laboratory Services Manager

  
Alexandra Stenta  
Key Account Representative



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Page 1 of 14

BTEX in Soil			
Our Reference:	UNITS	55816-3	55816-4
Your Reference	-----	QC3A	QC4A
Sample Type	-----	Soil	Soil
Date Sampled		11/10/07	11/10/07
Benzene	mg/kg	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<0.5	<0.5
Total Xylenes	mg/kg	<1.5	<1.5
BTEX Surrogate (%)	%	87	106

TRH in soil with..C6-C9 by P/T Our Reference: Your Reference Sample Type Date Sampled	UNITS ----- -----	55816-3 QC3A Soil 11/10/07	55816-4 QC4A Soil 11/10/07
TRH C <sub>6</sub> - C <sub>9</sub> P&T	mg/kg	<20	<20
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	<20	<20
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	<50	<50
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	<50	<50

PAHs in Soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ----- -----	55816-3 QC3A Soil 11/10/07	55816-4 QC4A Soil 11/10/07
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	1.3	<0.1
Anthracene	mg/kg	0.2	<0.1
Fluoranthene	mg/kg	2.3	<0.1
Pyrene	mg/kg	2.1	<0.1
Benzo[a]anthracene	mg/kg	0.7	<0.1
Chrysene	mg/kg	0.7	<0.1
Benzo[b,k]fluoranthene	mg/kg	1.3	<0.2
Benzo[a]pyrene	mg/kg	0.89	<0.05
Indeno[123-cd]pyrene	mg/kg	0.6	<0.1
Dibenzo[ah]anthracene	mg/kg	<0.1	<0.1
Benzo[ghi]perylene	mg/kg	0.7	<0.1
Total PAHs	mg/kg	<11.29	<1.55
Nitrobenzene-d5	%	98	102
2-Fluorobiphenyl	%	94	96
<i>p</i> -Terphenyl- <i>d</i> 14	%	102	101

OC Pesticides in Soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ----- -----	55816-3 QC3A Soil 11/10/07	55816-4 QC4A Soil 11/10/07
HCB	mg/kg	<0.1	<0.1
<i>alpha</i> -BHC	mg/kg	<0.1	<0.1
gamma-BHC (Lindane)	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
<i>beta</i> -BHC	mg/kg	<0.1	<0.1
<i>delta</i> -BHC	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
<i>o,p</i> -DDE	mg/kg	<0.1	<0.1
<i>alpha</i> -Endosulfan	mg/kg	<0.1	<0.1
<i>trans</i> -Chlordane	mg/kg	<0.1	<0.1
<i>cis</i> -Chlordane	mg/kg	<0.1	<0.1
<i>trans</i> -Nonachlor	mg/kg	<0.1	<0.1
<i>p,p</i> -DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
<i>o,p</i> -DDD	mg/kg	<0.1	<0.1
<i>o,p</i> -DDT	mg/kg	<0.1	<0.1
<i>beta</i> -Endosulfan	mg/kg	<0.1	<0.1
<i>p,p</i> -DDD	mg/kg	<0.1	<0.1
<i>p,p</i> -DDT	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Endrin Ketone	mg/kg	<0.1	<0.1
2,4,5,6-Tetrachloro-m-xylene ( <i>Surrogate</i> )	%	117	119

PCBs in Soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ----- -----	55816-3 QC3A Soil 11/10/07	55816-4 QC4A Soil 11/10/07
Arochlor 1016	mg/kg	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1
Arochlor 1262	mg/kg	<0.1	<0.1
Arochlor 1268	mg/kg	<0.1	<0.1
Total Positive PCB	mg/kg	<0.90	<0.90
PCB_Surrogate 1	%	117	119

Acid Extractable Metals in Soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ----- -----	55816-3 QC3A Soil 11/10/07	55816-4 QC4A Soil 11/10/07
Arsenic	mg/kg	5	7
Cadmium	mg/kg	0.5	0.4
Chromium	mg/kg	13	19
Copper	mg/kg	10	11
Lead	mg/kg	38	13
Mercury	mg/kg	0.05	<0.05
Nickel	mg/kg	3.0	2.5
Zinc	mg/kg	28	9.4

Asbestos ID in soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ----- -----	55816-3 QC3A Soil 11/10/07	55816-4 QC4A Soil 11/10/07
Sample Description		43g Sand, Plant Matter	33g Clay
Asbestos ID in soil	-	No asbestos detected	No asbestos detected

Moisture			
Our Reference:	UNITS	55816-3	55816-4
Your Reference	-----	QC3A	QC4A
Sample Type	-----	Soil	Soil
Date Sampled		11/10/07	11/10/07
Moisture	%	12	19

Method ID	Methodology Summary
<b>SEO-018</b>	BTEX - Determination by purge and trap/ Gas Chromatography with MS Detection.
<b>SEO-017</b>	BTEX/TRH C6-C9 - Determination by Purge and Trap Gas Chromatography with Flame Ionisation Detection (FID) and Photo Ionisation Detection (PID). The surrogate spike used is aaa-trifluorotoluene.
<b>SEO-020</b>	TRH - Determination of Total Recoverable Hydrocarbons by gas chromatography following extraction with DCM/Acetone for solids and DCM for liquids.
<b>SEO-030</b>	PAHs by GC/MS - Determination of Polynuclear Aromatic Hydrocarbons (PAH's) by Gas Chromatography / Mass Spectrometry following extraction with dichloromethane or dichloromethane/acetone. The surrogate spike used is p-Terphenyl-d14.
<b>SEO-005</b>	OC/OP/PCB - Determination of a suite of Organchlorine Pesticides, Chlorinated Organo-phosphorus Pesticides and Polychlorinated Biphenyls (PCB's) by sonication extraction using dichloromethane for waters or acetone / hexane for soils followed by Gas Chromatographic separation with Electron Capture Detection (GC/ECD). The surrogate spike used is 2,4,5,6-Tetrachloro-m-xylene.
<b>SEM-010</b>	Metals - Determination of various metals by ICP-AES following aqua regia digest.
<b>SEM-005</b>	Mercury - Determination of Mercury by Cold Vapour Generation Atomic Absorption Spectroscopy.
<b>AN602</b>	Qualitative identification of asbestos type fibres in bulk using Polarised Light Microscopy and Dispersion Staining Techniques. Accreditation does not cover the identification of Synthetic Mineral Fibre.
<b>AN002</b>	Preparation of soils, sediments and sludges undergo analysis by either air drying, compositing, subsampling and 1:5 soil water extraction where required. Moisture content is determined by drying the sample at 105 ± 5°C.

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
BTEX in Soil								
Benzene	mg/kg	0.5	SEO-018	<0.5	55816-3	<0.5    <0.5	55816-4	82%
Toluene	mg/kg	0.5	SEO-018	<0.5	55816-3	<0.5    <0.5	55816-4	84%
Ethylbenzene	mg/kg	0.5	SEO-018	<0.5	55816-3	<0.5    <0.5	55816-4	84%
Total Xylenes	mg/kg	1.5	SEO-018	<1.5	55816-3	<1.5    <1.5	55816-4	87%
BTEX Surrogate (%)	%	0	SEO-018	110	55816-3	87    98    RPD: 12	55816-4	97%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
TRH in soil with..C6-C9 by P/T								
TRH C <sub>6</sub> - C <sub>9</sub> P&T	mg/kg	20	SEO-017	<20	55816-3	<20    <20	55816-4	98%
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	20	SEO-020	<20	55816-3	<20    [N/T]	[NR]	[NR]
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	50	SEO-020	<50	55816-3	<50    [N/T]	[NR]	[NR]
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	50	SEO-020	<50	55816-3	<50    [N/T]	[NR]	[NR]
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
PAHs in Soil								
Naphthalene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	LCS	92%
Acenaphthylene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	LCS	88%
Acenaphthene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	LCS	117%
Fluorene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	[NR]	[NR]
Phenanthrene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	LCS	99%
Anthracene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	LCS	102%
Fluoranthene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	LCS	99%
Pyrene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	LCS	102%
Benzo[a]anthracene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo[b,k]fluoranthene	mg/kg	0.2	SEO-030	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo[a]pyrene	mg/kg	0.05	SEO-030	<0.05	[NT]	[NT]	LCS	106%
Indeno[123-cd]pyrene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo[ah]anthracene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo[ghi]perylene	mg/kg	0.1	SEO-030	<0.1	[NT]	[NT]	[NR]	[NR]
Total PAHs	mg/kg	1.55	SEO-030	1.55	[NT]	[NT]	[NR]	[NR]
Nitrobenzene-d5	%	0	SEO-030	96	[NT]	[NT]	LCS	93%
2-Fluorobiphenyl	%	0	SEO-030	97	[NT]	[NT]	LCS	92%
p -Terphenyl-d 14	%	0	SEO-030	102	[NT]	[NT]	LCS	97%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
OC Pesticides in Soil								
HCB	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>alpha</i> -BHC	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
gamma-BHC (Lindane)	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Heptachlor	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	LCS	120%
Aldrin	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	LCS	126%
<i>beta</i> -BHC	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>delta</i> -BHC	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	LCS	122%
Heptachlor Epoxide	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>o,p</i> -DDE	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>alpha</i> -Endosulfan	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>trans</i> -Chlordane	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>cis</i> -Chlordane	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>trans</i> -Nonachlor	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>p,p</i> -DDE	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Dieldrin	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	LCS	122%
Endrin	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	LCS	126%
<i>o,p</i> -DDD	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>o,p</i> -DDT	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>beta</i> -Endosulfan	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>p,p</i> -DDD	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
<i>p,p</i> -DDT	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	LCS	84%
Endosulfan Sulphate	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Methoxychlor	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Ketone	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
2,4,5,6-Tetrachloro-m-xy lene ( <i>Surrogate</i> )	%	0	SEO-005	117	[NT]	[NT]	LCS	121%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
PCBs in Soil								
Arochlor 1016	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1260	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	LCS	110%
Arochlor 1262	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1268	mg/kg	0.1	SEO-005	<0.1	[NT]	[NT]	[NR]	[NR]
Total Positive PCB	mg/kg	0.9	SEO-005	0.90	[NT]	[NT]	[NR]	[NR]
PCB_Surrogate 1	%	0	SEO-005	117	[NT]	[NT]	LCS	117%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Acid Extractable Metals in Soil								
Arsenic	mg/kg	3	SEM-010	<3	[NT]	[NT]	LCS	101%
Cadmium	mg/kg	0.1	SEM-010	<0.1	[NT]	[NT]	LCS	101%
Chromium	mg/kg	0.3	SEM-010	<0.3	[NT]	[NT]	LCS	99%
Copper	mg/kg	0.5	SEM-010	<0.5	[NT]	[NT]	LCS	104%
Lead	mg/kg	1	SEM-010	<1	[NT]	[NT]	LCS	100%
Mercury	mg/kg	0.05	SEM-005	<0.05	[NT]	[NT]	LCS	86%
Nickel	mg/kg	0.5	SEM-010	<0.5	[NT]	[NT]	LCS	100%
Zinc	mg/kg	0.3	SEM-010	<0.3	[NT]	[NT]	LCS	99%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank				
Hold sample-NO test required								
Sample on HOLD				[NT]				
QUALITY CONTROL	UNITS	PQL	METHOD	Blank				
Moisture								
Moisture	%	1	AN002	<1				
QUALITY CONTROL	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD			
TRH in soil with..C6-C9 by P/T								
TRH C6 - C9 P&T	mg/kg	[NT]	[NT]	[NR]	[NR]			
TRH C10 - C14	mg/kg	[NT]	[NT]	LCS	93    [N/T]			
TRH C15 - C28	mg/kg	[NT]	[NT]	LCS	86    [N/T]			
TRH C29 - C36	mg/kg	[NT]	[NT]	LCS	80    [N/T]			

**Result Codes**

[INS] :	Insufficient Sample for this test	[HBG] :	Results not Reported due to High Background Interference
[NR] :	Not Requested	*	Not part of NATA Accreditation
[NT] :	Not tested	[N/A] :	Not Applicable

**Result Comments**

Sampled by the client

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy.

This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

No respirable fibres detected using trace analysis technique.

Asbestos analysed by Wonnie Condos.

Date Organics extraction commenced: 16/10/07

NATA Corporate Accreditation No. 2562, Site No 4354

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

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**Quality Control Protocol**

**Reagent Blank:** Sample free reagents carried through the preparation/extraction/digestion procedure and analysed at the beginning of every sample batch analysis. For larger projects, a reagent blank is prepared and analysed with every 20 samples.

**Duplicate:** A separate portion of a sample being analysed which is treated the same as the other samples in the batch. A duplicate is prepared at least every 10 samples.

**Matrix Spike Duplicates:** Sample replicates spiked with identical concentrations of target analyte(s). The spiking occurs during the sample preparation and prior to the extraction/digestion procedure. They are used to document the precision and bias of a method in a given sample matrix. Where there is not enough sample available to prepare a spiked sample, another known soil/sand or water (or Milli-Q water) may be used. A duplicate spiked sample is prepared at least every 20 samples.

**Surrogate Spike:** Added to all samples requiring analysis for organics (where relevant) prior to extraction. Used to determine the extraction efficiency. They are organic compounds which are similar to the target analyte(s) in chemical composition and behaviour in the analytical process, but which are not normally found in environmental samples.

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

**Control Standards:** Prepared from a source independent of the calibration standards. At least one control standard is included in each run to confirm calibration validity.

**Additional QC Samples:** A calibration standard and blank are run after every 20 samples of an instrumental analysis run to assess analytical drift.



# CHAIN OF CUSTODY

PROJECT NO.: 40514  
 PROJECT NAME: TUNG HUA GULF + TONG HONG GULF  
 SEND REPORT TO: S. BATHIA  
 SEND INVOICE TO: A. ANDAL  
 DATE NEEDED BY:  
 COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:  
 12MW TAT PROSE

LABORATORY BATCH NO.:  
 SAMPLERS: SG.  
 PHONE:  
 QC LEVEL: NEPM 1999 (✓)  
 EMAIL: g.bathia@jbs.com.au

SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	pH	NOTES
MUND0	water	11/10/07		25, 20, 10N, 10S		
MUND10						
MUND2						
DUP A.						
Trip Sake						
Trip blank						

Envirohab Services  
 54 Franchs Rd  
 Werris Creek NSW 2068  
 Ph: 9858 5801

Job No: 14320  
 Date received: 12/10/07  
 Received by: AJL  
 Time: 9am  
 Temp: Cool/Ambient  
 Security: Intact/Broken/None

RECEIVED BY: NAME: AJL DATE: 12/10/07  
 OF: ENV10195  
 NAME: DATE:  
 OF:

METHOD OF SHIPMENT:  
 CONSIGNMENT NOTE NO.  
 TRANSPORT CO.  
 CONSIGNMENT NOTE NO.  
 TRANSPORT CO

FOR RECEIVING LAB USE ONLY:  
 COOLER SEAL - Yes..... No..... Intact..... Broken.....  
 COOLER TEMP..... deg C  
 COOLER SEAL - Yes..... No..... Intact..... Broken.....  
 COOLER TEMP..... deg C

Container & Preservative Codes: P = Plastic; J = Soil Jar; B = Glass Bottle; N = Nitric Acid Presv.; E = Sodium Hydroxide Presv.; VC = Hydrochloric Acid Presv; VnH = Sulfuric Acid Presv; VnI = Sulfuric Acid Presv; VnV = Sulfuric Acid Presv; VnW = Sulfuric Acid Presv; VnX = Sulfuric Acid Presv; ST = Sealed Bottle; D = Other

Suite 2, 595 Gardeners Road MASCOT NSW 2020  
 PO Box 340 MASCOT NSW 1560  
 www.jbs.com.au

JBS Environmental Pty Ltd ABN 67 071 842 638  
 Phone: (02) 8338-1011  
 Fax: (02) 8338-1700

INSD Form 5033 - Chain of Custody



## EnviroLab Services Pty Ltd

ABN 37 112 535 645

54 Frenchs Rd Willoughby NSW 2068

ph 02 9958 5801 fax 02 9958 5803

email: tnotaras@envirolabservices.com.au

### CERTIFICATE OF ANALYSIS 14320

**Client:**

**JBS Environmental**

P.O. Box 940

MASCOT

NSW 1460

**Attention:** Greg Bartlett

**Sample log in details:**

Your Reference:

**40414, Tung Hui Chung & Tong Hong Chung**

No. of samples:

6 Waters

Date samples received:

12/10/07

Date completed instructions received:

12/10/07

**Analysis Details:**

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

***Please refer to the last page of this report for any comments relating to the results.***

**Report Details:**

Date results requested by:

16/10/07

Date of Preliminary Report:

Not Issued

Issue Date:

16/10/07

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Accredited for compliance with ISO/IEC 17025.

**Tests not covered by NATA are denoted with \*.**

**Results Approved By:**

  
\_\_\_\_\_  
Jacinta Hurst  
Operations Manager

EnviroLab Reference: 14320  
Revision No: R 00



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VOC's in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	14320-1 MW56 11/10/2007 Water	14320-2 MW510 11/10/2007 Water	14320-3 MWD2 11/10/2007 Water	14320-4 Dup A 11/10/2007 Water
Date extracted	-	12/10/2007	12/10/2007	12/10/2007	12/10/2007
Date analysed	-	13/10/2007	13/10/2007	13/10/2007	13/10/2007
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1.0	<1.0	<1.0	<1.0
Trans-1,2-dichloroethene	µg/L	1.4	18	<1.0	1.3
1,1-dichloroethane	µg/L	3.0	16	<1.0	2.8
Cis-1,2-dichloroethene	µg/L	<1.0	5.1	<1.0	<1.0
Bromochloromethane	µg/L	<1.0	<1.0	<1.0	<1.0
Chloroform	µg/L	<1.0	2.6	<1.0	<1.0
2,2-dichloropropane	µg/L	<1.0	<1.0	<1.0	<1.0
1,2-dichloroethane	µg/L	<1.0	150	<1.0	<1.0
1,1,1-trichloroethane	µg/L	<1.0	<1.0	<1.0	<1.0
1,1-dichloropropene	µg/L	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	µg/L	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	<1.0	<1.0	<1.0	<1.0
Dibromomethane	µg/L	<1.0	<1.0	<1.0	<1.0
1,2-dichloropropane	µg/L	<1.0	<1.0	<1.0	<1.0
Trichloroethene	µg/L	<1.0	5.6	<1.0	<1.0
Bromodichloromethane	µg/L	<1.0	<1.0	<1.0	<1.0
trans-1,3-dichloropropene	µg/L	<1.0	<1.0	<1.0	<1.0
cis-1,3-dichloropropene	µg/L	<1.0	<1.0	<1.0	<1.0
1,1,2-trichloroethane	µg/L	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	<1.0	<1.0	<1.0	<1.0
1,3-dichloropropane	µg/L	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane	µg/L	<1.0	<1.0	<1.0	<1.0
1,2-dibromoethane	µg/L	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	µg/L	<1.0	<1.0	<1.0	<1.0
1,1,1,2-tetrachloroethane	µg/L	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	µg/L	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	<1.0	<1.0	<1.0	<1.0
Bromoform	µg/L	<1.0	<1.0	<1.0	<1.0
m+p-xylene	µg/L	<2.0	<2.0	<2.0	<2.0
Styrene	µg/L	<1.0	<1.0	<1.0	<1.0
1,1,2,2-tetrachloroethane	µg/L	<1.0	<1.0	<1.0	<1.0
o-xylene	µg/L	<1.0	<1.0	<1.0	<1.0

VOC's in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	14320-1 MW56 11/10/2007 Water	14320-2 MW510 11/10/2007 Water	14320-3 MWD2 11/10/2007 Water	14320-4 Dup A 11/10/2007 Water
1,2,3-trichloropropane*	µg/L	<1.0	<1.0	<1.0	<1.0
Isopropylbenzene	µg/L	<1.0	<1.0	<1.0	<1.0
Bromobenzene	µg/L	<1.0	<1.0	<1.0	<1.0
n-propyl benzene	µg/L	<1.0	<1.0	<1.0	<1.0
2-chlorotoluene	µg/L	<1.0	<1.0	<1.0	<1.0
4-chlorotoluene	µg/L	<1.0	<1.0	<1.0	<1.0
1,3,5-trimethyl benzene	µg/L	<1.0	<1.0	<1.0	<1.0
Tert-butyl benzene	µg/L	<1.0	<1.0	<1.0	<1.0
1,2,4-trimethyl benzene	µg/L	<1.0	<1.0	<1.0	<1.0
1,3-dichlorobenzene	µg/L	<1.0	<1.0	<1.0	<1.0
Sec-butyl benzene	µg/L	<1.0	<1.0	<1.0	<1.0
1,4-dichlorobenzene	µg/L	<1.0	<1.0	<1.0	<1.0
4-isopropyl toluene	µg/L	<1.0	<1.0	<1.0	<1.0
1,2-dichlorobenzene	µg/L	<1.0	<1.0	<1.0	<1.0
n-butyl benzene	µg/L	<1.0	<1.0	<1.0	<1.0
1,2-dibromo-3-chloropropane	µg/L	<1.0	<1.0	<1.0	<1.0
1,2,4-trichlorobenzene	µg/L	<1.0	<1.0	<1.0	<1.0
Naphthalene	µg/L	<1.0	<1.0	<1.0	<1.0
Hexachlorobutadiene	µg/L	<1.0	<1.0	<1.0	<1.0
1,2,3-trichlorobenzene	µg/L	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%	109	104	98	101
Surrogate toluene-d8	%	80	85	84	89
Surrogate 4-BFB	%	64	64	65	61

vTPH & BTEX in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	14320-1 MW56 11/10/2007 Water	14320-2 MW510 11/10/2007 Water	14320-3 MWD2 11/10/2007 Water	14320-4 Dup A 11/10/2007 Water	14320-5 Trip Spike 11/10/2007 Water
Date extracted	-	12/10/2007	12/10/2007	12/10/2007	12/10/2007	12/10/2007
Date analysed	-	13/10/2007	13/10/2007	13/10/2007	13/10/2007	13/10/2007
TPH C <sub>6</sub> - C <sub>9</sub>	µg/L	<10	<10	<10	<10	[NA]
Benzene	µg/L	<1.0	<1.0	<1.0	<1.0	105%
Toluene	µg/L	<1.0	<1.0	<1.0	<1.0	82%
Ethylbenzene	µg/L	<1.0	<1.0	<1.0	<1.0	80%
m+p-xylene	µg/L	<2.0	<2.0	<2.0	<2.0	100%
o-xylene	µg/L	<1.0	<1.0	<1.0	<1.0	80%
Surrogate Dibromofluoromethane	%	109	104	98	101	130
Surrogate toluene-d8	%	80	85	84	89	105
Surrogate 4-BFB	%	64	64	65	61	88

vTPH & BTEX in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	14320-6 Trip Blank 11/10/2007 Water
Date extracted	-	12/10/2007
Date analysed	-	13/10/2007
Benzene	µg/L	<1.0
Toluene	µg/L	<1.0
Ethylbenzene	µg/L	<1.0
m+p-xylene	µg/L	<2.0
o-xylene	µg/L	<1.0
Surrogate Dibromofluoromethane	%	90
Surrogate toluene-d8	%	91
Surrogate 4-BFB	%	99

sTPH in Water (C10-C36)		14320-1	14320-2	14320-3	14320-4
Our Reference:	UNITS	14320-1	14320-2	14320-3	14320-4
Your Reference	-----	MW56	MW510	MWD2	Dup A
Date Sampled	-----	11/10/2007	11/10/2007	11/10/2007	11/10/2007
Type of sample		Water	Water	Water	Water
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007
TPH C <sub>10</sub> - C <sub>14</sub>	µg/L	<50	<50	<50	<50
TPH C <sub>15</sub> - C <sub>28</sub>	µg/L	<100	<100	<100	<100
TPH C <sub>29</sub> - C <sub>36</sub>	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	121	118	110	107

PAHs in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	14320-1 MW56 11/10/2007 Water	14320-2 MW510 11/10/2007 Water	14320-3 MWD2 11/10/2007 Water	14320-4 Dup A 11/10/2007 Water
Date extracted	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Naphthalene	µg/L	<1	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1	<1
Fluorene	µg/L	<1	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1	<1
Anthracene	µg/L	<1	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1	<1
Pyrene	µg/L	<1	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1	<1
Chrysene	µg/L	<1	<1	<1	<1
Benzo(b,k)fluoranthene	µg/L	<2	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1	<1
Surrogate p-Terphenyl-d14	%	120	118	112	104

8 HM in water - dissolved					
Our Reference:	UNITS	14320-1	14320-2	14320-3	14320-4
Your Reference	-----	MW56	MW510	MWD2	Dup A
Date Sampled	-----	11/10/2007	11/10/2007	11/10/2007	11/10/2007
Type of sample		Water	Water	Water	Water
Date prepared	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Date analysed	-	15/10/2007	15/10/2007	15/10/2007	15/10/2007
Arsenic-Dissolved	µg/L	<1	<1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1
Copper-Dissolved	µg/L	<1	<1	<1	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.5	<0.5	<0.5	<0.5
Nickel-Dissolved	µg/L	2.9	2.9	3.5	3.0
Zinc-Dissolved	µg/L	4.2	12	4.5	3.4

Method ID	Methodology Summary
<b>GC.13</b>	Water samples are analysed directly by purge and trap GC-MS.
<b>GC.16</b>	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS.
<b>GC.3</b>	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
<b>GC.12</b>	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
<b>Metals.22 ICP-MS</b>	Determination of various metals by ICP-MS.
<b>Metals.21 CV-AAS</b>	Determination of Mercury by Cold Vapour AAS.

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
VOC's in water						Base II Duplicate II %RPD		
Date extracted	-			12/10/07	[NT]	[NT]	LCS-W1	12/10/07%
Date analysed	-			13/10/07	[NT]	[NT]	LCS-W1	13/10/07%
Dichlorodifluoromethane	µg/L	10	GC.13	<10	[NT]	[NT]	[NR]	[NR]
Chloromethane	µg/L	10	GC.13	<10	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	µg/L	10	GC.13	<10	[NT]	[NT]	[NR]	[NR]
Bromomethane	µg/L	10	GC.13	<10	[NT]	[NT]	[NR]	[NR]
Chloroethane	µg/L	10	GC.13	<10	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	µg/L	10	GC.13	<10	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Trans-1,2-dichloroethene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,1-dichloroethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	92%
Cis-1,2-dichloroethene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Bromochloromethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Chloroform	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	98%
2,2-dichloropropane	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	88%
1,1,1-trichloroethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	102%
1,1-dichloropropene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Carbon tetrachloride	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Benzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Dibromomethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Trichloroethene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	88%
Bromodichloromethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	100%
trans-1,3-dichloropropene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Toluene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Dibromochloromethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	94%
1,2-dibromoethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Tetrachloroethene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	100%
1,1,1,2-tetrachloroethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Chlorobenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Bromoform	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
m+p-xylene	µg/L	2	GC.13	<2.0	[NT]	[NT]	[NR]	[NR]
Styrene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
VOC's in water						Base II Duplicate II %RPD		
o-xylene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,2,3-trichloropropane*	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Isopropylbenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Bromobenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Tert-butyl benzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Sec-butyl benzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,2,4-trichlorobenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Naphthalene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Hexachlorobutadiene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	[NR]	[NR]
Surrogate	%		GC.13	101	[NT]	[NT]	LCS-W1	101%
Dibromofluoromethane								
Surrogate toluene-d8	%		GC.13	85	[NT]	[NT]	LCS-W1	108%
Surrogate 4-BFB	%		GC.13	63	[NT]	[NT]	LCS-W1	115%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
<b>vTPH &amp; BTEX in Water</b>						<b>Base II Duplicate II %RPD</b>		
Date extracted	-			12/10/07	[NT]	[NT]	LCS-W1	12/10/07%
Date analysed	-			13/10/07	[NT]	[NT]	LCS-W1	13/10/07%
TPH C <sub>6</sub> - C <sub>9</sub>	µg/L	10	GC.16	<10	[NT]	[NT]	LCS-W1	97%
Benzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	119%
Toluene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	94%
Ethylbenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	92%
m+p-xylene	µg/L	2	GC.13	<2.0	[NT]	[NT]	LCS-W1	90%
o-xylene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	92%
Surrogate Dibromofluoromethane	%		GC.13	101	[NT]	[NT]	LCS-W1	105%
Surrogate toluene-d8	%		GC.13	85	[NT]	[NT]	LCS-W1	92%
Surrogate 4-BFB	%		GC.13	63	[NT]	[NT]	LCS-W1	100%
<b>sTPH in Water (C10-C36)</b>						<b>Base II Duplicate II %RPD</b>		
Date extracted	-			15/10/07	[NT]	[NT]	LCS-W1	15/10/07%
Date analysed	-			15/10/07	[NT]	[NT]	LCS-W1	15/140/07%
TPH C <sub>10</sub> - C <sub>14</sub>	µg/L	50	GC.3	<50	[NT]	[NT]	LCS-W1	72%
TPH C <sub>15</sub> - C <sub>28</sub>	µg/L	100	GC.3	<100	[NT]	[NT]	LCS-W1	97%
TPH C <sub>29</sub> - C <sub>36</sub>	µg/L	100	GC.3	<100	[NT]	[NT]	LCS-W1	109%
Surrogate o-Terphenyl	%		GC.3	119	[NT]	[NT]	LCS-W1	118%
<b>PAHs in Water</b>						<b>Base II Duplicate II %RPD</b>		
Date extracted	-			15/10/07	[NT]	[NT]	LCS-W1	15/10/07%
Date analysed	-			15/10/07	[NT]	[NT]	LCS-W1	15/10/07%
Naphthalene	µg/L	1	GC.12	<1	[NT]	[NT]	LCS-W1	76%
Acenaphthylene	µg/L	1	GC.12	<1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	1	GC.12	<1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	1	GC.12	<1	[NT]	[NT]	LCS-W1	105%
Phenanthrene	µg/L	1	GC.12	<1	[NT]	[NT]	LCS-W1	83%
Anthracene	µg/L	1	GC.12	<1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	1	GC.12	<1	[NT]	[NT]	LCS-W1	78%
Pyrene	µg/L	1	GC.12	<1	[NT]	[NT]	LCS-W1	121%
Benzo(a)anthracene	µg/L	1	GC.12	<1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	1	GC.12	<1	[NT]	[NT]	LCS-W1	105%
Benzo(b,k)fluoranthene	µg/L	2	GC.12	<2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	1	GC.12	<1	[NT]	[NT]	LCS-W1	117%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Water						Base II Duplicate II %RPD		
Indeno(1,2,3-c,d)pyrene	µg/L	1	GC.12	<1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	1	GC.12	<1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	1	GC.12	<1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		GC.12	120	[NT]	[NT]	LCS-W1	121%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
8 HM in water - dissolved						Base II Duplicate II %RPD		
Date prepared	-			16/10/07	14320-1	15/10/2007    15/10/2007	LCS-W1	16/10/07%
Date analysed	-			16/10/07	14320-1	15/10/2007    15/10/2007	LCS-W1	16/10/07%
Arsenic-Dissolved	µg/L	1	Metals.22 ICP-MS	<1	14320-1	<1    <1	LCS-W1	110%
Cadmium-Dissolved	µg/L	0.1	Metals.22 ICP-MS	<0.1	14320-1	<0.1    <0.1	LCS-W1	106%
Chromium-Dissolved	µg/L	1	Metals.22 ICP-MS	<1	14320-1	<1    <1	LCS-W1	94%
Copper-Dissolved	µg/L	1	Metals.22 ICP-MS	<1	14320-1	<1    <1	LCS-W1	94%
Lead-Dissolved	µg/L	1	Metals.22 ICP-MS	<1	14320-1	<1    <1	LCS-W1	92%
Mercury-Dissolved	µg/L	0.5	Metals.21 CV-AAS	<0.5	14320-1	<0.5    <0.5	LCS-W1	84%
Nickel-Dissolved	µg/L	1	Metals.22 ICP-MS	<1	14320-1	2.9    2.9    RPD: 0	LCS-W1	96%
Zinc-Dissolved	µg/L	1	Metals.22 ICP-MS	<1	14320-1	4.2    3.6    RPD: 15	LCS-W1	108%
QUALITY CONTROL	UNITS	Dup. Sm#		Duplicate		Spike Sm#	Spike % Recovery	
8 HM in water - dissolved				Base + Duplicate + %RPD				
Date prepared	-		[NT]		[NT]	14320-2	16/10/07%	
Date analysed	-		[NT]		[NT]	14320-2	16/10/07%	
Arsenic-Dissolved	µg/L		[NT]		[NT]	14320-2	112%	
Cadmium-Dissolved	µg/L		[NT]		[NT]	14320-2	93%	
Chromium-Dissolved	µg/L		[NT]		[NT]	14320-2	113%	
Copper-Dissolved	µg/L		[NT]		[NT]	14320-2	91%	
Lead-Dissolved	µg/L		[NT]		[NT]	14320-2	85%	
Mercury-Dissolved	µg/L		[NT]		[NT]	14320-2	81%	
Nickel-Dissolved	µg/L		[NT]		[NT]	14320-2	100%	
Zinc-Dissolved	µg/L		[NT]		[NT]	14320-2	88%	

**Report Comments:**

Asbestos analysed by: Not applicable for this job

INS: Insufficient sample for this test  
RPD: Relative Percent Difference  
NR: Not requested

NT: Not tested  
NA: Test not required  
<: Less than

PQL: Practical Quantitation Limit  
LCS: Laboratory Control Sample  
>: Greater than

**Quality Control Definitions**

**Blank:** This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

**Duplicate:** This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

**Matrix Spike:** A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

**LCS (Laboratory Control Sample):** This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

**Surrogate Spike:** Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

**Laboratory Acceptance Criteria:**

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable. Surrogates: Generally 60-140% is acceptable.

**Appendix D**  
**Groundwater Sampling Forms**







**Appendix E**  
**Calibration and Decontamination Documentation**



# ENVIROEQUIP RENTALS

Your Friend in the Field

## Equipment Report - MINIRAE 2000 PID

This PID has been performance checked / calibrated\* as follows:

Calibration	Actual Value	Reading	Pass?
Zero – fresh air	0.0 ppm	0.0 ppm	<input checked="" type="checkbox"/>
Span – Isobutylene	104 ppm	104 ppm	<input checked="" type="checkbox"/>
<b>Operations Check</b>			
<input checked="" type="checkbox"/> Performance Check (pump, lamp, sensor & battery voltage check)			
<input checked="" type="checkbox"/> Battery Charged	<input checked="" type="checkbox"/> Filters Check	<input checked="" type="checkbox"/> Spare battery Voltage (5.5v minimum) <u>6</u> V	

\* Calibration gas traceability information is available upon request.

Date: 05-10-07 Checked by: [Signature]

Signed: [Signature]

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum \$20 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Received	Returned	Item
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MiniRae 2000 PID / Operational Check, plus Battery Voltage @ <u>5.6V</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lamp Voltage: <u>10.6</u> C/factor: <u>1</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Compound Set to: <u>ISOBUTYLENE</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Protective yellow rubber boot
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Inlet probe (attached to PID)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spare water trap filter(s) Qty <u>1</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Charger 240V to 12V 500mA
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Instruction Manual behind foam on the lid of case "
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Quick Guide Sheet behind foam on the lid of case "
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spare Alkaline Battery Compartment with batteries
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Inline Moisture trap Filter Guide Laminated
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Calibration regulator & tubing (optional)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Carry Case
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Processors Signature/ Initials MS

EE Quote Reference	<u>3419</u>	Condition on return
Customer Ref		
Equipment ID	<u>PIDMINISAF</u>	
Equipment serial no.	<u>700781</u>	
Return Date	<u>1 / 1</u>	
Return Time		

Melbourne Sydney Brisbane Perth Auckland Kuala Lumpur

Melbourne - 13A Rocklea Drive, Port Melbourne VIC 3207 Australia  
 Telephone: +61-3-9646-4190 FreeCall (interstate): 1-800-675-756  
 Rentals Direct Fax: +61-3-9681-9251 Head Office Fax: +61-3-9646-4195  
 Email: rentals.melb@enviroequip.com Internet: www.rentals.enviroequip.com



CUSTOMER COPY

## CALIBRATION CERTIFICATE

MAKE: Yeo-Kal

MODEL: 611

ASSET: 792

---

	ZERO POINT	SPAN POINT
<u>CONDUCTIVITY</u>	0 $\mu$ S/cm	1413 $\mu$ S/cm
<u>DISSOLVED OXY.</u>	0%	100%
<u>TURBIDITY</u>	0ntu	250ntu
<u>SALINITY</u>	0ppt	35ppt
<u>DEPTH</u>	-	-

---

TEMPERATURE CHECK 19.7 °C

PH 4.0pH 10.0pH

REDOX 295mV 472mV

Please remove electrode protection caps for measurements.

REPLACE WHEN FINISHED! Applicable  
Not applicable

The above instrument was calibrated in accordance with manufacturers specifications.

Signed: D. Neil Searc

Date: 01/06/07.

ENVIRORENT, 3/14 APOLLO CRT, BLACKBURN, VIC, 3130, PH: 1800 810 560.

# Field Equipment Calibration and Decontamination



PROJECT NAME: <i>Chester Hill</i>	PROJECT NO: <i>40414</i>
FIELD DATES: <i>12/10/07</i>	FIELD STAFF: <i>S.G</i>

<b>CALIBRATION SUMMARY</b>
EQUIPMENT: <i>Water Quality meter, interface probe.</i>
CALIBRATION STANDARD:

DATE	TIME	READING (ppm <sub>v</sub> )	COMMENTS
<i>12/10/07</i>			

<b>DECONTAMINATION SUMMARY</b>			
EQUIPMENT: <i>Water Quality meter and interface probe.</i>			
1. Was the equipment decontaminated appropriately prior to sampling at each location?	<input checked="" type="radio"/>	N	NA
2. Was excess soil removed by scraping, brushing or wiping with disposable towels?	<input checked="" type="radio"/>	N	NA
3. Was the equipment contaminated with grease, tar or similar material? If so, was the equipment steam cleaned or rinsed with pesticide-grade acetone:hexane?	Y	<input checked="" type="radio"/>	NA
4. Was phosphate-free detergent used to wash the equipment?	<input checked="" type="radio"/>	N	NA
5. Was the equipment rinsed with clean water?	<input checked="" type="radio"/>	N	NA
6. Was the equipment then rinsed with deionised water?	<input checked="" type="radio"/>	N	NA
7. Were all sample containers cleaned and acid or solvent washed prior to sample collection?	Y	N	<input checked="" type="radio"/>
<b>WERE ANY ADDITIONAL DECONTAMINATION MEASURES REQUIRED? PROVIDE DETAILS.</b>			

**Appendix F**

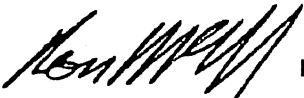
**Previous Site Audit Statement and Site Audit Report (CH2MHILL 2002)**

# NSW Environment Protection Authority

## SITE AUDIT STATEMENT

Schedule 1, Form 2 (Contaminated Land Management Regulation 1998)

SITE AUDITOR (accredited under the Contaminated Land Management Act 1997):

Name: Mr Ross McFarland  Phone: 02 9950 0200  
Company: CH2M HILL Australia Pty Ltd Fax: 02 9950 0600  
Address: Level 7, 9 Help Street Accred. No: 9819  
CHATSWOOD, NSW 2065

SITE AUDIT STATEMENT NO: 2002/13

### SITE DETAILS:

Address: 191 Miller Street  
Chester Hill, NSW Postcode: 2162  
Lot and DP number: Lot 101 DP 851138.  
Local government area: Bankstown City Council

### SITE AUDIT REQUESTED BY:

Name: Mr David Tubb  
Company: PacLib Industrial Pty Limited (ACN 097 555 649)  
Address: Suites 2 and 3, 22 Elizabeth Street  
ARTARMON NSW Postcode: 2069  
Phone: 02 - 9412-4555 Fax: 02 - 9412-4998

and

Name: The Manager  
Company: Villa World Limited (CAN 010 621 226)  
Address: Level 16, 50 Cavill Street  
SURFERS PARADISE QLD Postcode: 4217

and

Name: The Manager  
Company: Incitec Limited (ACN 010 767 263)  
Address: Paringa Road, Gibson Island  
MURARRIE, BISBANE QLD Postcode: 4170

and

Name: The Manager  
Company: Biga Nominees Pty Limited (ACN 005 186 158)  
Address: 672 Footscray Road  
FOOTSCRAY VIC Postcode: 3011

Name of contact person (if different from above): as above

Mr David Tubb, PacLib Industrial Pty Limited

Consultancy(ies) who conducted the site investigation(s) and/or remediation:

HLA Envirosiences Pty Ltd (HLA)

Title(s) of report(s) reviewed:

HLA-Envirosiences Remedial Action Plan, Subdivision of 191 Miller Road, Chester Hill, NSW, 14 August 2001.

HLA-Envirosiences Characterisation of Fill Mound - 191 Miller Road, Chester Hill, 18 October 2001

HLA-Envirosiences UST Decommissioning Validation - 191 Miller Road, Chester Hill, 29 January 2002.

HLA-Envirosiences Validation of Building Footprints - 191 Miller Road, Chester Hill, 14 June 2002.

HLA-Envirosiences Site Management Plan - 191 Miller Road, Chester Hill, 22 August 2002.

HLA-Envirosiences Groundwater Monitoring Report, 191 Miller Road, Chester Hill, 12 August 2002

HLA-Envirosiences Site Validation Report - 191 Miller Road, Chester Hill, 2 August 2002

Other information reviewed:

Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999, Volumes 1, 2 and 3.

Woodward-Clyde Phase 2C Soil Investigation of Incitec Chester Hill Site, 191 Miller Road, Chester Hill, 15 December 1999

Golder Associates Contamination Investigation, Waste Water Treatment Tank Area, Incitec Site - Chester Hill NSW, April 1998.

Dames and Moore Preliminary Contamination Assessment, Miller Road, Chester Hill Site for Incitec Ltd, December 1992.

Summary Site Audit Report Title:

Summary Site Audit Report for PacLib Industrial Pty Ltd, in relation to 191 Miller Street, Chester Hill, Site Assessment, Remediation, Validation and Ongoing Management.

Date: August 2002

I have completed a site audit (as defined in the Contaminated Land Management Act 1997) and reviewed the reports and information referred to above with due regard to relevant laws and guidelines. I certify that the site (tick all appropriate boxes):

(a) Is suitable for the following use(s):

Residential, including substantial vegetable garden and poultry

hon

- residential, including substantial vegetable garden excluding poultry;
- residential with accessible soil, including garden (minimal home grown produce contributing less than 10% fruit and vegetable intake) excluding poultry;
- residential with minimal opportunity for soil access, including units;
- day care centre, preschool, primary school;
- secondary school;
- park, recreational open space, playing field;
- commercial/industrial use;
- other (please specify): \_\_\_\_\_

subject to:

condition(s) (please specify):

- that this Site Audit Statement be read in conjunction with the associated Summary Site Audit Report;
- that the attached Site Management plan (SMP) be implemented; and
- that any works undertaken in relation to the SMP be reviewed by a NSW EPA accredited Site Auditor and results reported to the local Council.

~~(b) It is not suitable for any beneficial use due to risk of harm from contamination.~~

(comments): \_\_\_\_\_

I am accredited by the NSW Environment Protection Authority under the Contaminated Land Management Act 1997 as a Site Auditor.

Accreditation Number: 9819

I certify that:

- (a) I have personally examined and am familiar with the information contained in this statement, including the reports and information referred to in this statement, and
- (b) this statement is, to the best of my knowledge, true, accurate and complete, and
- (c) on the basis of my inquiries made to those individuals immediately responsible for making the reports, and obtaining the information, referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties for wilfully submitting false, inaccurate or incomplete information.

Signed: 

Date: 30 August 2002

**FORWARD TO:**  
 Manager, Contaminated Sites Section  
 NSW Environment Protection Authority  
 PO Box A290  
 SYDNEY SOUTH NSW 1232

Phone: 02 9995 5614  
 Fax: 02 9995 5999

Prepared for

**PacLib Industrial Pty Ltd**

191 Miller Road Chester Hill

Site Assessment, Remediation, Validation and Ongoing  
Site Management

Summary Site Audit Report (SSAR 2002/13)

August 2002

Reference: 110610  
EPA File Number CH7978



CH2M HILL AUSTRALIA Pty Ltd  
Level 7, 9 Help Street  
CHATSWOOD NSW 2067  
Phone 02 9950 0200  
Fax 02 9950 0600

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This document should not be used or copied without written authorisation from CH2M HILL AUSTRALIA Pty Ltd.

## Executive Summary

In April 2002, CH2M HILL Australia Pty Ltd (CH2M HILL) was commissioned by PacLib Industrial Pty Ltd (PacLib) to provide a Statutory Site Audit Statement (SAS) for the remedial works and site validation for a proposed subdivision of the former Incitec Limited (Incitec) Site located at 191 Miller Road, Chester Hill, NSW. This audit was undertaken to meet a planning condition from Bankstown City Council, in relation to the rezoning of the Site for continued commercial/industrial purposes. During the course of this audit, Bankstown City Council imposed specific consent conditions that resulted in the nature of the audit changing from "non-statutory" (due to no change of landuse) to "statutory" (ie required by planning instrument) in nature.

The attached survey plan defines the area (marked Lots 1, 2, 3, 4 and 7, and includes the planned service road) that are the subject of this report (the "Site").

As requested by PacLib, Ross McFarland (NSW EPA accredited Site Auditor No. 9819), has completed a detailed review of all of the Site characterisation, the remedial action plan and the validation report, with a view to providing a Site Audit Statement, under the provisions of the Contaminated Land Management Act 1997.

CH2M HILL has prepared a Site Audit Statement and associated Summary Site Audit Report (SSAR) for the 'Site' at 191 Miller Road, substantially based on the NSW EPA 1998 Guidelines for the NSW Site Auditor Scheme.

In summary, the Site Audit Statement has concluded that the Site is suitable for continued commercial/industrial purposes, provided a site-specific management plan is implemented to ensure the continued safe use of the Site for its intended purposes. The Site Management Plan (SMP) is provided as an attachment to both the Site Audit Statement and this Summary site Audit Report.

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**List of Appendices**

Appendix A - Drawings

Appendix B - Site Management Plan

## 1 Introduction

Ross McFarland, NSW Environment Protection Authority (NSWEPA) Site Auditor accreditation Number 9819, an employee of CH2M HILL Australia Pty Ltd (CH2M HILL), was engaged by PacLib Industrial Pty Ltd (PacLib) to provide a Statutory Site Audit Statement (SAS) and Summary Site Audit Report (SSAR) for the remediation and validation works carried out on the former Incitec Limited (Incitec) Site (the 'Site') located at 191 Miller Road, Chester Hill, NSW.

The attached survey plans (Drawing Numbers 56980LD1 through 56980LD5 in Appendix A) clearly defines the area that is the subject of this report. It is the intention of the owner to subdivide the land into seven lots. This proposed subdivision is shown in the above survey plans.

This Summary Site Audit Report for the remediation and validation works carried out at 191 Miller Road was compiled from a detailed review of the environmental reports produced by:

- AGC Woodward-Clyde Pty Ltd (WWC) [now URS]; and
- HLA-Envirosciences Pty Ltd (HLA).

In addition, reference was made to reports by:

- Dames and Moore [now URS Australia Pty Ltd (URS)]; and
- Golder Associates Pty Ltd.

The full references for these reports are listed below. A Site inspection of the subject area was also conducted by CH2M HILL personnel on a number of occasions, with detailed inspections on 11 June 2002, during the remediation, and again on 6 August 2002 at the completion of all works and following the provision of the Environmental Consultant's final validation report.

The format of this Summary Site Audit Report is substantially based on the NSW EPA Guidelines for the NSW Site Auditor Scheme, 1998, as described on pages 11-12 of the guidance document.

The following primary documents were used for the purpose of preparing this review:

- Woodward-Clyde *Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill*, 30 August 1999, Volumes 1, 2 and 3.
- Woodward-Clyde *Phase 2C Soil Investigation of Incitec Chester Hill Site, 191 Miller Road, Chester Hill*, 15 December 1999
- HLA-Envirosciences *Remedial Action Plan, Subdivision of 191 Miller Road, Chester Hill, NSW*, 14 August 2001.
- HLA-Envirosciences *Characterisation of Fill Mound - 191 Miller Road, Chester Hill*, 18 October 2001
- HLA-Envirosciences *UST Decommissioning Validation - 191 Miller Road, Chester Hill*, 29 January 2002.

- HLA-Enviroscience's *Validation of Building Footprints – 191 Miller Road, Chester Hill*, 14 June 2002.
- HLA-Enviroscience's *Site Management Plan – 191 Miller Road, Chester Hill*, 22 August 2002.
- HLA-Enviroscience's *Groundwater Monitoring Report, 191 Miller Road, Chester Hill*, 12 August 2002
- HLA-Enviroscience's *Site Validation Report – 191 Miller Road, Chester Hill*, 2 August 2002

Reference was also made to the reports:

- Golder Associates *Contamination Investigation, Waste Water Treatment Tank Area, Incitec Site – Chester Hill NSW*, April 1998.
- Dames and Moore *Preliminary Contamination Assessment, Miller Road, Chester Hill Site for Incitec Ltd*, December 1992.

In addition, the Bankstown City Council's *Policy for the Management of Contaminated Land*, September 1999 was considered in the development of this SSAR, as well as in the development of an acceptable form of Site Audit Statement and site management plan for the local consent authority's use.

## 2 Site Location Details

### 2.1 Relevant Information

The Site, before the proposed subdivision is:

- Located as shown in Drawing 110610-01, in Appendix A; and
- Designated as Lot 101 on Deposited Plan 851138 at Chester Hill, Local Government Area Bankstown, Parish of Liberty Plain, County of Cumberland<sup>1</sup>. Revisions to the above deposit plan are required for the subdivision.

The Site is located within Bankstown City Council. The Site is bounded by:

- Miller Road to the west;
- Main Southern Rail line to the north;
- Orchard Road and the Orchard Road Development to the east; and
- The AEP VisQueen Plant to the South.

The Site is primarily surrounded by transportation uses, and commercial/industrial landuses. North of the rail line and east of Orchard Road is residential landuse.

The Site has a total area of approximately 70,025 m<sup>2</sup>. The proposed subdivision into seven lots<sup>2</sup> creates the following areas:

- Proposed Lot 1 - 14,090 m<sup>2</sup>
- Proposed Lot 2 - 8,456 m<sup>2</sup>
- Proposed Lot 3 - 8,489 m<sup>2</sup>
- Proposed Lot 4 - 10,757 m<sup>2</sup>
- Proposed Lot 5 - 10,030 m<sup>2</sup>
- Proposed Lot 6 - 13,620 m<sup>2</sup>
- Proposed Lot 7 - 4,583 m<sup>2</sup>

At the time of the June 2002 Site inspection, the buildings nominated in the remedial action plan for removal had been demolished, their footings removed and remediation of the structure called the 'dome' was taking place. Buildings nominated for reuse and the roadways remained in situ. A further inspection by the Auditor, in the August 2002, observed the status of the environmental and validation works.

<sup>1</sup> Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999

<sup>2</sup> Survey Plan Drawing Numbers 56980LD1 through 56980LD5 in Appendix A

## 2.2 Auditor Opinion

In my opinion the Site location details and description on the surveyor's plan attached to this SSAR and to the SAS for the proposed subdivision are a reasonable representation of the areas that are the subject of this audit. The property description information has not been confirmed by detailed Land Titles Office search, but it is accurately reproduced from earlier investigation reports and is considered to be reliable, based on the information provided.

### 3 Site History

#### 3.1 Relevant Information

A comprehensive Site history is provided in the 1999 Woodward-Clyde Phase 1&2 Assessment<sup>3</sup>. A summary of this information pertaining to proposed Lots 1 to 7 is presented as follows:

Year	Site History/Ownership
Prior to 1942	Vacant land probably used for farming
1942	The Commonwealth Government commenced operations of the Villawood Explosives Factory at Chester Hills. It is understood that the main operating Acid Section was built on the area designated as a roadway for the new development and may have encroached on the western portion of the proposed Lot 4. Process activities that may have potentially been undertaken on the Site included production of: <ul style="list-style-type: none"> <li>• Oleum from sulfur;</li> <li>• Nitric acid from sodium nitrate and by ammonia oxidation.</li> </ul>
1943/44 to 1946	The operation was progressively closed down after operating for approximately 18 months. When operational the entire Site (ie proposed Lots 1 to 7) contained the following plant and buildings (note dump refers to above-ground pile storage): <ul style="list-style-type: none"> <li>• Coal Dumps</li> <li>• Sulfur Dump 1</li> <li>• Oleum Plant</li> <li>• DOV (Dilute Oil of Vitriol - Sulfuric Acid) Tank Farm</li> <li>• Cooling Tower</li> <li>• Compressor House</li> <li>• Bagmag (Sulfuric Acid Concentration)</li> <li>• Coal fed Gas Producer, producing carbon monoxide and nitrogen</li> <li>• Sodium Nitrate Store</li> <li>• Nitre pots (Nitric Acid (N/A) retorts)</li> <li>• ARP (Acid Regeneration Plant) Acid Tank</li> <li>• Tea House</li> <li>• Shift Chemists &amp; Foreman's' Office</li> <li>• Two Absorption Towers (located near the N/A retorts and DOV Tank Farm)</li> <li>• Acid Laboratory</li> <li>• Acid Change</li> <li>• Administration Offices and Laboratories (Acid Laboratory ?)</li> <li>• Amenity buildings</li> </ul>
1946	Australian Fertilisers Limited (AFL) leased the Site including the on-Site buildings, tank farms, the Oleum plant and the Contact Acid plant
1946 - 1950	Due to an increased demand for more concentrated acids, operations at the Site changed from nitrogen-based processes to sulfur based processes, producing conc.(98%) sulfuric acid.
1948	The Contact Acid Plant (Sulfuric Acid) re-commenced operations. The product was stored in four ASTs to the north of the DOV tank farm and transferred through overhead pipes to the I.C.I.A.N.Z ammonia sulphate plant Site to the south of the Site.

<sup>3</sup> Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999

Year	Site History/Ownership
	It is understood that oleum was also produced on the Site during this period.
1951	The Contact Acid plant was extended to include a second converter and absorption tower.
1955	The Gas Producer Plant was removed.
1957	Ownership of the Site was transferred to AFL. The two Bamag gas producers were sold to I.C.I.A.N.Z Botany.
1961 to 1965	The George Shirley company occupied part of the Site (including the soil-testing laboratory - proposed Lot 7). It is understood that the Contact Acid Plant was still in operation. Battery acid was produced by diluting 98% Sulfuric Acid stored in lead lined tanks located in the DOV Tank Farm.
1966 to 1970	In 1967 Shirley Fertilisers Pty Ltd was established and took over management of the operations at the Site with the exception of the Transport Division (proposed Lots 1 and 2) and Soil Testing Laboratory (proposed Lot 7). Some buildings were modified during this period.
1969	An aerial photograph of the Site showed a stockpile of drums stored in a roadway on the adjacent VisQueen Plant Site. The drums were reported to contain process byproducts from the ICI Botany Plant, produced during the manufacture of ethylene dichloride (EDC). The byproducts were known as 'EDC Lights' and 'EDC Heavies'.
1971 to 1978	The Site was subdivided into two Lots. The Balmag building was demolished (proposed Lot 7). The rail tank purging area was established in the former Sulfur Dump No. 1 (proposed Lot 1).
1979 to 1986	The Soil Testing Laboratory was closed down and converted to a training room in 1981 (proposed Lot 7). The current Boylans warehouse building was constructed in 1982 (proposed Lots 1 and 2). In approx. 1982 to 1983 'Zingro' was stored to the south of the DOV Tank Farm, near the location of a former a copper sulphate plant. Sulfamic acid tablets were understood to be produced in the DOV Tank farm building. A bulk hydrofluoric acid tank was reportedly located to the south of the sulfur building.
1987 - 1989	In 1987 AFL changed its name to Incitec Ltd and the Transport Division of Incitec became known as Chemtrans.
1996	The Boylan warehouse and Site office building were constructed. The former Oleum plant was reportedly demolished by this time. A flammable liquids store was constructed adjacent to the DOV Tank farm (proposed Lot 4)
1997 to present	The Boylan warehouse was used to store packaged liquid chemicals and compounds in 200 L and smaller drums including Class 3 flammable liquids, Class 4 flammable solids, Class 5 powdered chlorine, and Class 8 corrosives (proposed Lots 1 and 2). A paved area, near the former Bagmag building, was used to store 'Isotanks' (proposed Lot 4).

### 3.2 Auditor Opinion

The historical information provided was considered adequate to draw reasonable conclusions as to the environmentally significant operations at the Site, their approximate locations, and the probable contaminants of primary concern (CoPC).

The sixty or so years of industrial activity, especially in relation to the production of strong acids, has led to contamination that may be considered to be typical for the age and nature of the activities undertaken across the Site.

The basis and rationale for my opinion is based on the Consultant's appropriate application of the methods outlined in the 1999 NEPM Schedule B(2)<sup>4</sup> relating to the identification and assessment of contaminated land, and especially with respect to improving site history appraisals.

---

<sup>4</sup> National Environment Protection Council (NEPC) (1999) National Environment Protection (Assessment of Site Contamination) Measure, Schedule B(2) Guidelines on Data Collection, Sample Design and Reporting.

## 4 Potential Contaminants of Concern & Sampling and Analysis Design

### 4.1 CoPC Assessment

The potential contamination was initially assessed by Woodward-Clyde<sup>5</sup> for the Phase 1 and 2 Site assessment. This report forms the basis of all decisions in subsequent reports, and is therefore scrutinised here. The report uses the NSW EPA endorsed guidelines nominated in S105 of the Contaminated Land Management (CLM) Act, 1997 for the identification and assessment of contaminated land. This approach may be described as:

- Careful review and consideration of historical landuses, including adjacent uses;
- Consideration of landuse history gaps or uncertainties; and
- Development of a conservative list of potential contaminants of primary concern based on the historical landuses.

The contaminants of primary concern at the Site were finally concluded by Woodward-Clyde to be:

- Polycyclic aromatic hydrocarbons (PAH);
- Inorganic elements, specifically arsenic, cadmium, copper (and copper sulphate), lead (and lead sulphate), zinc, nickel, chromium, and mercury;
- Phenolic compounds;
- Total petroleum hydrocarbons (TPH);
- Benzene, toluene and xylene (BTEX);
- Polychlorinated biphenols (PCB);
- Acids (including chlorosulphonic acid and fluosilicic acid) which were analysed by testing pH and major cations and anions;
- Sodium and Potassium Hydroxide;
- Organochlorine (OC) and organophosphate (OP) pesticides;
- Asbestos sheet; and
- Chlorinated organics (TCE, TCA, trichloroethene and 1,1,1-trichloroethane).

With standard laboratory testing procedures, results were also produced for:

- Oxygenated hydrocarbons (MEK, MBK);

<sup>5</sup> Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999

- Sulphonated Compounds like carbon disulphide;
- Fumigants;
- halogenated aliphatic compounds; and
- Trihalomethanes.

The potential for the presence of explosives and their production reagents was canvassed by the Auditor, with the HLA Envirosciences. However, it was concluded by the environmental consultant that the likelihood for this form of contamination was low, as the explosive manufacturing and storage activities were isolated to another area, that was not part of the subject Site.

#### 4.2 Sampling and Analysis Design

The CoPC information, together with the NSW EPA Sampling Design Guidelines<sup>6</sup> was used by the Environmental Consultants to develop a detailed Site specific sampling and analysis design. This included:

- A judgemental sampling pattern for groundwater<sup>7</sup>;
- A grid pattern for soil sampling, able to detect a 20.65 m circular 'hotspot' with a 95% confidence limit<sup>8</sup>;
- A sampling pattern dictated by the NSW EPA *Guidelines for Assessing Service Station Sites, 1994*<sup>9</sup> for the validation of UST removed in the north-western corner of the Site;
- A judgemental sampling pattern for validation sampling under demolished buildings, utilising field observations, odour, staining, discolouration and PID readings<sup>10</sup>; and
- A judgemental sampling pattern for the validation of sludges within, and soils and groundwater around the "Dome" structure<sup>11</sup>.

The NSW EPA's Service Station Guidelines<sup>12</sup> were used by Woodward-Clyde for validation sampling of the soils under the car park UST<sup>13</sup>, which was removed.

The basis of sampling the fill mound on Site for asbestos was not noted in the HLA Envirosciences report<sup>14</sup>.

<sup>6</sup> NSW EPA *Contaminated Sites: Sampling Design Guidelines* (1995)

<sup>7</sup> Woodward-Clyde *Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999*

<sup>8</sup> Woodward-Clyde *Phase 2C Soil Investigation of Incitec Chester Hill Site, 191 Miller Road, Chester Hill, 15 December 1999*

<sup>9</sup> HLA-Envirosciences *UST Decommissioning Validation – 191 Miller Road, Chester Hill, 29 January 2002*

<sup>10</sup> HLA Envirosciences *Validation of Building Footprints – 191 Miller Road, Chester Hill, 14 June 2002.*

<sup>11</sup> HLA-Envirosciences *Site Validation Report – 191 Miller Road, Chester Hill, 2 August 2002*

<sup>12</sup> NSW EPA *Guidelines for Assessing Service Station Sites, 1994*

<sup>13</sup> Woodward-Clyde *Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999*

<sup>14</sup> HLA-Envirosciences *Characterisation of Fill Mound – 191 Miller Road, Chester Hill, 18 October 2001*

### 4.3 Auditor Opinion

Based on available information on the Site's history, Woodward-Clyde's assessment<sup>15</sup> of the CoPCs is considered to be sufficient to derive an adequately conservative list of environmentally significant chemicals for subsequent remediation and validation.

The basis and rationale for this opinion is derived from the Consultant's appropriate application of the methods outlined in the 1999 NEPM Schedule B(2)<sup>16</sup> relating to the identification and assessment of contaminated land, and especially with respect to the identification of the contaminants of primary concern.

With the exception of the investigative work to characterise the fill mound<sup>17</sup> (which is discussed below), the Consultant's sampling and analysis plans for the Site assessment and Site validation works are considered similarly adequate to identify areas contaminated or remediated of CoPCs. The basis and rationale for this opinion is derived from the Consultant's appropriate application of the methods outlined in the 1999 NEPM Schedule B(2)<sup>18</sup> relating to the data collection and sampling design.

The HLA characterisation of the fill mound<sup>19</sup> does not state the sampling rationale. There is currently no recognised stockpile sampling guideline for asbestos. Having found that, of the 20 samples taken from the stockpile, one sample was reported to contain asbestos fragments but no detectable fibres. On the basis of this fragment detection, HLA has recognised that the mound is potentially contaminated, although the form and extent of the asbestos contamination was considered by the Consultant to be low and, therefore, a Site Management Plan<sup>20</sup> was developed with special provisions to deal with the minor asbestos fragment contamination identified in the mound (refer to Section 9.1 of this Report). I consider this management technique to be an adequately conservative approach for the low risk posed to the current and proposed use of the Site.

For validation of the Dome after the removal of sludge, some dense non-aqueous phase liquid (DNAPL) and an inner lining of bricks, HLA took two samples through the base of the dome (resealed later) and by sampling on the outside of and down-gradient from the dome at three locations (north, east and west). No samples were taken on the western side due to access restrictions. This approach is consistent with the validation sampling required by the NSW EPA's Service Station Guidelines<sup>21</sup>.

I consider the validation protocols employed for the Dome area to be appropriate for the nature and extent of contamination problems that were identified for this area of the Site.

<sup>15</sup> Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999

<sup>16</sup> National Environment Protection Council (NEPC) (1999) *National Environment Protection (Assessment of Site Contamination) Measure, Schedule B(2) Guidelines on Data Collection, Sample Design and Reporting*.

<sup>17</sup> HLA-Enviroscience's Characterisation of Fill Mound - 191 Miller Road, Chester Hill, 18 October 2001.

<sup>18</sup> National Environment Protection Council (NEPC) (1999) *National Environment Protection (Assessment of Site Contamination) Measure, Schedule B(2) Guidelines on Data Collection, Sample Design and Reporting*.

<sup>19</sup> HLA-Enviroscience's Characterisation of Fill Mound - 191 Miller Road, Chester Hill, 18 October 2001

<sup>20</sup> HLA-Enviroscience's Site Management Plan - 191 Miller Road, Chester Hill, 22 August 2002

<sup>21</sup> NSW EPA Guidelines for Assessing Service Station Sites, 1994

## 5 Soil Stratigraphy and Hydrogeology

### 5.1 Relevant Information

Woodward-Clyde's reference documents<sup>22</sup> describe:

- The Site as underlain by the Ashfield Shale a formation that belongs to the Wianamatta Group. The deep (regional) aquifer lies within this formation;
- The groundwater encountered within this rock is saline, due to its marine origins and typically contains elevated levels of heavy metals;
- The shale formation is characterised by:
  - Fine grained consolidated rock;
  - Low to very low porosity due to compaction and clay mineralogy; a fractured and jointed structure; and
  - Fine laminations;
- Groundwater flow is predominantly through joints and faults. Consequently the flow is highly variable, but limited due to the overall effective porosity being low;
- The shallow aquifer lies in the soil layer, which overlies the bedrock shale. It has its origins as a weathering product of the shale bedrock, and has a transition from shale through a 'conglomerate' zone to the overlying clay layer. Most of the groundwater flow occurs through the 'conglomerate' zone.

Investigations<sup>23</sup> on the Site have shown the Site to generally have a layer of fill distributed over the top surface of the Site. The shallow aquifer is intersected at AHD 20 m to 23 m (generally three to four metres below ground surface on the Site) and flows approximately east-west across the Site. The receiving waters are concluded by Woodward Clyde<sup>24</sup> to be Prospect Creek, which is approximately 2.5 km from the Site. The concreted stormwater channel, which is three to four metres deep and is immediately alongside the Site, was not considered by Woodward-Clyde as a receiving water. The assumption made by Woodward-Clyde that Prospect Creek were the receiving waters was restated by HLA-Envirosciences in their documentation<sup>25,26</sup>.

### 5.2 Auditor Opinion

The Site's soil stratigraphy is incorrectly listed as Ashfield Shale. Reference to relevant material<sup>27</sup> showed the formation to be Bringelly Shale. The groundwater,

<sup>22</sup> Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999

<sup>23</sup> Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999

<sup>24</sup> Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999

<sup>25</sup> HLA-Envirosciences Groundwater Monitoring Report, 191 Miller Road, Chester Hill, 12 August 2002

<sup>26</sup> HLA-Envirosciences Site Validation Report – 191 Miller Road, Chester Hill, 2 August 2002

<sup>27</sup> Penrith Geological Series 9030, 1:100 000, NSW Government, 1991

being saline due to its maritime origins, may be correct, but the true nature of the groundwater was determined by sampling. However, it is the auditor's opinion that the differences between the Ashfield and Bringelly shale formations bear no consequence on the conclusions of the report.

The general hydrogeology characterisation was considered adequate for the purpose of designing an effective remedial strategy and associated validation program.

It is the auditor's opinion that the conclusion that the receiving waters are Prospect Creek, and not the concreted stormwater channel alongside the Site, has not been adequately demonstrated. This channel flows into Prospect Creek. Therefore, for the purpose of this Audit, the adjacent concrete channel has been considered as the nearest receiving waters.

## 6 Evaluation of Quality Assurance and Quality Control Plans

### 6.1 Relevant Information

The QA/QC protocols applied to the Site investigations and validation works were compared with NSW EPA 1997 Consultants Reporting on Contaminated Sites Guidelines. The results are contained in the Table below.

	Woodward Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999	Woodward-Clyde Phase 2C Soil Investigation of Inertic Chester Hill Site, 191 Miller Road, Chester Hill, 15 December 1999	HLA-Enviroscience's Characterisation of Fill Material - 191 Miller Road, Chester Hill, 15 October 2001	HLA-Enviroscience's UST Decommissioning Validation - 191 Miller Road, Chester Hill, 29 January 2002	HLA Enviroscience's Validation of Building Footprints - 191 Miller Road, Chester Hill, 14 June 2002	HLA-Enviroscience's Groundwater Monitoring Report, 191 Miller Road, Chester Hill, 12 August 2002	HLA-Enviroscience's Site Validation Report - 191 Miller Road, Chester Hill, 2 August 2002
<b>Specific QA Requirements</b>							
Reference to Data Quality Objectives (DQOs)	No	No	No	No	No		No
Reference to Data Quality Indicators (DQIs)	✓	✓	✓	No	✓		✓
Compliance with NIEPM for lab analysis	N/A	N/A	✓	No	✓		✓
NATA lab for analyses performed	✓	✓	✓	✓	✓		✓
Batch number	✓	✓	✓	No	✓		✓
Number of original samples	✓	✓	✓	No	✓		✓
Completeness of CoPC list	✓	✓	Note 1	Note 1	Note 1		Note 1
<b>Sample Handling</b>							
By chain of custody times	✓	✓	No	No	✓		✓
By lab receipt of temperature	No	No	No	No	✓		No
By lab notification of complete seals	No	No	No	No	No		No
Laboratory, field (rinsate) and trip blanks for volatiles	✓		✓	Note 2	✓		Note 2
Lab surrogates - Inorganics/organics and other CoPC	✓	✓	✓		✓		✓
Matrix spikes present	✓	✓	✓		✓		✓
Matrix spike duplicates present							
<b>Lab check samples</b>							
Limits of reporting appropriate	✓	✓	✓		✓		✓
% recovery of inorganics/organics and other CoPC	✓	✓	✓		✓		✓
% relative percent difference of inorganics/inorganics and other CoPC	✓	✓	✓		✓		✓
blank performance	✓	✓	✓		✓		✓
<b>Field checks</b>							
% relative percent difference of organics/inorganics and other CoPC.			✓				✓
<b>Overall performance notes</b>							
Precision					✓		✓
Accuracy					✓		✓
Representativeness					✓		✓

	Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999	Woodward-Clyde Phase 2C Soil Investigation of Incitec Chester Hill Site, 191 Miller Road, Chester Hill, 15 December 1999	HLA-Enviroscience's Characterisation of Fill Abundant - 191 Miller Road, Chester Hill, 18 October 2001	HLA-Enviroscience's UST Decommissioning Validation - 191 Miller Road, Chester Hill, 29 January 2002	HLA-Enviroscience's Validation of Building Footprints - 191 Miller Road, Chester Hill, 14 June 2002	? HLA-Enviroscience's Groundwater Monitoring Report, 191 Miller Road, Chester Hill, 12 August 2002	? HLA-Enviroscience's Site Validation Report - 191 Miller Road, Chester Hill, 2 August 2002
Comparability					✓		✓
Completeness					✓		✓
Conclusions							
Note 1	Co/C list appropriate for targeted validation area						
Note 2	Soil samples were taken from the excavator bucket by hand, using a new pair of disposable gloves for each sample. No rinsate blanks therefore necessary. Trip blanks not done. Laboratory blanks completed						

As stated by the Consultant<sup>28</sup> that undertook the soil assessment, there was a degree of imprecision indicated by the field duplicate results, most likely due to soil sample heterogeneity, which is not uncommon. However, the overall soil data was assessed by Woodward-Clyde and subsequently also by HLA-Enviroscience's to be of suitable quality to enable valid assessments to be performed, based on their work.

## 6.2 Auditor Opinion

Based on the information provided, I concur with the Consultants that most of the QC/QA results indicate data of sufficient quality to allow assessment of the Site conditions.

The basis and rationale for my opinion is derived from a comparison of the Consultant's work against the NSW EPA's Checklist for Site Auditors<sup>29</sup> in which data quality considerations and general data useability were assessed and found to be adequate for the decision purposes. The detailed quality assurance evaluation against the QA plans is provided in the sections that follow.

<sup>28</sup> Woodward-Clyde Phase 2C Soil Investigation of Incitec Chester Hill Site, 191 Miller Road, Chester Hill, 15 December 1999

<sup>29</sup> NSW EPA (1998) Checklist for Site Auditors using the EPA Guidelines for the NSW Site Auditor Scheme, prepared by NSW EPA, 14 September 1998 (version 2.0).

## 7 Analytical Results and Quality Assurance Evaluation

Following this Auditor's review of the QA data against the nominated DQOs and DQIs, an overall performance assessment was undertaken to determine the suitability of the data for the purpose of validation of the remedial works. The assessment was not undertaken for the Site assessment data as this information was independently assessed by the validation consultant to design the validation works, including additional actions to address any identified uncertainties associated with the earlier work.

### 7.1 Relevant Information

The quality assurance and quality control program for the subject area consisted of a field QA/QC component, a laboratory QA/QC component and a materials testing and validation plan. Details of this composite QA/QC program, including raw analytical data, were provided for Auditor review.

NATA test method certificates, laboratory and field quality assurance information, chain-of-custody forms and data validation summary reports have been appended in the HLA reports<sup>30,31</sup>. Summary data tables were reviewed against the raw data provided in the form of original NATA certified laboratory reports. Detailed evaluation against current reference guidelines is provided in Tables 7.1, 7.2, 7.3 and 7.4.

<i>HLA Envirosciences Validation of Building Footprints – 191 Miller Road, Chester Hill, 14 June 2002.</i>				
Item	Objective	Reference	Summary of Results	Compliance
Comparison of field and analytical data.	Agreement between visual, olfactory & PID measurements with laboratory results.		General Compliance	Yes
Calibration of field instruments (PID).	Meet calibration specifications.	AS4482	Available	Yes
Verification of field procedures.	Comply with NEPM.	NEPM	General compliance.	Yes
Analysis of 10% field blind duplicate samples.	RPDs 30 to 50% for soil and 20% for water.	AS4482	Duplicate samples collected and analysed. No exceedences.	Yes
Interlaboratory analysis of 10% of the duplicate samples.	RPDs 30 to 50% for soil and 20% for water.	AS4482	Interlaboratory duplicates collected and analysed. Some exceedences.	No[Note 1]
Chain of Custody documentation.	Completed.	NEPM	Complete.	Yes
Sample analysis and extraction holding times.	Comply with AS4482.	AS4482	All within guidelines.	Yes
Use of NATA certified laboratories.	All analytical procedures are NATA-accredited.	NEPM	Analytical certificates all NATA stamped.	Yes

<sup>30</sup> HLA-Envirosciences *UST Decommissioning Validation – 191 Miller Road, Chester Hill, 29 January 2002.*

<sup>31</sup> HLA Envirosciences *Validation of Building Footprints – 191 Miller Road, Chester Hill, 14 June 2002.*

**Table 7.1**

HLA Envirosciences *Validation of Building Footprints – 191 Miller Road, Chester Hill, 14 June 2002.*

Item	Objective	Reference	Summary of Results	Compliance
Limits of Reporting.	Less than Site Acceptance Criteria.		Acceptable.	Yes
Analysis of field (rinsate) blanks, including trip and equipment blanks as appropriate.	No contamination of blanks (rinsate).		Blanks taken and analysed. Some exceedences.	No [Note 2]
Analysis of laboratory method blanks.	No contamination of blanks.		All non-detects (below LORs)	Yes
Analysis of laboratory control samples and spike recoveries.	Recoveries of 75 - 125% or as specified by laboratory.		Analysis completed. Exceedence on one chemical	No [Note 3]
Analysis of laboratory duplicates.	RPD of 20% for both soil and water, or as specified by the laboratory		No exceedences.	Yes
Analysis of surrogates for volatile compounds.	Recoveries of 75% - 125%.		Analysis completed. A few recoveries out of range	No [Note 4]

Notes to Table 7.1

- Note 1:** One inter-laboratory duplicate was analysed and compared. RPDs were generally within the DQI of  $\pm 30\%$  except for sulphate (RPD 106%), arsenic (100%) and lead (60%).
- Note 2:** Two blanks were analysed. Both exceeded the LOR for zinc, which is 0.001 mg/L. Analysis returned the results of 0.003 and 0.004 mg/L. It is the Auditor's opinion that this is not significant in the context of the report.
- Note 3:** One spiked sample gave an average recovery of 211% for trans 1,4-dichloro-2-butene. It is the Auditor's opinion that this is not significant in the context of the report.
- Note 4:** Four acid extractable pesticide surrogates and two base extractable pesticide surrogates were recovered in the 62 to 75% range. One method blank for pesticide surrogate recovered at 69%. It is the Auditor's opinion that this is not significant in the context of the report.

**Table 7.2**

HLA-Envirosciences UST Decommissioning Validation – 191 Miller Road, Chester Hill, 29 January 2002.

Item	Objective	Reference	Summary of Results	Compliance
Comparison of field and analytical data.	Agreement between visual, olfactory & PID measurements with laboratory results.		Laboratory analysis confirmed the following filed observations: <ul style="list-style-type: none"> <li>• Fill material contaminated</li> <li>• Excavation base and sides not contaminated</li> </ul>	Yes
Calibration of field instruments (PID).	Meet calibration specifications.	AS4482	N/A	N/A
Verification of field procedures.	Comply with Service Station Guidelines.	NSW EPA	General compliance.	Yes
Analysis of 10% field blind duplicate samples.	RPDs 30 to 50% for soil and 20% for water.	AS4482	One duplicate collected and analysed. No exceedences.	Yes
Inter-laboratory analysis of 10% of the duplicate samples.	RPDs 30 to 50% for soil and 20% for water.	AS4482	No inter-laboratory duplicates collected. No discussion	No
Chain of Custody documentation.	Completed.	NEPM	Complete.	Yes
Sample analysis and extraction holding times.	Comply with AS4482.	AS4482	All within guidelines.	Yes
Use of NATA certified laboratories.	All analytical procedures are NATA-accredited	NEPM	Analytical certificates all NATA stamped.	Yes
Limits of Reporting.	Less than Site Acceptance Criteria.		Acceptable.	Yes
Analysis of field (rinse) blanks, including trip and equipment blanks as appropriate.	No contamination of blanks (rinse).		No field blanks taken	No [Note 1]
Analysis of laboratory method blanks.	No contamination of blanks.		All non-detects (below LORs)	Yes
Analysis of laboratory control samples and spike recoveries.	Recoveries of 75 - 125% or as specified by laboratory. RPD in 0 to 20% range		Analysis completed. Some recoveries and RPDs out of range	No [Note 2]
Analysis of laboratory duplicates.	RPD of 20% for both soil and water, or as specified by the laboratory.		No exceedences.	Yes
Analysis of surrogates for volatile compounds.	Recoveries of 75% - 125%.		Analysis completed. No results out of range.	Yes

**Notes to Table 7.2**

Note 1: Soil samples were taken from the excavator bucket by hand, using a new pair of disposable gloves for each sample. No blanks are therefore necessary. It is the Auditor's opinion that this is adequate.

Note 2: One matrix spike showed recoveries of 120% for C10-14 and for C15-28. One spiked sample showed recovery of 120%, where laboratory specification was 117%. One spiked sample showed an RPD of 23.4% for benzo(a)anthracene. It is the Auditor's opinion that is not significant in the context of the report.

**Table 7.3**

HLA-Enviroscience's Groundwater Monitoring Report, 191 Miller Road, Chester Hill, 12 August 2002.

Item	Objective	Reference	Summary of Results	Compliance
Comparison of field and analytical data.	Agreement between visual, olfactory & PID measurements with laboratory results.		General Compliance	Yes
Calibration of field instruments (PID).	Meet calibration specifications.	AS4482	Not Available	No
Verification of field procedures.	Comply with NEPM.	NEPM	General compliance	Yes
Analysis of 10% field blind duplicate samples.	RPDs 30 to 50% (or 10xLOR) for soil and 20% for water.	AS4482	Duplicate samples collected and analysed. Some exceedences (Note 1)	No (Note 1)
Interlaboratory analysis of 10% of the duplicate samples (10% of 10%).	RPDs 30 to 50% for soil and 20% for water.	AS4482	No interlaboratory duplicates	No (Note 2)
Chain of Custody documentation.	Completed.	NEPM	Complete.	Yes
Sample analysis and extraction holding times.	Comply with AS4482.	AS4482	No data. Unable to confirm.	
Use of NATA certified laboratories.	All analytical procedures are NATA-accredited.	NEPM	Analytical certificates all NATA stamped.	Yes
Limits of Reporting.	Less than Site Acceptance Criteria.		Acceptable	Yes
Analysis of field (rinstate) blanks, including trip and equipment blanks as appropriate.	No contamination of blanks (rinstate).		Trip spike and trip blank sent for analysis. Disposable bailers used, so no rinstate samples required.	Yes
Analysis of laboratory method blanks.	No contamination of blanks.			
Analysis of laboratory control samples and spike recoveries.	Recoveries of 75 - 125% or as specified by laboratory.		Recoveries within spec, except for one substance (MBK) in one batch, and 2-picoline, 1-naphthylamine, 4-aminobiphenyl, 3,3'-dichlorobenzidine and endrin in another batch.	No (Note 3)
Analysis of laboratory duplicates.	RPD of 20% for both soil and water, or as specified by the laboratory.		No exceedences	Yes
Analysis of surrogates for volatile compounds.	Recoveries of 75% - 125%.		Surrogates analysed. No recoveries out of specification.	Yes

**Notes to Table 7.3**

Note 1: For water samples, RPD is 20%. Exceedences recorded in DUP01 for zinc (40%, 8 vs 12 µg/L. Criterion 8 µg/L) and cyanide (82%, 5 vs 12 µg/L. Criterion 7 µg/L, LOR 5 µg/L). %. Exceedences recorded in DUP02 for copper (40%, 4 vs 6 µg/L. Criterion 1.4 µg/L), and C15-C28 Fraction (61%, 208 vs 309 µg/L. No stated criterion).

Note 2: HLA commented in their report that "given that duplicate samples, trip spikes and trip blanks were utilised to assess the laboratories quality and given ALS's internal quality control is adequate, the quality assessment process is sufficient to validate the data".

Note 3: None of the substances mentioned are compounds of concern on the site. Deviations are not considered substantive.

**Table 7.4**

**HLA-Enviroscience's Site Validation Report – 191 Miller Road, Chester Hill, 2 August 2002.**

Note : Samples included in the Building Footprint Validation Report are duplicated in this report. These are dealt with in Table 7.1, and not scrutinised here.

Item	Objective	Reference	Summary of Results	Compliance
Comparison of field and analytical data.	Agreement between visual, olfactory & PID measurements with laboratory results.		General compliance	Yes
Calibration of field instruments (PID).	Meet calibration specifications.	AS4482	Available	Yes
Verification of field procedures.	Comply with NEPM.	NEPM	General compliance.	Yes
Analysis of 10% field blind duplicate samples.	RPDs 30 to 50% for soil and 20% for water.	AS4482	Sampling rate was 1 per 13 samples (7.8%). HLA noted this was within NEPM (1999) requirements of 1 in 20	Yes
Interlaboratory analysis of 10% of the duplicate samples.	RPDs 30 to 50% for soil and 20% for water.	AS4482	Ignoring footprint samples, 1 sample in 46 (2%) had interlaboratory analysis. RPD (metals) analysis varied from 5 to 216%.	Yes
Chain of Custody documentation.	Completed.	NEPM	Complete	Yes
Sample analysis and extraction holding times.	Comply with AS4482.	AS4482	HLA Data Validation Summary reports all holding times met.	Yes
Use of NATA certified laboratories.	All analytical procedures are NATA-accredited.	NEPM	Analytical certificates all NATA stamped.	Yes
Limits of Reporting.	Less than Site Acceptance Criteria.		Acceptable	Yes
Analysis of field (rinsate) blanks, including trip and equipment blanks as appropriate.	No contamination of blanks (rinsate).		Ignoring footprint samples, 1 rinsate sample was taken and analysed for metals. Found copper contamination (10 µg/L), where PQL was 5 µg/L	Yes
Analysis of laboratory method blanks.	No contamination of blanks.		All method blanks reported as <PQL	Yes
Analysis of laboratory control samples and spike recoveries.	Recoveries of 75 - 125% or as specified by laboratory.		Note 2	Note 2
Analysis of laboratory duplicates.	RPD of 20% for both soil and water, or as specified by the laboratory.		All laboratory duplicates reported analysis <DQOs	Yes
Analysis of surrogates for volatile compounds.	Recoveries of 75% - 125%.		Note 2	Note 2

Notes to Table 7.4

Note 1: One soil inter-laboratory duplicate was analysed and compared (BH14). RPDs outside of the DQI of 30 to 50 % included sulphate (55 & 99 mg/kg, RPD 82%, EIL 2000 mg/kg), arsenic (4 & 57 mg/kg, RPD 216%, SIL 500 mg/kg), and zinc (53%). The variances are most likely due to matrix interference, and the low concentrations, when compared to the Site Criteria, do not have a substantive effect on the conclusions of this Report.

Note 2: HLA reports that matrix spike recoveries and surrogate spike recoveries were generally within acceptable 70-130% range, with few outside of range. Lab reported exceedences were likely due to matrix interference.

## 7.2 Auditor Opinion

Based on the inspection of the QA data, the data obtained was considered adequate for the purposes of proving the veracity of the validation data.

The analytical program generally conformed to the guidance of the NEPM with respect to laboratory procedures. Non-conformances noted above do not appear to have adversely impacted on the overall data quality for the purposes proposed.

The basis and rationale for my opinion is also derived from a comparison of the Consultant's work against the NSW EPA's Checklist for Site Auditors<sup>32</sup> in which data quality considerations and general data useability were assessed and found to be adequate for the decision purposes.

<sup>32</sup> NSW EPA (1998) *Checklist for Site Auditors using the EPA Guidelines for the NSW Site Auditor Scheme*, prepared by NSW EPA, 14 September 1998 (version 2.0).

## 8 Environmental Quality Criteria Used for the Site

### 8.1 Relevant Information

The adopted site-specific soil remediation criteria for the Site's validation were presented in the Site Validation Report<sup>33</sup>. The final criteria are shown in Table 8.1:

Analyte/Compound	Criteria	Criteria Source
TPH C <sub>6</sub> - C <sub>9</sub> Fraction	65	NSW EPA (1994) <sup>(a)</sup>
TPH C <sub>10</sub> - C <sub>16</sub> Fraction	1,000	NSW EPA (1994) <sup>(a)</sup>
TPH > C <sub>16</sub> - C <sub>15</sub> Aromatics	450	NEPC (1999) <sup>(b)</sup>
TPH > C <sub>16</sub> - C <sub>15</sub> Aliphatics	28,000	NEPC (1999) <sup>(b)</sup>
TPH > C <sub>15</sub> Aliphatics	28,000	NEPC (1999) <sup>(b)</sup>
Benzene	1	NSW EPA (1994) <sup>(a)</sup>
Toluene	1.4	NSW EPA (1994) <sup>(a)</sup>
Ethylbenzene	3.1	NSW EPA (1994) <sup>(a)</sup>
Xylenes	14	NSW EPA (1994) <sup>(a)</sup>
As	500	NSW EPA (1998) <sup>(c)</sup>
Cd	100	NSW EPA (1998) <sup>(c)</sup>
CrIII	60%	NSW EPA (1998) <sup>(c)</sup>
CrVI	500	NSW EPA (1998) <sup>(c)</sup>
Trichloroethene (TCE)	6.1	US EPA PRG (1998) <sup>(d)</sup>
1,2-Dichloroethane (1,2 DCA)	0.76	US EPA PRG (1998) <sup>(d)</sup>
Cu	5,000	NSW EPA (1998) <sup>(c)</sup>
Ni	3,000	NSW EPA (1998) <sup>(c)</sup>
Pb	1,500	NSW EPA (1998) <sup>(c)</sup>
Zn	35,000	NSW EPA (1998) <sup>(c)</sup>
Hg	75	NSW EPA (1998) <sup>(c)</sup>
Benzo(a)pyrene	5	NSW EPA (1998) <sup>(c)</sup>
Total Reported PAHs	100	NSW EPA (1998) <sup>(c)</sup>
Phenol	42,500	NSW EPA (1998) <sup>(c)</sup>
PCBs (Total)	50	NSW EPA (1998) <sup>(c)</sup>
Asbestos	No detections	NSW EPA guidance to Auditors
Sulphur	600	NEPC (1999) <sup>(b)</sup>
Sulphate	2,000	NEPC (1999) <sup>(b)</sup>
pH	Comparison to background	NSW EPA guidance to auditors
Tetrachloroethene (PCE)	19	US EPA PRG (1998) <sup>(d)</sup>

<sup>33</sup> HLA-Envirosciences Site Validation Report, 191 Miller Road, Chester Hill, NSW, 2 August 2002

Table 8.1 191 Miller Road Site-specific Soil Remediation Criteria (mg/kg unless stated)		
Analyte/Compound	Criteria	Criteria Source
(a) NSW EPA (1994) <i>Guidelines for assessing Service Station Sites</i>		
(b) National Environment Protection Council <i>National Environment Protection (Assessment of Contaminated Sites) Measure</i> (1999)		
(c) NSW EPA (1998) <i>Guidelines for the NSW Site Auditor Scheme</i>		
(d) US EPA Regional Preliminary Remediation Goals (1998). These were used where no local references were available.		

Groundwater monitoring results were compared to the ANZECC Guidelines for Fresh and Marine Water Quality (2000). The adopted site-specific groundwater criteria for the Site's monitoring were presented in the Groundwater Monitoring Report<sup>34</sup>. The final criteria are shown in Table 8.2:

Table 8.2 191 Miller Road Site-specific Groundwater Criteria (mg/l unless stated)	
Analyte/Compound	Criteria
Benzene	0.950
Toluene	0.300
Ethylbenzene	0.140
ortho-Xylenes	0.350
As	0.024
Cd	0.0002
Cr	0.001
Cu	0.0014
Ni	0.011
Pb	0.0034
Zn	0.008
Hg	0.0006
Total Cyanide	0.007
PH	pH 6.5 - 9

## 8.2 Auditor Opinion

The proposed soil criteria are considered to be adequately conservative for commercial/industrial purposes. Groundwater threshold levels were considered to be adequately protective of the local groundwater conditions.

The basis and rationale for my opinion is derived from the Consultant's appropriate application of the methods outlined in the 1999 NEPM Schedule B(1), Schedule B(2) and Schedule B(3) relating to the identification and assessment of contaminated land, and especially with respect to the methods for site validation sampling and analysis.

<sup>34</sup> HLA-Envirosciences *Groundwater Monitoring Report, 191 Miller Road, Chester Hill, 12 August 2002*

My opinion is also based on a comparison of the Consultant's work against the NSW EPA's *Checklist for Site Auditors*<sup>35</sup> in which soil investigation levels (SIL) are considered. I have also considered the nominated site groundwater threshold levels against the ANZECC 2000 guidelines and consider the levels proposed to be adequately conservative and protective for the possible groundwater receptors.

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<sup>35</sup> NSW EPA (1998) *Checklist for Site Auditors using the EPA Guidelines for the NSW Site Auditor Scheme*, prepared by NSW EPA, 14 September 1998 (version 2.0).

## 9 Assessment of Risk

### 9.1 Relevant Information Regarding Soils

As part of the Phase 1 and 2 Site assessments, Woodward-Clyde<sup>36</sup> did a qualitative assessment of the significant risk of harm using NSW EPA Guidelines<sup>37</sup>. It was concluded by Woodward-Clyde that the "contamination identified in this assessment is not considered to represent a significant risk of harm to human health or the environment."

After the remedial works for soils had been completed, HLA-Envirosciences concluded in their Site Validation Report<sup>38</sup>:

- "Elemental sulphur and elevated concentrations of sulphate have been identified in fill material and may potentially be present within the stormwater drains located at the Site. The presence of Sulphur and high concentrations of sulphate may impact on subsurface services and structures (ie concrete foundations)";
- "Low pH soil. Acidic soils and groundwater may impact on subsurface services and structures or increase the mobility of metallic contaminants." However they are "not considered to be posing unacceptable risk to human health or the environment under commercial/industrial use";
- PAH compounds in fill, originating from ash, slag and coal where "these concentrations are not considered to pose an unacceptable risk under commercial/industrial landuse";
- "Concentrations of lead above the SIL<sub>1</sub> guidelines has been detected in fill located .... beneath the existing warehouse." "These concentrations are not considered to pose an unacceptable risk under a commercial/industrial landuse";
- "Petroleum hydrocarbons and VOC compounds have been detected in fill materials"; and
- "Asbestos was present in one location in the 'fill mound' located on the northeastern corner of the Site". This asbestos impacted soil "was excavated by Whitehorse Constructions and used to backfill the bottom portion of the [6 m deep] Dome void. Whitehorse has informed HLA that this material will be covered by clean imported soil."

To manage the above risk associated with the soil contaminants, HLA-Envirosciences has developed a Site Management Plan (SMP)<sup>39</sup>. It is the intention that the SMP to be used during future construction, management and maintenance on the Site. The SMP requires the drafting of a site-specific occupational health

<sup>36</sup> Woodward-Clyde *Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill*, 30 August 1999, Volumes 1, 2 and 3

<sup>37</sup> NSW EPA *Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report*, April 1999

<sup>38</sup> HLA Envirosciences *Site Validation Report, 191 Miller Road, Chester Hill*, 2 August 2002

<sup>39</sup> HLA-Envirosciences *Site Management Plan - 191 Miller Road, Chester Hill*, 22 August 2002

and safety plan and specific works methodologies. The SMP covers the general environmental management issues such as:

- Stormwater Management;
- Soil Management;
- Traffic and Access;
- Protection of Vegetation;
- Odour Control;
- Dust Control;
- Noise and Vibration;
- Vehicle Equipment Cleaning and Operation;
- Materials Management;
- Waste Management and Minimisation;
- MSDS
- Community Consultation;
- Landscaping; and
- Contingency planning for uncovering contaminated or unknown materials, damage to underground services, spills and leaks, excessive rain and equipment and surface water protection measures failure.

Specific to the known contaminants present on Site, the SMP has the following information:

- A location map of potential management areas;
- A summary of remaining contamination issues requiring management;
- Requirement for Contractors to:
  - "Review the SMP to identify any area that will be disturbed that require management";
  - "Review the SMP to determine if the proposed building materials are suitable for elevated sulphate and or low pH soil conditions";
  - Separately stockpile "materials excavated from the areas identified in the SMP as 'potentially requiring management' ";
  - Require "excavations and stockpiled material .... inspected for any obvious signs of contamination";

- For the fill mound [found to contain a small area of possible asbestos fragment contamination] the "fill met the SIL<sub>4</sub> guidelines for commercial/industrial landuse. The report, however, made the following recommendations:"
  - If it "is to be disposed off-site it should be classified in accordance with the NSW EPA Environmental Guidelines: Assessment, Classification & Management of Liquid and Non-liquid Wastes";
  - "The portion of the stockpile characterised by TP08 should be re-sampled and analysed for PAH to ensure benzo(a)pyrene and total PAH concentrations are below SIL<sub>4</sub> guidelines". The PAH concentrations, "although not in such a state to pose any unacceptable risk to future users, requires responsible management"; and
  - "During reuse of fill, any suspected fragments of fibrous-cement sheeting encountered should be removed from the soil, double-bagged and disposed of."

## 9.2 Relevant Information Regarding Groundwater

As part of the Phase 1 and 2 Site assessments, Woodward-Clyde<sup>40</sup> did a qualitative assessment of the significant risk of harm using NSW EPA Guidelines<sup>41</sup>. It was concluded by Woodward-Clyde that the "contamination identified in this assessment is not considered to represent a significant risk of harm to human health or the environment." Woodward-Clyde also noted that "Due to its high salinity, the groundwater beneath the subject site would not be used for consumption by humans and animals. The NSW Department of Land and Water Conservation could not locate any registered groundwater bores within 2 km of the site."

The HLA Envirosciences Groundwater Monitoring Report<sup>42</sup> noted:

- "The contaminants exceeding ANZECC (2000) freshwater ecosystem guidelines include the following - Copper, nickel and zinc". It was concluded "the elevated concentrations of zinc and copper .. is likely to be background concentrations", with the increase concentrations in one well "attributable to the low pH reading.... which may have increased metal solubility and mobility";
- "The contaminants exceeding ANZECC (2000) freshwater ecosystem guidelines include the following - Total Cyanide" in three wells. HLA noted "the groundwater samples were tested for total cyanide and not free cyanide. Free cyanide testing determines the sum of hydrogen cyanide and the cyanide ion (CN<sup>-</sup>) in a sample, which are considered the most toxic forms of cyanide. It is likely that total cyanide concentrations in the groundwater are greater than free cyanide levels, however as a conservative measure total cyanide has been compared to free cyanide criteria";
- "Concentrations of TPH were detected" in 5 wells, and "no free phase product was observed in any of the wells tested and only a surface sheen was observed" in four wells (there are no ANZECC (2000) criteria for TPH). It was concluded that the "potential sources of TPH in groundwater have been

<sup>40</sup> Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999

<sup>41</sup> NSW EPA Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report, April 1999

<sup>42</sup> HLA-Envirosciences Groundwater Monitoring Report, 191 Miller Road, Chester Hill, 12 August 2002

previously removed, which include the UST in the office car park<sup>43</sup> and Boylans yard<sup>44</sup>. In addition, an integrity test of the existing UST showed that the tank and associated fuel lines were tight (not leaking)";

- "Concentrations of VOCs were detected" [above the practical quantification limit (PQL)] in 4 wells, and "included 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethene and chloroform" (there are no ANZECC (2000) criteria for VOCs). HLA concluded that that indications were that "the impact appears to be restricted to the area of the Dome" and "notes that any impact to groundwater from the sludge Dome has also been alleviated due to the removal of the sludge within the Dome";
- "Concentrations of PAHs (namely fluoranthene, pyrene, benzo(a)anthracene, benzo(a)pyrene, indo(1,2,3-cd)pyrene, benzo(g,h,i)perylene) above PQL" in one well [there are no ANZECC (2000) criteria for PAHs]; HLA speculated "the PAH ... is possibly associated with activities associated with adjacent UST and previously decommissioned diesel UST located in the office car park"

The Woodward-Clyde Report<sup>45</sup> also stated "The VHA [volatile halogenated aliphatic, equivalent to VOC mentioned above] compound concentrations detected in the shallow aquifers are not considered to represent a significant risk of harm to potential receiving surface waters, such as Prospect Creek and the Georges River, due to the level of the VHA compound concentrations detected and attenuation of these concentrations through the aquifer." The compounds of note were 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethene, tetrachloroethene and chloroform.

During the remediation works, HLA-Envirosciences found the Dome contained sludge that was similarly contaminated with the above VOC/VHA compounds. Following the removal of the sludge, the base of the dome was broken through. HLA detected<sup>46</sup> "a dark liquid with a strong organic odour was also present between the brick and concrete." Analysis "indicated the presence of dense non-aqueous phase liquid (DNAPL) at the base of the dome, between the brick and concrete layers." However, "based on the construction of the dome, 0.3 m thick steel reinforced concrete wall and 0.7 m thick steel reinforced concrete base, and given that the concrete base and walls were not damaged or weathered, HLA consider that it is unlikely impact to soil or groundwater had previously occurred from the waste previously held in the dome." Any future "impact to groundwater from the sludge [in the] dome has been alleviated due to the removal of the sludge."

HLA-Envirosciences followed up the Woodward-Clyde groundwater monitoring with another round of groundwater sampling<sup>47</sup>, and found the groundwater similarly contaminated VHA/VOC.

To manage the above risk associated with the groundwater contaminants, the Site Management Plan<sup>48</sup> (SMP) developed by HLA-Envirosciences has to be adhered

<sup>43</sup> Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999

<sup>44</sup> HLA-Envirosciences UST Decommissioning Validation - 191 Miller Road, Chester Hill, 29 January 2002.

<sup>45</sup> Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999

<sup>46</sup> HLA-Envirosciences Site Validation Report - 191 Miller Road, Chester Hill, 2 August 2002

<sup>47</sup> HLA-Envirosciences Groundwater Monitoring Report, 191 Miller Road, Chester Hill, 12 August 2002

<sup>48</sup> HLA-Envirosciences Site Management Plan - 191 Miller Road, Chester Hill, 22 August 2002

to. The SMP recommends a groundwater monitoring program be implemented on a quarterly basis for twelve months. This monitoring program should be reported to the Auditor for review and comment.

### 9.3 Auditors opinion

Future construction, management and maintenance activities on the Site will require reference to the SMP.

I agree with HLA's<sup>49</sup> recommendation that, prior to any use being made of the stockpile material, the portion of the fill mound (characterised by TP08) should be re-sampled and analysed, even though it is "not in such a state to pose any unacceptable risk to future users"

The HLA recommendation to monitor groundwater is necessary, as there remains uncertainty regarding the broader environmental risk the contaminants may pose and whether there is any significant risk of off site contaminant migration.

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<sup>49</sup> HLA-Envirosciences *Site Management Plan - 191 Miller Road, Chester Hill, 22 August 2002*

## 10 Evaluation of Remediation for the Proposed Land Use

### 10.1 Relevant Information

The Site was remediated by a combination of the following:

- Demolition of several structures to ground level and validation of the building's footprint<sup>50</sup>;
- Excavation and removal of the decommissioned UST located in the north-western portion of the site and landfarming of the excavated soils. The soils were found to be suitable for reuse on site<sup>51</sup>;
- Bowser and pipeline removal and excavation of soils associated with the above UST. The excavated and stockpiled material was removed and disposed of off site<sup>52</sup>;
- Removal and off site disposal of water and sludge from the dome, and discovery, recovery and off site disposal of DNAPL found between the brick and concrete layer of the base of the dome<sup>53</sup>; and
- "Asbestos was present in one location in the 'fill mound' located on the north-eastern corner of the Site". A portion of this asbestos impacted soil "was excavated by Whitehorse Constructions and used to backfill the bottom portion of the [6 m deep] Dome void. Whitehorse has informed HLA that this material will be covered by clean imported soil."<sup>54</sup>

No groundwater remediation was undertaken.

### 10.2 Auditor's Opinion

The range of remedial approaches, applied to the identified contamination, is considered to be consistent with the hierarchy for site remediation as suggested in the 1992 ANZECC/NHMRC Guidelines for the Assessment and Management of Contaminated sites, as well as the recommendations provided in the more recent 1999 NEPM guidance.

The source removal for groundwater management, together with ongoing localised monitoring to prove compliance was considered appropriate for the degree and extent of groundwater hazard that was identified by the Environmental Consultant.

<sup>50</sup> HLA Enviroscience's Validation of Building Footprints – 191 Miller Road, Chester Hill, 14 June 2002.

<sup>51</sup> HLA-Enviroscience's UST Decommissioning Validation – 191 Miller Road, Chester Hill, 29 January 2002.

<sup>52</sup> HLA-Enviroscience's Site Validation Report – 191 Miller Road, Chester Hill, 2 August 2002

<sup>53</sup> HLA-Enviroscience's Site Validation Report – 191 Miller Road, Chester Hill, 2 August 2002

<sup>54</sup> HLA-Enviroscience's Site Validation Report – 191 Miller Road, Chester Hill, 2 August 2002

## 11 Compliance with Regulatory Guidelines and Directions

### 11.1 Relevant Information

The documentation reviewed complied with the guidelines indicated in the table below.

	Woodward Clyde Phase 1 and 2 Assessment of Chester Hill Site 191 Miller Road, 30 Aug '99	Woodward Clyde Phase 2C Soil Investigation of Chester Hill Site 191 Miller Rd, 15 Dec '99	HLA Enviroscience's Characterisation of Fill Material - 191 Miller Road, 18 October 2001	HLA Enviroscience's UST Decommissioning Validation - 191 Miller Road, 29 Jan 2002	HLA Enviroscience's Validation of Building Footprints - 191 Miller Road, 14 June 2002	HLA Enviroscience's Site Management Plan - 191 Miller Road, Chester Hill, June 2002.	HLA Enviroscience's Groundwater Monitoring Report, 191 Miller Road, 12 Aug 2002	HLA Enviroscience's Site Validation Report - 191 Miller Road, Chester Hill, 2 August 2002
Contaminated Land Management Act 1997, and associated Regulations, as amended	✓	✓	✓	✓	✓	✓	✓	✓
ANZECC/NIHMRC (Australian and New Zealand Environment and Conservation Council/National Health and Medical Research Council), Guidelines for the Assessment and Management of Contaminated Sites (1992)	✓	✓	✓	✓	✓	✓	✓	✓
National Environmental Health Forum, 1998	✓	✓		✓	✓	✓	✓	✓
National Environment Protection Council National Environment Protection (Assessment of Contaminated Sites) Measure, 1999				✓	✓		✓	✓
NSW EPA, Guidelines for Assessing Service Station Sites (1994)	✓	✓	✓	✓	✓			✓
NSW EPA, Guidelines for the NSW Site Auditor Scheme (1998)	✓	✓	✓	✓	✓			✓
NSW EPA, Guidelines for Consultants Reporting on Contaminated Sites (1997)	✓	✓	✓	✓	✓		✓	✓
NSW EPA, Sampling Design Guidelines (1995)	✓	✓						
Acceptance of waste for off site disposal as inert, solid or hazardous according to the NSW EPA Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-liquid Wastes (1999)								✓
ANZECC Australian Water Quality Guidelines for Fresh and Marine Waters, November 1992	✓							
ANZECC Guidelines for Fresh and Marine Quality, 2000							✓	✓
US EPA Regional Preliminary Remediation Goals, 1998.							✓	✓
NSW EPA Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report, April 1999	✓							
Bankstown City Council Policy for the Management of Contaminated Land 28 Sept 1999								✓
Australian Institute of Petroleum The Removal and Disposal of Underground Petroleum Storage Tanks, 1994				✓				

### 11.2 Auditor Opinion

In my opinion, based on the information provided, the investigation and remediation at the Site has complied with the appropriate guidelines.

In my opinion, Bankstown City Council consent and notification were obtained for the Site's remediation.

The basis and rationale of this opinion is derived from my review of the above documentation, as well as consideration of the items raised in the Site Auditor Scheme Guidelines.

## 12 Any Evidence of, or Potential for, Contaminant Migration

### 12.1 Relevant Information

As noted in Section 9.2 above, the groundwater is contaminated with metals, cyanide, VOC, THP and PAH. The receiving waters are concluded by Woodward Clyde<sup>55</sup> to be Prospect Creek, which is approximately 2.5 km from the Site. This assumption was restated by HLA-Envirosciences in their documentation.

### 12.2 Auditor Opinion

The argument that Prospect Creek is the receiving waters, and not the drain alongside the site, in my opinion, has been satisfactorily established, as mentioned in Section 5.2 of this Report.

If the drain is the receiving water for groundwater, or a portion of the upper layers of the shallow aquifer's groundwater, the analysis of the Significant Risk of Harm done by Woodward-Clyde<sup>56</sup> is, therefore, also called into question.

It is my opinion that insufficient information has been provided to establish what the receiving waters are, whether there is a significant risk of harm, and what material is migrating off site. Therefore, I agree with HLA's recommended action<sup>57</sup> that additional groundwater monitoring take place to establish this information.

<sup>55</sup> Woodward-Clyde *Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill*, 30 August 1999, Volumes 1, 2 and 3

<sup>56</sup> Woodward-Clyde *Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill*, 30 August 1999, Volumes 1, 2 and 3

<sup>57</sup> HLA-Envirosciences *Site Management Plan - 191 Miller Road, Chester Hill*, 22 August 2002

## 13 Phytotoxicity Considerations

### 13.1 Relevant Information

HLA-Envirosciences state in their validation report<sup>58</sup> that provisional phytotoxicity based investigation levels (PBILs) and Ecological Investigation Levels (EILs) "have been devised for the protection of plants and are designed to be applied as single number criteria indicative of environmental effects." "PBILs need to be considered on sites used for either residential purposes, or land uses including parks, recreational open space and secondary schools and not on commercial or industrial properties.

### 13.2 Auditors Opinion

During the course of the remedial works, Bankstown City Council's Environment Officer raised a concern in relation to the apparent exceedences of certain contaminants above EPA's Provisional Phytotoxicity-Based Investigation Levels (PBILs) at locations within the subdivision. A letter<sup>59</sup> was sent to Council to address this concern, which stated "It is important to realise that the PBILs are not relevant criteria for a site's continued Commercial/ Industrial use, and are therefore not part of the 'Decision Process for Assessing Urban Redevelopment Sites'".

As the landuse is continuing commercial/industrial, I therefore agree with HLA's assessment that phytotoxic considerations do not apply.

<sup>58</sup> HLA-Envirosciences *Site Validation Report – 191 Miller Road, Chester Hill*, 2 August 2002

<sup>59</sup> Letter from Ross McFarland of CH2M HILL to The General Manager, Bankstown City Council, dated 14 June 2002

## 14 Council Policy Considerations

The Bankstown City Council *Policy for the Management of Contaminated Land* requires the Site Auditor to address the following questions explicitly:

### 14.1 "Has the contaminated land consultant complied with all EPA endorsed guidelines?"

With reference to Section 8 of this report, "Environmental Quality Criteria Used for the Site", appropriately conservative criteria have been selected using EPA guidelines.

With reference to Section 11 of this report, "Compliance with Regulatory Guidelines and Directions", it is my opinion that, based on the information provided, the investigation and remediation at the Site has complied with the appropriate guidelines.

Cross references to other acts, regulations and guidelines are included throughout the text of the report.

### 14.2 "What further investigations or remediation is required before the land is suitable for any specified use or range of uses?"

The intended landuse is for continued commercial/industrial purposes. The remedial work was considered by the Consultant to be adequate to enable continued commercial/industrial use, provided the proposed Site Management Plan was implemented to manage the small hazard and manageable risks remaining at the Site.

With reference to Section 9.1 of this report, further testing must take place in the fill mound, around TP08 prior to any disturbance of this stockpile. As there is no unacceptable risk of harm from this one hotspot in its current form, the Site may be considered to be suitable for continued commercial/industrial uses, provided the proposed Site Management Plan is implemented.

With reference to Section 9.3 and section 12 of this report, further information is proposed to be gathered on a quarterly basis over the next 12 months, regarding the fate of the groundwater, what are the receiving waters for the Site, and whether there is a risk of harm from the Site associated with any contaminant migration passing across the Site. It is my opinion that this information can be gathered in parallel with the ongoing commercial/industrial landuse of the Site without adversely impacting on the normal use of the Site. Furthermore, based on the information already provided in relation to groundwater quality, there does not appear to be any unacceptable risks posed by the current groundwater condition.

### 14.3 "Whether the Auditor considers that the remediation is adequate and .... will render the Site to be suitable for the proposed use?"

The Environmental Consultant concluded that the remediation completed has resulted in the Site being made acceptable for continuing commercial/industrial

purposes, subject to the implementation of the Site Management Plan for any disturbance activities, viz:

- With reference to Section 9.3 of this report, future construction, management and maintenance work conducted on the Site will require reference to the Site Management Plan (SMP)<sup>60</sup>. The SMP also requires the production of a health and safety plan, and site specific safe work method statements.

#### **14.4 "Whether it can be concluded that there is no unacceptable off-site migration of contaminants, particularly via groundwater?"**

With reference to Section 12 of this Report, the argument that Prospect Creek is the receiving waters, and not the drain alongside the site has, in my opinion, not been satisfactorily established. If the drain is the receiving water for groundwater the Analysis of the Significant Risk of Harm done by Woodward-Clyde<sup>61</sup> is, therefore, also called into question.

It is my opinion that insufficient information has been provided to establish what the receiving waters are, whether there is a significant risk of harm, and what material is migrating off site.

#### **14.5 Whether the contamination conditions at the site are suitable for the in-ground absorption of stormwater?**

The information provided suggests a low contaminant mobility potential from the soils. However, given the historical nature of the contaminating activities across the Site, it would be prudent to avoid the use of on-site in-ground adsorption processes for stormwater management. Instead, fully enclosed on-site first-flush systems would be sagacious, notwithstanding the low potential risks that might be posed by the Site's soil conditions.

<sup>60</sup> HLA-Envirosciences *Site Management Plan – 191 Miller Road, Chester Hill*, 22 August 2002

<sup>61</sup> Woodward-Clyde *Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill*, 30 August 1999, Volumes 1, 2 and 3

## 15 Conclusions and Recommendations

In my opinion, based on the information provided and my observations of the Site, there do not appear to be any unacceptable risks in the Site's proposed use for continued commercial/industrial purposes.

More specifically and consistent with the Decision Process for assessing urban redevelopment sites<sup>62</sup>, I have checked that:

- All site assessment, remediation and validation reporting has followed the 1997 NSW EPA Guidelines for Consultant Reporting;
- Aesthetic issues have been addressed;
- Soils have been appropriately assessed against the lower of the appropriate health-based investigation levels and provisional phytotoxicity investigation levels (EILs).
- Issues relating to local background soil characteristics have been considered.
- Impacts associated with chemical mixtures have been considered.
- The attached site management strategy is appropriate to address any disturbance and monitoring requirements.
- Evidence of, or potential for, migration of contaminants from the Site has been considered and relevant stakeholders, by the publication of this Summary Site Audit Report and associated Site Audit Statement, have been made aware of the environmental status of the Site.

On this basis I have prepared a Site Audit Statements (SAS No. 2002/13) that concludes that the site is suitable for the landuses nominated subject to the implementation of the associated Site Management Plan.

This report should be read in conjunction with the attached Site Audit Statement and Site Management Plan, as well as the various reports and guidelines nominated above.

Ross McFarland  
CH2M HILL Principal Environmental Auditor (Contaminated Land)  
NSW Accredited Site Auditor (No. 9819)

<sup>62</sup> NSW EPA (1998) Guidelines for the NSW Site Auditor Scheme, pages 28 and 29.

## Appendix A

### Drawings

Drawing Number	Date	Author	Title
56980LD1	Mar'01	Lean Lackenby & Hayward	Plan showing Detail and Levels and Proposed Subdivision, Sheet 1 of 5
56980LD2	Mar'01	Lean Lackenby & Hayward	Plan showing Detail and Levels and Proposed Subdivision, Sheet 2 of 5
56980LD3	Mar'01	Lean Lackenby & Hayward	Plan showing Detail and Levels and Proposed Subdivision, Sheet 3 of 5
56980LD4	Mar'01	Lean Lackenby & Hayward	Plan showing Detail and Levels and Proposed Subdivision, Sheet 4 of 5
56980LD5	Mar'01	Lean Lackenby & Hayward	Plan showing Detail and Levels and Proposed Subdivision, Sheet 5 of 5

## Appendix B

### Site Management Plan

**Appendix G**

**Auditor Review of Groundwater Monitoring Report (CH2MHILL 2004)**

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**Memorandum**

Date 19 October 2004  
To David Tubb, PacLib  
CC Sedat Tasdemir, HLA Envirosciences  
From Ross McFarland  
Job no. 110610 File no. D4  
Subject **Auditor Review of Groundwater Monitoring Report, Chester Hill, NSW**

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My Site Audit Statement of August 2002, refers to the need for a groundwater monitoring program to assess the longer term status of the groundwaters at the Site generally known as 191 Miller Street, Chester Hill, NSW (the "Chester Hill Site").

Recently, I have received a groundwater report for the Chester Hill Site. The report is titled:

"Groundwater Monitoring Report, Final Round, 2004, 191 Miller Street, Chester Hill, NSW", prepared by HLA Envirosciences Pty Ltd, dated 30 July 2004 (HLA Reference: J1698\_5\_RPT\_4<sup>th</sup> rnd\_30Jul04).

My review of the assessment of groundwater risk from contaminant mobility has been made with regard to the National Environmental Protection Measure for the Assessment of Contaminated Sites (NEPM), with specific reference to Schedule B(6)<sup>1</sup>, in that an appraisal of the following issues (as applicable) indicates, based on the use of the current ongoing site management plan (SMP), there is negligible likelihood of unacceptable groundwater contamination that would adversely impact on the Site's proposed use:

- on-site sources (type of source);
- contaminant sources unrelated to the site;
- whether sources(s) has been removed;
- permeability of the strata on the site;
- known or expected depth to the local water table;
- ambient groundwater quality;
- quantity of contaminant and its mobility characteristics;
- identification of potential receptors; and
- other site-specific issues, as applicable.

The SMP that has been developed and implemented at the Chester Hill Site is considered to be an adequately conservative response to the nature and extent of residual risks associated with the Site.

My opinion is also based on a comparison of the Consultant's work against the NSW EPA's Checklist for Site Auditors<sup>2</sup> in which data quality, assessment criteria and risk assessment are considered.

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<sup>1</sup> NEPC(1999). "National Environment Protection (Assessment of Site Contamination) Measure – Schedule B(6) – Guideline on Risk Based Assessment of Groundwater Contamination

<sup>2</sup> NSW EPA (1998) Checklist for Site Auditors using the EPA Guidelines for the NSW Site Auditor Scheme, prepared by NSW EPA, 14 September 1998 (version 2.0).

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More specifically, the HLA report provides the following information in relation to the NEPM B(6) guidance:

on-site sources (type of source)

The likely former **primary** source of groundwater contamination was identified as the former in-ground neutralisation tank) that has been removed.

Possible **secondary** sources may have been associated with activities in the vicinity of

- o a former caustic tank (located up-gradient of MWS8);
- o a former Tanker Washer Bay, located immediately east of MWS8; and
- o storage of drums believed to have contained chlorinated solvent compounds, on the neighbouring property, to the south of the Site, and adjacent to MWS8 and MWS10.

contaminant sources unrelated to the site

As noted above, there appears to be an up-gradient source of chlorinated solvent compounds migrating into the groundwater and onto the Chester Hill Site.

whether sources(s) has been removed

As noted above, all identified primary and second sources within the Chester Hill Site have been reported to have been removed. It is unclear as to the status of the alleged up-gradient source.

permeability of the strata on the site

The Consultant estimates a groundwater velocity to be very slow, and in the order of 0.013 to 1.3 metres per year. This range is based on the estimated character of the Site's residual clays identified during groundwater well construction, as well as from an estimated hydraulic gradient of 0.025 metre/metre) calculated from recent on-site well head measurements.

known or expected depth to the local water table

Shallow groundwater has been measured in the final groundwater monitoring round (June 2004) to be at between AHD18.59m (MWS5) to AHD20.65m (MWS10). The depth to the local water table across the site varies from 1.48m (MWS10) to 2.31m (MWS6).

ambient groundwater quality

In the last groundwater monitoring round report, the ambient heavy metal water quality is described by the Consultant to be generally below the ANZECC 2000 Water Quality Guidelines for Fresh waters, except for:

Nickel at 0.528 mg/L (MWS8) against an ANZECC threshold of 0.011 mg/L.

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Based on comparison against the previous six years of monitoring data, this reported Nickel exceedence appears to be an ambient background condition rather than a contaminant arising from the Chester Hill Site.

Other contaminants of concern (TPH, BTEX, PAHs, Cyanides) levels were at local background conditions, below ANZECC 2000 threshold levels, or were below appropriate method detection limits.

Volatile organic compounds (VOCs) continued to be detected across the Site, but the monitoring wells that were considered to be representative of groundwater that may be leaving the down-gradient area of the Site showed either non-detect or very low levels that appeared to be representative of the Site's natural attenuation of these contaminants. This natural attenuation was reflected in comparisons against the previous 6 years of groundwater monitoring data, and by a review of the reported formation of typical daughter products that arise from the natural decay of the contaminants of concern.

The Site Management Plan was considered to be appropriate to ensure that the ongoing use of the Site was not adversely impacted by the identified residual VOC.

quantity of contaminant and its mobility characteristics

The mobility of the identified VOC contaminants of concern was considered to be low in both the vertical and horizontal directions, due to the physical characteristics of the residual soils, the low hydraulic head across the Site, and the broad coverage of the Site by an effectively impermeable surface covering (concrete slab). Furthermore, any potential for adverse impacts that could arise from contaminant mobility have been adequately addressed in the SMP.

identification of potential receptors

The nearest sensitive receptor is believed to be Prospect Creek, located more than 3,000 metres to the west/southwest. It is unlikely that the identified impacted groundwaters would have any adverse impact on this nearest sensitive receptor.

Onsite receptors are limited to commercial/industrial uses which are controlled by the SMP.

other site-specific issues, as applicable.

As noted above, an ongoing site management plan (SMP) has been developed and implemented at the Site to ensure the ongoing protection of the commercial users of the Site.

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### AUDITOR'S OPINION

Based on the information provided, it is my opinion that:

- ❖ the likely on-site sources of groundwater contamination have been removed;
- ❖ the groundwater monitoring program undertaken from 1999 to June 2004 has concluded that the identified contaminants arising from the Chester Hill Site are undergoing natural attenuation within the Site's boundaries;
- ❖ Given the results to-date, there does not appear to be a need for further groundwater monitoring, unless the Site is considerably modified, such as by the removal of significant areas of the Site's concrete slabs or other activities that may increase the potential mobility of the identified groundwater contamination;
- ❖ the identified groundwater contamination is not considered to pose any adverse impact on the normal use of the Site for its continued commercial purposes, provided the SMP continues to be implemented.

I would be pleased to provide further information on this review, at your request.

This review should be read in conjunction with my completed Site Audit Statement and associated site Audit Report, dated August 2002 (my Reference 2002/13).

Yours sincerely  
CH2MHILL AUSTRALIA PTY LTD



Ross McFarland  
NSWEPA Site Auditor No. 9819

**Appendix H**  
**Site Management Plan (HLA 2002)**

## Site Management Plan

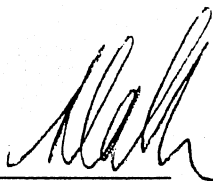
**191 Miller Road  
Chester Hill, NSW**

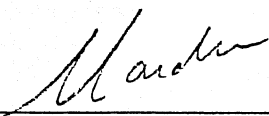
Prepared for:

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Suite 3 & 4  
22 Elizabeth Street  
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HLA-Envirosciences Project No: J1698

by

  
for Lauren Allen  
Senior Environmental Scientist

  
Sedat Tasdemir  
Senior Environmental Scientist

22 August 2002  
Revision 3



*This document was prepared for PacLib Management Pty Ltd and the regulatory agencies that are directly involved in this project, the only intended beneficiaries of our work. No other party should rely on the information contained herein without the prior written consent of HLA-Envirosiences Pty Limited and the site owner.*

*From a technical perspective, the subsurface environment presents very substantial uncertainty. It is a heterogeneous, complex environment, in which small subsurface features or changes in geologic conditions can have substantial impacts on water and chemical movement. Major uncertainties also exist in source characterisation assessment of chemical fate and transport in the environment, assessment of exposure risks and health effects, and remedial action performance. These factors make uncertainty an inherent feature of potentially contaminated sites. Technical uncertainties are characteristically several orders of magnitude greater at contaminated sites than for other kinds of projects.*

*HLA's professional opinions are based upon its professional judgement, experience, and training. These opinions are also based upon data derived from the limited testing and analysis described in previous investigation reports. It is possible that additional testing and analysis might produce different result and/or different opinions. HLA has limited its investigation to the scope agreed upon with its client. HLA believes that its opinions are reasonably supported by the testing and analysis that have been done, and that those opinions have been developed according to the professional standard of care for the environmental consulting profession in this area at this time.*



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Appendix F Environmental Training Register

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**191 Miller Road, Chester Hill, NSW**

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## **1.0 INTRODUCTION**

HLA-Envirosciences Pty Limited (HLA) has prepared this Site Management Plan (SMP) for PacLib Management Pty Ltd (PacLib) and the site owner. The SMP refers to the site at 191 Miller Road, Chester Hill, NSW, hereafter referred to as 'the site' (see Figure 1).

The roles and responsibilities are provided in Section 1.11, below.

### **1.1 Objectives of the SMP**

The objective of the SMP is to provide a manual for use by the owner/management and operational staff at the site. It also forms an advisory document to regulatory agencies and stakeholders. The objectives of the SMP include:

- Summarise background environmental information and current conditions at the site
- Outline methods to prevent any adverse affects on the environment and human health
- Outline safety controls
- Outline areas of potential environmental concern (AEC) remaining on the site
- Management of excavation works in AECs
- Management and effective containment of AEC's
- Procedures for the routine or emergency maintenance works occurring in AECs.

This document outlines:

- Environmental management responsibilities;
- Monitoring Requirements;
- Relevant legislation;
- Incident management;
- Corrective action procedures;
- Complaint handling responsibilities;
- Auditing requirements;
- Training programs;
- Contingency plans;
- Environmental monitoring requirements; and
- Specific environmental management actions to be undertaken in relation to the works.

This document will be incorporated into the standard operating procedures and quality plans used by contractors and sub-contractors on site, and all work on the site shall be carried out in accordance with this SMP.

**Site Management Plan**  
**191 Miller Road, Chester Hill, NSW**

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**1.2 Site Location and Past Use**

The Site is located at 191 Miller Road, Chester Hill, NSW (Figure 1) and occupies approximately 66,539 m<sup>2</sup>. The site has a history of liquid and solid chemical manufacturing and storage for various companies since 1942, as summarised in Section 3.3 of the HLA Remediation Action Plan (HLA, 2001). The site was decommissioned during 2001, and remediation of the site conducted in 2002 to ensure that the rezoned and subdivided site was suitable for ongoing commercial / industrial landuse.

**1.3 Site Land Use**

During 2002, the site was remediated, and a number of the buildings onsite demolished. The site is currently zoned commercial / industrial, and the future development works will be for commercial / industrial landuse.

Following the remedial works the site was validated and confirmed as suitable for its continued use as commercial/industrial, based on considerations of those guidelines provided in S105 of the Contaminated Land Management (CLM) Act.

**1.4 Surrounding Land Uses**

The surrounding land uses are summarised as follows:

Direction	Surrounding Landuse
North	The main southern rail line borders the property to the north. Properties further to the north of the rail line are used for residential purposes.
South	The AEP VisQueen plant is located further to the south, is used for the manufacture of plastic bags.
East	A strata, five unit warehouse development occupies the property known as Lot 102 to the east of the site. Further to the east is Orchard Road and a residential development.
West	To the west of the site is Miller Road, and a strip of land with a railway siding owned by AEP. The property to the south of the railway siding is occupied by BHP Company Limited Transport (BHP). This site contains warehouses and stores shipping containers. The property to the north of the railway siding, occupied by Pacific Food Products (Australia) Pty Ltd.

**1.5 Topography and Site Drainage**

The site is situated on the western flank of a north-south trending ridgeline. The site is flat with a gentle grade towards the southwest. A number of areas are raised across the site due to filling and/or landscaping. An embankment has been constructed along the Southern Railway to an approximate height of between 1 – 3 m above the natural site level. The 'isotank' storage and former tank farm are raised to a height of approx. 0.5 – 0.75 m above the road level.

A concrete lined open stormwater channel is located approximately 100m to the south west of the site. Stormwater from the site either discharges to municipal stormwater, a small open drain which runs along the western boundary of the site, via Duck Street on the eastern side

## Site Management Plan

### 191 Miller Road, Chester Hill, NSW

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of the ridgeline, to Miller Road or the open stormwater channel located to the south west of the site.

It is understood that the channel connects with Prospect Creek (approx. 3 km from the site) and eventually to the Georges River, located in a southerly direction from the site.

## 1.6 Geology and Hydrogeology

The site is understood to be underlain by the Bringelly Shale formation, comprising shale, carbonaceous claystone, laminate, fine grained lithic sandstones and rarely coal (Sydney 1:100000 Geological Series Sheet). Investigations conducted across the site generally encountered fill material of varying thickness comprising gravelly sand with some clay and anthropogenic materials (brick, slag, sulfur, overlying residual gravelly, sandy clay. Siltstone and sandstone bedrock has been encountered in the deeper boreholes at depths ranging from approximately 1 mbgs in the northeast of the site to deeper than 6 mbgs in the southwest.

Three groundwater systems have been identified at the site, which were described by Woodward-Clyde as:

- Moderately saline (electrical conductivity [EC] ranged from 17,600 to 19,600  $\mu\text{S/cm}$ ) groundwater in the bedrock shale with static water levels (SWLs) ranging from 18.84 to 22.25 mAHD (June 1999), with an inferred flow from north east to the west.
- Moderately saline groundwater in the residual clay with SWLs ranging from 18.84 to 21.02 mAHD (June 1999), with an inferred flow from to the west-south-west.
- Perched groundwater in fill at one location with a SWL of 22.25 mAHD.

## 1.7 Previous Investigations

A number of environmental investigations have been previously undertaken at the site. These are listed, in chronological order, as follows:

- Dames & Moore. 1992. Preliminary Contamination Assessment, Miller Street, Chester Hill Site. Prepared for Incitec Ltd. December 1992. (Appendix 4, Woodward-Clyde 1999a).
- Dames & Moore. 1996. Data Report. Baseline Environmental Assessment, Incitec Ltd, Chester Hill. Prepared for Incitec Ltd. May 1996. (Appendix 35, Woodward-Clyde, 1999a).
- AGC Woodward-Clyde Pty Limited. 1999a. Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill. 30 August 1999.
- AGC Woodward-Clyde Pty Limited. 1999b. Phase 2c Soil Investigation of Incitec Chester Hill Site, 191 Miller Road, Chester Hill. 15 December 1999.
- HLA Envirosiences Pty Limited. 2001a. Remedial Action Plan, Subdivision of 191 Miller Road, Chester Hill, NSW. Prepared for Paclib Management Pty Ltd. 14 August 2001.

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- HLA Envirosciences Pty Limited. 2001b. Characterisation of Fill Mound - 191 Miller Road, Chester Hill, NSW. Prepared for Paclib Management Pty Ltd. 18 October 2001.
- HLA Envirosciences Pty Limited. 2002a. UST Decommissioning Validation - 191 Miller Road, Chester Hill. Prepared for Paclib Management Pty Ltd. 29 January 2002.
- HLA Envirosciences Pty Limited. 2002b. Materials Management Plan - 191 Miller Road, Chester Hill. Prepared for Paclib Management Pty Ltd. 27 May 2002.
- HLA Envirosciences Pty Limited. 2002c. Groundwater Investigation - 191 Miller Road, Chester Hill. Prepared for Paclib Management Pty Ltd. 12 August 2002.
- HLA-Envirosciences Pty Limited. 2002d. Site Validation Report, 191 Miller Road, Chester Hill. Prepared for Paclib Management Pty Ltd. 13 August 2002.

A summary of the works conducted to date is outlined briefly below. A full and complete summary of the previous investigations is presented in the above reports.

**Preliminary Site Assessment (Dames & Moore, 1992):** a screening investigation of the site, collecting soil samples from 25 locations, and installation and testing of groundwater at 3 locations. Soil samples were analysed for a range of heavy metals, sulfur, sulfate, total petroleum hydrocarbons (TPH), and benzene, toluene, ethyl benzene and xylenes (BTEX). Some soil samples exceeded the SIL<sub>4</sub> guidelines for lead and sulfur, and pH ranged from 2.56 - 9.46 units across the area sampled. One groundwater sample detected high concentrations of sulfate, lead and low pH.

**Baseline Environmental Investigation (Dames & Moore, 1996)** – an investigation on the area proposed for lease along the northern boundary at the site. In summary the assessment involved the collection of soil samples from 9 locations and analysis of a portion of these samples for heavy metals, sulfur, sulfate, TPH and BTEX. All analytical results for metals, TPH and BTEX were within the SIL<sub>4</sub> guidelines. Sulfate concentrations ranged from 67mg/kg to 4,620 mg/kg, and pH ranged from 4.4 to 9.76 in the samples analysed.

**Phase 1 & 2 Investigation (Woodward-Clyde, 1999a)** - was conducted to assess and identify areas of potential contamination and potential for off-site migration of contaminants in groundwater. The investigation involved the drilling of 6 shallow and 3 deep boreholes, and collection and analysis of groundwater samples for a range of pH, heavy metals, sulfate, TPH, total phenolics, polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), volatile halogenated aliphatic compounds (VHAs), trihalomethanes (THMs), chloroprene. Soil samples analysed during this investigation showed pH ranging from 5.4 – 9.4 units, sulfate concentrations ranging from 10 – 12,900 mg/kg, and asbestos fibres detected in 3 surface samples. The groundwater bore sampling and analysis identified pH ranging from approximately 5 - 7.5 units, moderately saline conditions (EC of 17,000 to 20,000  $\mu$ S/cm), some elevated copper and zinc, and TPH (C<sub>10</sub>-C<sub>36</sub> fraction) and PAH in close proximity to the USTs.

**Phase 2C Assessment (Woodward-Clyde, 1999b)** – was conducted to further characterise soil conditions across the site with respect to the presence of fill material and concentrations of possible contaminants. A total of 45 additional sample locations were sampled and

## Site Management Plan 191 Miller Road, Chester Hill, NSW

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analysed for pH, heavy metals, sulfate, TPH, BTEX, phenols, PAHs, VOCs and asbestos. In summary, the soil pH ranged from greater than 4 to 9.7, elevated sulphate was noted in some samples, and no asbestos material was identified. Samples were identified exceeding the SIL<sub>4</sub> guideline for lead (1 location), TPH (1 location), PAHs (3 locations). Trichloroethylene (TCE) was reported in one sample and dichloroethane (DCE) was detected one location.

An analysis of the significant risk of harm according to the NSW EPA guidelines (NSW EPA, *Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report*) was undertaken by Woodward-Clyde using the results of the Phase 1 and 2 soil and groundwater investigations. Due to the site usage and level of development (ie industrial development with paved and unpaved areas) at the time, Woodward-Clyde concluded that the soil and groundwater contamination identified in the assessment was not considered to represent a significant risk of harm to human health or the environment.

**Remediation Action Plan (RAP) (HLA, 2001)** – Numerous environmental investigations conducted previously at the site indicated that, in its current state, the site was generally suitable for ongoing industrial purposes. HLA developed an RAP presenting several options for remediation to address the issues relating to contamination detected in previous reports.

The recommendations comprised minimising off-site disposal of asbestos contaminated fill material by placing the material into an on-site repository located underneath the bitumen access road, combined with in-situ management of the PAH impacted soils. HLA also presented recommendations on remediation of hydrocarbon impacted soils that may be encountered upon decommissioning of the UST.

Since the RAP was developed for a seven lot subdivision, it was not applicable for remediating the entire site, as such was not used during the remediation works at the site.

**Characterisation of Fill Mound (HLA, 2001b)** - HLA undertook soil sampling and analysis on the fill mound located in the northeastern corner of the site. The volume of the mound of fill was estimated to be between 2,500 m<sup>3</sup> and 4,000 m<sup>3</sup> and had previously been assumed to contain asbestos waste based on previous sampling in the area. The work involved the collection of samples from 12 test pits following, and analysis of samples for beneficial reuse/disposal characterisation parameters (TPH, BTEX, heavy metals, PAHs, OCPs, and PCBs), and asbestos in soil.

HLA summarised the findings of the validation as follows:

- Concentrations of heavy metals, phenols, and OCPs were reported at less than NSW EPA (1998) SIL<sub>4</sub> guidelines, which are applicable for a commercial or industrial land use in all samples analysed.
- Concentrations of TPH were reported at less than NSW EPA (1994) sensitive landuse guidelines in all samples analysed.
- Concentrations of PAHs were reported at less than NSW EPA (1998) SIL<sub>4</sub> guidelines applicable for a commercial or industrial land use with the exception of one sample, which marginally exceeded the SIL<sub>4</sub> guidelines for the compound benzo(a)pyrene (7mg/kg, SIL<sub>4</sub>=5mg/kg).

Of the 13 soil samples submitted for asbestos identification, Chrysotile asbestos was detected in one sample collected from a depth of 1.1 to 1.2mbgl. Fibrous cement sheeting was not

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observed in any test pits during the investigation. Asbestos was not identified in the remaining 12 samples.

Based on the investigation results, the fill met the SIL<sub>4</sub> guidelines for commercial/industrial landuse. The report however, made the following recommendations:

- If any soil material is to be disposed off-site it should be classified in accordance with the NSW EPA (1999) *Environmental Guidelines: Assessment, Classification & Management of Liquid and Non-Liquid Wastes*;
- The portion of the stockpile characterised by test pit TP08 should be re-sampled and analysed for PAHs to ensure benzo(a)pyrene and total PAH concentrations are below SIL<sub>4</sub> commercial/industrial guidelines; and
- During reuse of fill, any suspect fragments of fibrous-cement sheeting encountered should be removed from the soil, double bagged and disposed of in accordance with the regulations and requirements of NSW Government and WorkSafe Australia Asbestos Code of Practice and Guidance Notes.

HLA notes that the asbestos impacted soil at TP07 was excavated by Whitehorse Constructions and used to backfill the bottom portion of the Dome. Whitehorse has informed HLA that this material will be covered by clean imported soil.

**UST Decommissioning Validation (HLA, 2002a)** - HLA undertook soil validation sampling and analysis following decommissioning of the former diesel underground storage tank (UST) in the north-western corner of the property. The works involved the following:

- Removal of one 70,000 litre former diesel UST and associated UST pipework.
- Fill soils were excavated and stockpiled by excavator to depths where natural soils were encountered.
- Collected validation samples for TPH, BTEX and PAHs analysis.
- The stockpiled soil was landfarmed and tested for TPH and BTEX

HLA summarised the findings of the validation as follows:

- Concentrations of TPH, BTEX and PAHs in the samples analysed from the tankpit walls and base were reported at less than laboratory PQLs, indicating that no residual hydrocarbon impact remain at the extent of the excavation.
- Metal concentrations were reported at less than NSW EPA (1998) SIL<sub>4</sub> guidelines applicable for a commercial/industrial landuse in the sample obtained from fill material present in the walls of the excavation.
- Samples of stockpiled material (approximate volume 2,500 m<sup>3</sup> to 4,000 m<sup>3</sup>) following landfarming reported TPH and BTEX concentrations less than NSW EPA (1994) threshold concentrations for sensitive land use.

**Groundwater Investigation (HLA, 2002c)** - HLA undertook groundwater monitoring of 7 of the 13 original onsite monitoring wells at the site and 2 wells installed by HLA. The existing wells included MWD2, MWD3, MWS5, MWS6, MWS8, GW1 and BH2. The newly installed wells were designated MWS10 (shallow well) and MWD4 (deep well).

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**191 Miller Road, Chester Hill, NSW**

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HLA reported that the previously installed wells MWD1, MWS4, MWS9, GW2, BH7 and BH8 were either destroyed during demolition and/or remediation works, or not able to be located.

HLA noted that the logged top of the bedrock (based on the previous and current drilling) generally slopes to the south-southwest, with a sharp drop in the south-western portion of the site. This may be the result of a palaeochannel associated with the higher ground to the northeast of the site, running west-southwest towards Byrnes Creek.

The groundwater flow in the shallow and deep aquifers appeared to follow the slope of the bedrock/residual soil interface and while generally in a southwest direction is approximately parallel to the southern site boundary.

The findings of the groundwater assessment is summarised below:

**Heavy Metals**

The contaminants exceeding ANZECC (2000) freshwater ecosystem guidelines include copper, nickel and zinc, and total cyanide in MWD2, MWS6 and GW1.

HLA considered that the elevated concentrations of zinc and copper in the shallow and deep groundwater is likely to be background concentrations, as the levels were consistent at each location including the results for MWD1, which is located at an up gradient groundwater flow direction to the remainder of the wells. HLA, however noted that an increase of nickel and zinc concentrations were detected in MWS8. This increase may be attributable to the low pH reading (5.3) monitored during sampling, which may have increased metal solubility and mobility.

HLA notes that the groundwater samples were tested for total cyanide and not the free cyanide. Free cyanide testing determines the sum of hydrogen cyanide (HCN) and the cyanide ion (CN<sup>-</sup>) in a sample, which are considered the most toxic forms of cyanide. It is likely that total cyanide concentrations in the groundwater are greater than free cyanide levels, however as a conservative measure total cyanide has been compared to free cyanide criteria.

**TPH** TOTAL PETROLEUM HYDROCARBONS.

Concentrations of TPH were detected in MWD3, MWD4, MWS5, MWS10 and BH2. HLA noted that no free-phase product was observed in any of the wells tested and only a surface sheen was observed in wells MWS5, MWS6, MWS8 and BH2. TPH impact in MWS5 may be due to previous leaks from the decommissioned diesel UST as discussed in Woodward-Clyde's report (1999a).

HLA noted that the potential sources of TPH in groundwater have been previously removed, which include the UST in the office carpark (based on the Woodward-Clyde, 1999a) and the Boylans yard (HLA report, 2001a). In addition, an integrity test of the existing UST showed that the tank and associated fuel lines were tight (not leaking).

**Site Management Plan**  
**191 Miller Road, Chester Hill, NSW**

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PAHs POLYCYCLIC AROMATIC HYDROCARBONS.

PAHs were detected in MWS5. HLA noted that PAHs were not previously tested in MWS5. The PAHs in MWS5 is possibly associated with the activities associated with adjacent UST and previously decommissioned diesel UST located in the office carpark.

VHCs VOLATILE ~~AROMATIC~~ HYDROCARBONS.

HLA noted that, as found during previous monitoring events, the well with the highest concentrations of VOCs is MWS8. A comparison of VOCs in MWS8 with previous investigations indicates an increase in concentrations of 1,1-DCA, cis-1,2-DCE and TCE, and a decrease in concentrations of 1,1-DCE, 1,1,1-TCA and chloroform.

HLA also noted that the remaining wells with elevated VOC concentrations are MWD4, MWS10 and GW1, which are located adjacent to or near the Dome. The VOCs at these locations are likely to be associated with the following:

- Dissolved phase VOCs migrating from the area of MWS8, which is located at an upgradient hydraulic flow direction from these wells.
- The activities associated with the adjacent Tanker Washer Bay.
- Migration of contaminants along backfill surrounding underground pipes, which may provide a preferential pathway for the contaminants.

HLA concluded that, although VOCs were detected in deep groundwater at MWD4 (located immediately south of the Dome), no VOCs were present in the deep groundwater at MWD2. MWD2 is located downgradient of MWD4, indicating that the impact appears to be restricted to the area of the Dome.

A review of parent/daughter compound ratios (eg TCE to 1,1-DCE/cis&trans 1,2-DCE and 1,1,1-TCA to 1,1DCA/1,2-DCA) by HLA, indicated that potential source areas may have been around MWS8 (TCE) and GW2 (1,1,1-TCA), as well as the MWS9 and MWS10 area (TCE and 1,2-DCA). These areas show relatively high ratios of parent compounds to the breakdown products (daughter compounds). HLA added, the overall dataset is limited to a few sampling events (1999 and 2002) and no trends are evident other than concentrations have increased in some wells and decreased in others.

HLA noted that any impact to groundwater from the sludge Dome has also been alleviated due to the removal of the sludge from within the Dome by Collex (in June and July 2002).

**Site Validation (HLA, 2002d)** – The following validation and/or remediation and validations works were undertaken by HLA at the site:

- Validation sampling of the soil below building footprints.
- Remediation and validation of the Dome.
- Validation sampling of the soil stockpile on the north-eastern portion of the site.
- Validation sampling of the soil mound in Lot 7.
- Remediation and validation of the bowser and fuel lines of the former underground storage tank (UST) located on the north-eastern portion of the site.

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As part of the remediation works Collex removed the following from the site:

- 640,000 litres (approximate) of liquid (dewatering of the Dome).
- 15,000 litres of contaminated water (solvent impacted liquid).
- 2087.14 tonnes of waste from the site (including sludge from inside the Dome and the soil excavated from the UST bowser area) and disposed to SITA landfill at Kemps Creek.

Based on the validation testing HLA provided the following conclusions:

- The subfloors of the buildings discussed in this report are suitable for ongoing commercial/industrial landuse. HLA noted that sulphate concentrations at a sample locations exceed the NEPM (1999) 'built structure' guideline value of 2,000 mg/kg at SS23 (18,000 mg/kg) and SS24 (2,210mg/kg). Whitehorse Constructions have implemented siltation fences to contain these sulphate impacted areas. In addition, contractors will refer to the MMP (HLA, 2002b) and the SMP for any future management of the material to minimise potential future disturbance or impact on building structures.
- The subfloor of the Dome is suitable for ongoing commercial/industrial landuse. The sludge waste inside the Dome had not impacted the brick layer, the concrete base nor the underlying shale bedrock.
- The area of the former UST bowser and associated pipeline on the north-western portion of the site is suitable for commercial/industrial landuse.
- The soil stockpile in the proposed Lot 7 met the SIL<sub>4</sub> guidelines for commercial/industrial landuse for reuse onsite.
- The fill mound located on the north-eastern portion of the site is suitable for reuse at the site provided the following is undertaken:
  - The soil in the mound is used in areas with low potential for future disturbance including areas beneath building floors.
  - If any soil material is to be disposed off-site it should be classified in accordance with the NSW EPA (1999) *Environmental Guidelines: Assessment, Classification & Management of Liquid and Non-Liquid Wastes*;
  - During reuse of fill, any suspect fragments of fibrous-cement sheeting encountered should be removed from the soil, double bagged and disposed of in accordance with the regulations and requirements of NSW Government and WorkSafe Australia Asbestos Code of Practice and Guidance Notes.

### 1.8 Potential Areas of Environmental Concern (AEC) Requiring Management

HLA notes that the site is suitable in its current state for commercial/industrial landuse. However, the following areas poses potential risk to human health and/or the environment if exposed, or may impact on the integrity of future structures built on the site during the proposed construction activities.

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- Elemental sulphur and elevated concentrations of sulphate in fill across the site, which, although not in such a state to pose any unacceptable risk to future users, requires responsible management.
- Low pH soil. HLA notes that low pH soils at the site are not considered to be posing unacceptable risk to human health or the environment under an industrial land use.
- PAH concentrations in fill material on the northern parts of the site, which, although not in such a state to pose any unacceptable risk to future users, requires responsible management.
- Concentrations of lead above the SIL4 guideline has been detected in fill material located in the north-western corner of the site, and beneath the existing warehouse.
- Petroleum hydrocarbons and VOC compounds have been detected in fill material and groundwater at the site.

The location of these identified areas is shown in Figure 2.

### 1.9 Project Description (Construction Works)

It is envisaged that future construction works at the site during redevelopment will include:

- Sub surface construction of service lines such as gas, electricity, stormwater, surface drainage, Telstra, cabling and water supply.
- Maintenance of service lines.
- Excavation of soils for the construction of building footprints.
- Disturbance of soil for the construction of building foundations.
- Construction of internal roads.
- Development of landscaping areas.
- Stockpiling of material excavated as part of the redevelopment works.
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### 1.10 Applicable Documents

In preparing the SMP, HLA has referred to the documents referred to in Section 1.7, and additional documents including the following:

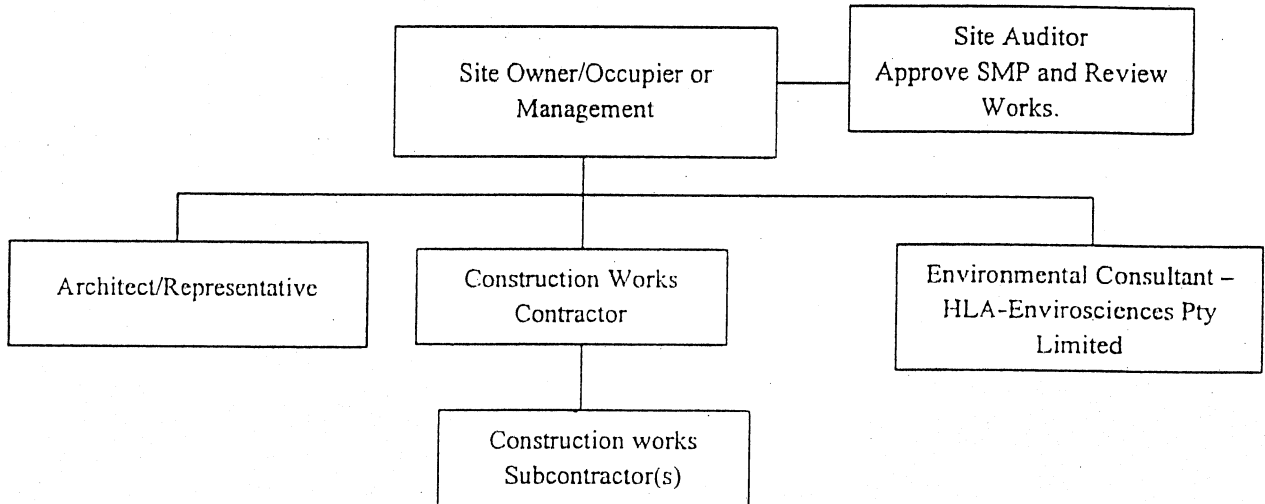
- HLA-Envirosciences Pty Limited. 2002. *Materials Management Plan, 191 Miller Road, Chester Hill*. Prepared for PacLib Management Pty Ltd. 27 May 2002.
- 'Schedule B (9) – Guideline on Protection of Health and the Environment during the Assessment of Site Contamination' of the National Environmental Protection (Assessment of Site Contamination) Measure, National Environment Protection Council, 1999.
- HLA-Envirosciences Pty Limited. 2002. *Site Validation Report, 191 Miller Road, Chester Hill*. Prepared for PacLib Management Pty Ltd. 13 August 2002.

### 1.11 Responsibilities

The site Owner/Occupier and/or its representative is responsible for managing the works associated with site, including management of any disturbed areas of environmental concern, dust mitigation and suppression, erosion and sedimentation control, and all monitoring requirements outlined in this SMP.

The site Owner/Occupier and/or its representative is responsible for ensuring that any Operational Staff (including contractors) undertakes the appropriate environmental management measures during any site works. The Operational Staff are responsible for ensuring that any sub-contractors employed during any site works conduct their operations in accordance with the environmental management principles contained in this plan and relevant statutory requirements. The project management hierarchy is shown below.

**Figure 2: Project Management Hierarchy**



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Specific responsibilities are outlined below.

Position and Company	Responsibilities
<b>Site Owner/Occupier/ Project Manager</b>	<ul style="list-style-type: none"> <li>▪ Approve the SMP</li> <li>▪ Ensure appropriate consents and licences are obtained for the redevelopment works.</li> <li>▪ Ensure all contractors comply with statutory and licence requirements.</li> <li>▪ Oversee construction works and overall implementation of SMP.</li> <li>▪ Undertake monitoring and inspections of the site as required</li> </ul>
<b>Site Auditor</b>	<ul style="list-style-type: none"> <li>▪ Review and Approve SMP</li> </ul>
<b>Future Owner/Occupier</b>	<ul style="list-style-type: none"> <li>▪ Implement the SMP at site level.</li> </ul>
<b>Operational Staff</b>  <b>(Contractors and Sub- contractors)</b>	<ul style="list-style-type: none"> <li>▪ Implement the SMP at site level.</li> <li>▪ Comply with the relevant conditions of the DA Consent.</li> <li>▪ Complete all necessary registers, databases, and records as required in the SMP.</li> <li>▪ Conduct all site operations in an environmentally responsible manner on a day to day basis.</li> <li>▪ Meet all OH&amp;S regulatory requirements.</li> <li>▪ Carry out all site operations in a safe and responsible manner on a day to day basis.</li> <li>▪ Ensure that all environmental protection measures are in place and are functioning correctly.</li> <li>▪ Notify HLA if visually contaminated or unusual material is encountered or strong odours are noted.</li> <li>▪ Undertake daily site inspections (OH&amp;S and environmental) and record and report as appropriate.</li> <li>▪ Complete non-conformance and corrective action reports as required and undertake follow up corrective actions, as required.</li> <li>▪ Complete incident reports and complaint reports, as required and follow up as required.</li> <li>▪ Provide adequate training of all employees and contractors during site induction, and as required on an ongoing basis during the works.</li> <li>▪ Conduct monitoring as required in the SMP.</li> <li>▪ Undertake audits of the project activities in accordance with the requirements of the SMP every two months.</li> <li>▪ Ensure all non-conformance and/or complaints are reported to the Project Manager.</li> <li>▪ Undertake corrective actions in response to requests made by the Project Manager regarding specific environmental or safety issues.</li> <li>▪ Ensure all works comply with relevant regulatory requirements.</li> <li>▪ Ensure all sub-contractors comply with statutory and licence requirements and conditions of the SMP.</li> </ul>
<b>Environmental Consultant</b> <b>HLA – Envirosiences</b>	<ul style="list-style-type: none"> <li>▪ As required, monitor to ensure that all operations are carried out in an environmentally responsible manner through site inspections and monitoring.</li> <li>▪ Monitor to ensure that the environmental protection measures put in place by the Project Manager are appropriate and functioning correctly.</li> <li>▪ Sample and analyse any visually contaminated or unusual material uncovered during any excavation work.</li> <li>▪ Notify the Project Manager of any significant environmental issues.</li> <li>▪ Provide summaries of monitoring results to the Project Manager regularly.</li> <li>▪ Provide advice on environmental issues.</li> </ul>

## **1.12 Document Revision**

This SMP shall be regularly reviewed and updated as necessary, therefore it is the responsibility of the reader of this document to ensure they have the current version of the SMP. The master document, with the up to date version of the SMP will be available from the site owner, and shall maintain an understanding of their responsibilities under the SMP, as amended.

## **2.0 STATUTORY REQUIREMENTS**

### **2.1 Licenses and Approvals Requirements**

The Owner, Occupier and Operational Staff shall be responsible for ensuring all necessary approvals and licences are obtained prior to the commencement of any works, which require an approval or licence. All Operational Staff (including contractors and any sub-contractors) must comply with the terms and conditions of all approvals and licences obtained, including the relevant Conditions of DA Consent.

### **2.2 Regulatory Requirements**

During the course of the project, all Operational Staff working in the area shall comply with the applicable environmental regulatory requirements, which include but are not limited to:

- Contaminated Land Management Act, 1997.
- Environmental Planning and Assessment Act, 1979 (State Environmental Planning Policy No 55 – Remediation of Land).
- Environmental Planning and Assessment Regulation, 2000.
- Protection of the Environment Operations Act, 1997 and Regulations.
- Occupational Health and Safety Act 2000 and Occupational Health and Safety Regulation 2001.
- Environmentally Hazardous Chemicals Act, 1985.
- Environmental Offences and Penalties Act, 1989.
- Construction Safety Act, 1912.
- Dangerous Goods Act 1975 and regulations.
- Traffic Act 1909 and regulations.

Compliance with all other relevant EPA guidelines including (but not limited to):

- EPA. 1994. Guidelines for Assessing Service Station Sites. NSW Environment Protection Authority. December.
- EPA. 1995. Sampling Design Guidelines. NSW Environment Protection Authority. September.

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- EPA. 1997. Guidelines for Consultants Reporting on Contaminated Sites. NSW Environment Protection Authority. December.
- EPA. 1998. Guidelines for the NSW Site Auditor Scheme. NSW Environment Protection Authority. June.
- EPA. 1999. Environmental Guidelines: Assessment, Classification & Management of Liquid and Non-Liquid Wastes. NSW Environment Protection Authority. May.
- EPA. 1999. Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report. April.
- NEPC 1999. National Environmental Protection Measure (Assessment of Site Contamination). National Environment Protection Council. December.

In addition, all Operational Staff will abide by any directions or procedures provided by the Site Owner and/or Site Occupier.

### 3.0 GROUNDWATER MONITORING REQUIREMENTS

A groundwater monitoring program should be implemented to confirm that the contaminant concentrations are reducing across the site. The monitoring program should be on a quarterly basis for 12 months. The remaining groundwater wells should be tested for the contaminants of potential concern, which include:

- Dissolved heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc).
- TPH (Total Petroleum Hydrocarbons).
- BTEX (Benzene, Toluene, Ethyl Benzene, Xylène).
- PAH (Polycyclic Aromatic Hydrocarbons).
- VOC (Volatile Organic Compounds).
- Phenols (speciated).
- Sulphate.
- TDS (Total Dissolved Solids).
- Cyanide.
- Major cations and anions.
- pH.

The results of the 12 month monitoring program should be reported to the site Auditor for review and comment.

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#### **4.0 WORKS METHODOLOGY**

Specific works methodology has not been yet developed. However, HLA notes that the following issues need to be considered as part of any works conducted at the site:

##### **4.1 Stage 1 –Site Establishment**

- 1) The Owner, Occupier and Operational Staff will obtain all necessary approvals and licences required by the regulatory authorities for the earthworks prior to the commencement of the project. A record of these permits/approvals and licenses will be kept in the project file and be available for review if requested.
- 2) The Owner, Occupier and Operational Staff should review the SMP to identify any areas that will be disturbed that require management for elevated sulfate and low pH soils.
- 3) The Owner, Occupier and Operational Staff should review the SMP to determine if the proposed building materials are suitable for the elevated sulfate and or low pH soil conditions.
- 4) The Owner, Occupier and Operational Staff should review the Materials Management Plan (HLA, 2002b) to plan the appropriate handling and management of contaminants of concern as described in Section 1.8.
- 5) All site personal will be inducted in accordance with the Site Occupational Health and Safety Plan, prior to commencement of works.
- 6) All site personnel will read the SMP, and acknowledge acceptance and compliance of the procedures by signing the attached log (Appendix A).
- 7) Appropriate signage will be erected around the site in accordance with Clause 78H of the EP&A Regulation, 1998, informing of the construction works and any site-specific requirements.
- 8) Bunding and siltation fences will be constructed around the perimeter of the work area.
- 9) Guards and fences will be established around all excavation works in accordance with the relevant standards.
- 10) The Operational Staff will identify all services (including, Telstra, electricity, gas, sewer, water) by obtaining information from the relevant agencies and/or site plans. The Operational Staff will obtain all relevant service location plans prior to undertaking the works. In addition, a service location contractor should be used to identify any additional underground services, which may be present and not shown on service plans. The locations of the services, if any, will be marked on the ground by the Operational Staff.
- 11) Sediment control structures will be appropriately placed (ie. silt fencing and/or hay bales) down gradient of the construction area and on the up slope of any stormwater collection channels.
- 12) The Owner, Occupier and Operational Staff will designate an area within the site for the stockpiling of excavated material, taking care to allow for separate stockpiling of imported fill, potentially contaminated soil and other excavated soil material. The

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Owner, Occupier and Operational Staff will ensure that the area is appropriately bunded to prevent any surface runoff from entering adjacent areas. Sediment control measures will be strategically placed down-gradient of the stockpile area and on the up-slope side of any stormwater collection channels in accordance with *Managing Urban Stormwater: Soils and Construction* (Dept. of Housing, 1998). In addition high-density polyethylene (HDPE) plastic or similar will be used to cover all exposed surfaces during wet periods and at the end of the workday, as required.

- 13) Dust screening fences and noise mitigation measures will be established in accordance with this SMP (refer to Section 7.0).

#### **4.2 Stage 2 –Earthworks and Construction**

- 1) All works should be undertaken during dry weather, where possible and in accordance with contractors operating procedures and any contract requirements.
  - 2) Service trenches will be excavated in accordance with any contract.
  - 3) Stormwater drainage will be constructed in accordance with any contract requirements.
  - 4) Material excavated from the areas identified in the SMP as “potentially requiring management” must be stockpiled separately to other excavated material.
  - 5) Excavations and any stockpiled material will be inspected by HLA for any obvious signs of contamination. HLA will notify the Project Manager of any action required, such as confirmation sampling.
  - 6) Foundations will be established in accordance with the contracted design. In the event that any ‘unknown’ materials are uncovered, the spoil excavated will be managed in accordance with the Soil Management Plan outlined in Section 4.2.
  - 7) Install services (water, sewer, gas, electrical, cable TV and Telstra).
  - 8) Building Construction will be in accordance with relevant plans and contract.
  - 9) Any fill material used for backfilling will comply with the requirements for the site, which include:
    - The material shall be identified as virgin excavated natural material (VENM) as defined in the POEO Act, 1997.
    - The contaminant concentrations shall meet the criteria for commercial / industrial landuse.
- Note: POEO defines VENM as material (such as clay, gravel, sand, soil and rock) that is not mixed with any other waste and that has been excavated from areas that are not contaminated, as a result of industrial, commercial, mining or agricultural activities with manufactured chemicals and that does not contain sulphuric ores or soils.
- 10) HLA will undertake regular site inspections as required by the Project Manager or its representative. The inspection of the following will be undertaken:
    - Erosion and sediment control measures.
    - Drainage lines.

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- Surface water levels and conditions.
- Dust and odour levels.

Photographs will be taken by HLA during each inspection as record of site conditions. The photographs will be retained on file for reference.

**4.3 Stage 3 –Decommissioning**

- 1) Any soil not used at the site will be need to be sampled by HLA to be classified and disposed of to an appropriately licensed landfill in accordance with EPA NSW (1999) *Environmental Guidelines: Assessment, Classification & Management of Liquid and Non-Liquid Wastes*.
- 2) The Owner, Occupier and Operational Staff must provide HLA with information that will allow the development of a report summarising the works undertaken and any other relevant contamination issues.

**5.0 ENVIRONMENTAL MANAGEMENT PLAN**

A site-specific environmental management plan (EMP) has been incorporated in this SMP to ensure that all Operational Staff (including contractors and sub-contractors) comply with the environmental conditions of approval for the project and that the environmental risks are properly managed. In general, best practice procedures will be followed throughout the works to protect the environment within and around the site. These procedures address:

- Surface water management;
- Soil management;
- Traffic and Access;
- Protection of vegetation;
- Odour control measures;
- Dust control measures;
- Noise and vibration control measures; and
- Equipment cleaning and operation.

**5.1 Water Management Plan**

The Operational Staff shall implement a soil and water management plan or erosion and sediment control plan in accordance with *Managing Urban Stormwater - Soils and Construction* (Department of Housing, 1998). As a minimum, the following stormwater controls should be implemented:

- Runoff from excavated fill or soil stockpile surfaces will not be allowed to enter stormwater. Such runoff will be prevented by, either covering the excavated material or containing any run-off on-site for appropriate treatment (if required) prior to reuse or disposal. Prior to any discharged to sewer a license will be obtained from Sydney Water.

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- Measures as outlined in the Soil Management Plan (below) should be included to minimise the sediment load of runoff entering the collection system.
- Under no circumstances shall any activities (including run-off or dewatering procedures) be undertaken which may involve a threat of pollution of any nearby water body.
- All pollution control devices shall be regularly maintained.
- Runoff detention basins should be considered if large volume of water is to be used during construction works, these basins should be constructed in the downslope areas of the work area in accordance with *Managing Urban Stormwater - Soils and Construction* (Department of Housing, 1998).

### 5.2 Soil Management Plan

Sediment control measures (i.e. silt fencing and/or hay bales) in accordance with *Managing Urban Stormwater - Soils and Construction* (Department of Housing, 1998) will be strategically placed at the following locations:

- up-gradient of stockpiles to redirect water;
- down-gradient of stockpiles and slopes;
- up-slope side of the stormwater collection channels;
- around temporary stockpiles; and
- down-gradient of stormwater channels as contingency against overflow.

Should stockpiling of imported fill materials be required, they will be placed in an area designated by the Site Owner/Occupier or its representative. The imported fill stockpiling area will be prepared by removing rubbish, rubble and vegetation, then by trimming and grading so that any depressions or mounds are removed. Imported fill stockpiles will be numbered and logged in the materials tracking forms for identification, and must be certified by HLA as meeting the landuse criteria for commercial / industrial landuse prior to use onsite.

Spoil resulting from any excavations or drilling shall be stockpiled on a bunded, hardstand area, separate to other soil stockpiles. Soil excavated from areas identified as potentially requiring management must be stockpiled separately from other material, and handled in accordance with the Materials Management Plan (HLA, 2002). If this material is replaced elsewhere on the site, its location must be recorded by the Operational Staff, and this information provided to the site Owner, Occupier and HLA.

### 5.3 Traffic and Access

All heavy vehicle access and egress to and from the site Owner/Occupier designated heavy vehicle route. No variation of the approved route shall be permitted without the concurrence of the site Owner/Occupier and/or its representative.

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Prior to commencement of site works the Operational Staff (including Contractors and Sub-contractors) will provide to the site Owner and Occupier the company details of the sub-contractor responsible for the transport of clean fill material to the site.

The contractor and sub-contractor shall nominate a contact person responsible for all heavy vehicle operations. A contact telephone, facsimile number and email address shall be provided to the Owner/Occupier or its representative. As a minimum, the following traffic control measures will be implemented:

- All streets along the designated heavy vehicle route will be kept free from detritus material during the course of the project. A representative of the contractor will, on a daily basis, monitor the roadways leading to and from the site, and take steps to clean any adversely impacted pavements.
- The Operational Staff (or an authorised representative) will arrange for regular dry mechanical suction sweeping of streets in the vicinity of the site, for the duration of the works (focusing on Miller Road).
- Vehicles travelling along the designated heavy vehicle route shall adhere to the RTA speed limits.

#### 5.4 Protection of Vegetation

All trees to be retained shall be identified and protected by fixing hardwood timber battens, rubber tyres or similar measures, prior to the commencement of the road reconstruction works. Any excavation work in the area of trees to be retained, will initially proceed slowly and carefully to locate the roots. Any roots likely to be affected by the works will be cut cleanly with a saw. The cut root will then be sealed with a tree wound sealant.

#### 5.5 Odour Control

All activities conducted at the site will be controlled such that all equipment used is designed and operated to control the emission of smoke, fumes and vapour into the atmosphere, and any odours arising from the excavation or stockpiled material is controlled. This also includes vapours in deep excavations and in basements. Control measures may include:

- Maintenance of construction equipment so that exhaust emissions comply with the Clean Air Regulations issued under the Protection of the Environment Operations Act;
- Use of appropriate vapour ventilating equipment;
- Cleared vegetation, demolition materials and other combustible waste will not be burned onsite;
- The spraying of a solution of Biosolve™ or other appropriate product if required to suppress any odours that may be generated by excavated materials; and
- Use of covers (i.e. HDPE).

All practicable measures will be taken to help ensure that fugitive emissions emanating from the site are minimised so that associated odours do not constitute a nuisance and that the ambient air quality is not adversely impacted.

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## **5.6 Dust Control Measures**

All practicable measures will be taken to ensure that dust emanating from the site is minimised. Measures to minimise the potential for dust generation include:

- Use of water sprays over unsealed or bare surfaces, which are generating unacceptable amounts of dust.
- Covering of excavation faces and stockpiles, where necessary (if unacceptable amounts of dust is generated or if weather forecasts predict strong winds).
- Establishing dust screens consisting of a minimum of 2 metre high shade cloth or similar material secured to a chain wire fence.
- Maintenance of all dust control measures to ensure good operating condition.
- All vehicles having had access to unpaved or contaminated areas of the site shall exit via an automated wheel wash facility to prevent mud and sediment from being deposited on Council roadways.

## **5.7 Noise and Vibration Control Plan**

The noise and vibration associated with construction will be controlled by the following means:

- Ensuring that no vehicles, machinery or equipment generate noise levels beyond applicable guidelines. Use of quieter equipment and acoustical enclosures.
- Approved silencing measures shall be provided and maintained on all power-operated plant used in construction works.
- Restricting the activities generating high noise and vibration levels to normal working hours (7am-6pm Monday to Friday, 8am-1pm on Saturday, with no work on Sunday and Public Holidays).
- All construction vehicles will enter and leave the site in accordance with the site entry requirements.
- Use of suitable construction techniques.
- Hydraulic hammers will not be used before 9:00am on Saturdays.

All practicable measures will be taken to minimise the generation of noise and vibrations to acceptable levels. In the event that short-term noisy operations are necessary, and where these are likely to affect residences, notifications will be provided to the Council and the residents, specifying the expected timing and duration, and monitoring will be undertaken at the direction of the site Owner/Occupier and/or its representative.

## **5.8 Vehicle/Equipment Cleaning and Operation**

The following controls will be placed on operation and movement of equipment:

- Equipment working within an excavation will be washed inside the area. Wash water will run into the excavation. The wash water will be allowed to evaporate.
- The surface of internal access roads carrying vehicular traffic will be kept clean.
- All equipment will be operated by suitably qualified operators.

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- All equipment will be maintained at optimum operating conditions, any servicing of equipment will be undertaken in areas specified by the site Owner/Occupier and/or its representative, on concrete or bitumen surfaces to prevent impact to surface soils by oils, fuels or cleaning agents.
- Any fuel stored onsite will be held in an area designated by the site Owner/Occupier and/or its representative. The area will be appropriately bunded to contain any potential spillages and/or leaks.
- Vehicles carrying spoil or rubble from the site shall at all times be covered with an "enviro-tarp" or similar impervious material to prevent the escape of dust or other material.
- A log of all trucks removing soil from the site or importing soil to the site will be kept in a Truck Log book.
- All heavy vehicle access and egress to and from the site shall be via site Owner/Occupier and/or its representative's designated heavy vehicle route.
- The wheels and wheel arches of all vehicles having had access to unpaved areas will be cleaned by the use of a broom or water spray to prevent mud and sediment from being deposited on Council roadways.
- After wheel and wheel arch cleaning, vehicles shall be inspected for the presence of rocks between tyres and sediment within the undercarriage of the vehicle, if detected, this shall be removed and placed at a designated point within the site.

### 5.9 Materials Management

To ensure that no inappropriate disposal and/or reuse of stockpiled material occurs the following management controls will be used:

- All stockpiles will be sign posted as to their source location and uniquely numbered and recorded.
- A field sketch of stockpiles will be recorded in the field log/site diary at the end of each day.

No material will be reused on site or taken offsite without first obtaining approval from the site Owner/Occupier and/or its representative. The site will be secured at night to prevent the potential for any illegal dumping.

### 5.10 Waste Management and Minimisation

Waste minimising and recycling practices and programmes will be employed to meet the requirements of EPA. The aim will be to:

- 1) Minimise products used;
- 2) Maximise the use of recycled materials, maximise recycling (paper, PET, glass, plastics etc.); and
- 3) Reduce waste generation (litter/garbage).

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The waste management hierarchy in accordance with Waste Avoidance and Resource Recovery Act (2001) will be:

- Avoid.
- Reduce.
- Reuse/recycle.
- Treat.
- Dispose.

Containers will be made available on site by the Operational Staff to allow segregation of the above materials, if practical.

Waste management activities related to the works shall be undertaken in accordance with any relevant Council's Waste Development Control Plans.

### **5.11 Material Safety Data Sheets (MSDS)**

Material Safety Data Sheets (MSDS) for chemicals/materials on the site and for chemicals/materials brought to the site for use during works associated with construction will be kept by the site Owner, Occupier and Operations Staff. These will be referred to by site personnel/occupier as required.

### **5.12 Community Consultation**

Any consultation with surrounding landowners and occupants of the nearby properties will be undertaken by the site Owner/Occupier and/or its representative.

### **5.13 Landscaping**

A detailed landscape and soil stabilisation plan shall be implemented on site during construction works.

## **6.0 EMERGENCY RESPONSE**

In the event of any incident, the first priority shall be the safety of all personnel and the community in the immediate vicinity. Following this, all practical steps should be taken to minimise the risk of further environmental damage as soon as possible after the event. The situation should be stabilised following the appropriate incident management or contingency plan procedures. The appropriate staff should be notified and emergency procedures enacted.

Typical first response actions may include:

- Containment of any pollution using booms, silt fences, absorbents, bunding or interception pits.
- Temporary repair or isolation of failed plant/equipment component.
- Sampling of impacted site media be it soil and/or surface water.

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Follow up action will include the development of a work plan to remediate the impacted site media. Such a work plan would detail any sampling and analysis requirements to define the nature and extent of impact, methods for the recovery, handling, storage and treatment of impacted material, disposal and/or reuse options for impacted material and personal protective equipment requirements.

In the event of a serious emergency at the site, the following procedure will be followed:

1. Stop work.
2. All personnel shall leave the work zone via established entry/exit routes.
3. Leave the site and assemble at the emergency assembly area on the Miller Road footpath.
4. Await further instructions from the site Owner/Occupier and/or its representative.

No project personnel or visitors are to leave the assembly area unless advised to do so by the site Owner/Occupier and/or its representative.

The on-site manager will notify the relevant service as to the details regarding any emergency:

- Fire Brigade (ph: 000).
- Ambulance (ph: 000).
- Police (ph: 000).
- Superintendent/OH&S Officer.
- Environment Protection Authority.

Records will be kept of any incidents, accidents, hazardous situations, unusual events and unsafe health exposures and the corrective action taken. The site Owner/Occupier and/or its representative will investigate the cause of any emergency so that necessary changes in work practices can be made to prevent the incident recurring.

Emergency procedures and contact telephone numbers should be displayed in a prominent position during site works by the site Owner/Occupier and/or its representative.

## 7.0 OCCUPATIONAL HEALTH AND SAFETY

A Site Specific Safety Plan has not been developed for the site. However, the following general OH&S requirements of the Occupational Health and Safety Regulation 2001 under the Occupational Health and Safety Act 2000 should be followed:

- Evaluation of onsite hazards and risks associated with these hazards;
- Particular risk control measures (including provisions regarding lighting, noise, atmosphere, electricity, confined spaces and manual handling);
- Definition of personal protection standards;
- Classification of onsite personnel and work zones;

**Site Management Plan**  
**191 Miller Road, Chester Hill, NSW**

- Details on work practices and restrictions, assessment of anticipated protection levels, controls on access to work zones and decontamination;
- The use of plant at places of work;
- Supervision of work practices and medical surveillance;
- The notification of accidents and other matters;
- Environmental monitoring protocols;
- Emergency information; and
- Risk assessment methods.

**7.1 General**

All workers and visitors to the site must attend the Health and Safety Induction before entry to the work zone is allowed.

**7.2 Personal Protective Equipment**

At a minimum, Level D PPE will be worn by all site personnel. This includes hard-hat, steel-toed boots and high-visibility vest. Latex gloves and safety glasses will be worn during manual handling of soil in an excavation and in soil stockpiles. The Operational Staff should ensure that face masks will be available for use during excavation and manual handling soils, if dusty conditions develop. PPE will meet the requirements of Australian Standards.

**7.3 Potential Hazards and Prevention**

In addition to the regulatory OH&S requirements, the following prevention practices will be employed (as a minimum) for the site:

Hazard	Prevention
Contaminated soil coming in contact with skin.	Wear gloves and overalls. Personal protective equipment shall be provided in sufficient quantities to provide for the duties of each on-site individual.
Dust inhalation	There is potential for exposure to contaminants via inhalation as a result of dust creation during any excavation works. Dust masks will be made available on site by the Operational Staff should these conditions arise, creating a potential (local) exposure to site staff. Dust will be suppressed by spraying to prevent on-site and off-site impacts;
Underground and Overhead Services	Underground services will be located by reviewing service plans and by the use of a service locator. Overhead services will be located prior to works.
Open Excavations	All open excavations will be barricaded in accordance with the NSW Occupational Health and Safety Act; Clause 16 (1) and the Construction Safety Regulation Section 73, as administered by WorkCover NSW. Warning signs will be installed at all access points.
Heavy Machinery	Safety vests will be worn for high visibility. Hardhats will be worn at all times whilst working on the site. A minimum of 2 metres will be kept between the excavator bucket and field personnel during digging. Prior to approaching the heavy equipment, the operator will be made aware by initially waving at the operator to receive their attention and proceeding once eye contact is made and the equipment is idle.

**Site Management Plan**  
**191 Miller Road, Chester Hill, NSW**

Hazard	Prevention
Site Traffic	Site traffic will be diverted or the area barricaded prior to commencement of the works. Warning signs will be installed on/adjacent to all access points.
Slippery Surfaces	If possible site personnel should avoid working in areas with slippery surfaces. Wear rubber sole boots. Non-slip material will be used to cover the surface, where appropriate. Warning signs will be installed on/adjacent to all access points.
Heat	Hardhats with rims, long sleeved shirts, long pants and sunscreen will be used. Plenty of liquids will be available for all field personnel.
Noise	Noise attenuation equipment will be used as necessary. All site personnel will carry earmuffs or plugs for use during excessive noise.
Hot Work	A 'hot work permit' will be completed and signed by the site Owner/Occupier and/or its representative, prior to commencing such works.
Confined Spaces	All confined space entry will be undertaken by appropriately trained personnel. The atmospheric conditions will be checked by the site Owner/Occupier and/or its representative or it's representative prior to entry.
Manual Handling and Lifting	Heavy loads are not to be lifted alone. Mechanical aids will be used. Gloves or hand tools will be used when handling rough jagged or sharp objects.
Work at Heights	Provision and maintenance of a stable and securely fenced work platform, with fences and handrails or other barriers to prevent falls. If this is not practicable, other forms of physical restraints will be used (eg harnesses).
Confined Space	Confined space entry will only be undertaken by suitably qualified/trained personnel.
Fatigue	Regular breaks will be taken and equipment will be used, where possible, to reduce heavy physical labour.

## 8.0 CONTINGENCY PLANS

The purpose of the contingency plan is to identify unexpected situations that could occur during works associated with the redevelopment works, and specify procedures that can be implemented to manage such situations and prevent adverse impacts to the environment and human health. During the development works the daily site inspection form in Appendix C will be completed by a representative of the Operational Staff, and any corrective actions required will be noted on this form.

The site Owner/Occupier and/or it's representative will be notified of any incidents and/or complaints, depending on the severity of the incident, other government agencies including the NSW Environment Protection Authority may be notified. HLA note that the Project Manager or their representative will be able to request that works cease in licence areas, if unacceptable conditions arise.

Details of the procedures are defined in the following sections.

### 8.1 Uncover Contaminated or Unknown Materials

In the event that any significant unknown type of material (including contaminated) is identified during the redevelopment works, the material will be inspected by HLA and

## **Site Management Plan**

### **191 Miller Road, Chester Hill, NSW**

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reported to the site Owner/Occupier and/or its representative. Any action required will be undertaken by the site Owner/Occupier and/or its representative.

### **8.2 Damage to Underground Services**

In the event that any underground services are damaged, all works in that area will be stopped immediately. The site Owner/Occupier and/or its representative will be notified. A representative of the site Owner/Occupier will assess the situation and inform the site Owner/Occupier. The site Owner/Occupier and/or its representative will notify the appropriate service provider, and an incident/accident report will be completed.

The works will only proceed if the site Owner/Occupier and/or its representative is satisfied that all the actions undertaken are appropriate and additional works will not cause an impact to the environment or health & safety.

### **8.3 Dust**

Should excessive dust (dust that is visible) be generated during the redevelopment works, the following measures will be considered for use as appropriate:

- Application of water sprays.
- Use of covers.
- Modification of the operation of the equipment.
- Cease work or work in a different area. Commence work in more favourable weather conditions.
- Use of different equipment that generates less dust.

### **8.4 Odour**

Should excessive odour (odour that is noticeable at the site boundary) be generated during the redevelopment works, the following measures will be considered for use as appropriate:

- Carry out the relevant odour monitoring.
- Reduce surface area.
- Application of odour suppressant agent.
- Use of covers.
- Modification of the operation of the equipment.
- Use of different equipment that generates less odour.
- Cease work. Commence work once the Project Manager is satisfied that all odour generating conditions have been controlled.

### **8.5 Noise and Vibrations**

Should nuisance noise or vibrations be generated during the redevelopment works, the noise will either be monitored and/or the following measures will be considered for use as appropriate:

## **9.0 REPORTING**

### **9.1 Non-Conformance and Corrective Action Reports**

Non-conformances reported to the Operational Staff will be recorded in a Non-Conformance and Corrective Action Report. A copy of the Non-Conformance Report is provided in Appendix D. Details of the non-conformance, including any immediate corrective actions undertaken, are to be recorded by the Operational Staff. The site Owner/Occupier and/or it's representative may also initiate a Non-Conformance Report.

It is the responsibility of the Operational Staff to immediately initiate corrective actions, if required. Once completed, the Operational Staff will provide details of the actions undertaken on the Non-conformance Report and sign, date and file the report. The site Owner/Occupier and/or it's representative will monitor feedback and response to prevent future occurrences.

### **9.2 Incident Management Reports**

Records will be kept of any environmental incidents, accidents, hazardous situations, unusual events and unsafe health exposures and the corrective action taken. A representative of the site Owner/Occupier will investigate the cause of any emergency so that necessary changes in work practices can be made to prevent the incident recurring.

### **9.3 Complaint Reporting**

The site Owner, Occupier and Operational Staff will be required to maintain a register of complaints from local residents, which will include a record of any action taken with respect to the complaints. The site Owner/Occupier or a nominated representative of the site Owner/Occupier will be notified immediately should any incident affecting the environment or the surrounding community, occur. HLA will be notified upon the occurrence of any incidents effecting the environment.

Details of the complaint are to be documented by the site Owner, Occupier and Operational Staff in the site's Complaints Register (Appendix E).

If a complaint identifies a non-conformance, a Non-Conformance and Corrective Action report is to be initiated (Appendix D).

## **10.0 SMP AUDITING**

### **10.1 Audits**

The site Owner/Occupier or a representative of the site Owner/Occupier and/or it's representative shall conduct audits of the construction activities every week. These will involve reviewing all environmental documents, records and monitoring results to ensure compliance with the requirements of the SMP and Conditions of DA Consent. If any deficiency is detected, the Owner/Occupier or their representative shall initiate a Non-Conformance Report and initiate the appropriate corrective action. The site Owner/Occupier

**Site Management Plan**  
**191 Miller Road, Chester Hill, NSW**

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will be informed of any non-conformances. Other issues to be covered by the audit may include but not be limited to the following:

- relevant environmental legislation
- reporting procedures
- complaint management
- general site issues
- traffic and access
- noise and vibration
- water quality, erosion and sedimentation
- air quality and dust
- hazards, risks and safety
- waste disposal and recycling
- emergency response procedures.



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**Memorandum**

Date 19 October 2004  
To David Tubb, PacLib  
CC Sedat Tasdemir, HLA Envirosciences  
From Ross McFarland  
Job no. 110610 File no. D4  
Subject Auditor Review of Groundwater Monitoring Report, Chester Hill, NSW

---

My Site Audit Statement of August 2002, refers to the need for a groundwater monitoring program to assess the longer term status of the groundwaters at the Site generally known as 191 Miller Street, Chester Hill, NSW (the "Chester Hill Site").

Recently, I have received a groundwater report for the Chester Hill Site. The report is titled:

"Groundwater Monitoring Report, Final Round, 2004, 191 Miller Street, Chester Hill, NSW", prepared by HLA Envirosciences Pty Ltd, dated 30 July 2004 (HLA Reference: J1698\_5\_RPT\_4" rnd\_30Jul04).

My review of the assessment of groundwater risk from contaminant mobility has been made with regard to the National Environmental Protection Measure for the Assessment of Contaminated Sites (NEPM), with specific reference to Schedule B(6)<sup>1</sup>, in that an appraisal of the following issues (as applicable) indicates, based on the use of the current ongoing site management plan (SMP), there is negligible likelihood of unacceptable groundwater contamination that would adversely impact on the Site's proposed use:

- on-site sources (type of source);
- contaminant sources unrelated to the site;
- whether sources(s) has been removed;
- permeability of the strata on the site;
- known or expected depth to the local water table;
- ambient groundwater quality;
- quantity of contaminant and its mobility characteristics;
- identification of potential receptors; and
- other site-specific issues, as applicable.

The SMP that has been developed and implemented at the Chester Hill Site is considered to be an adequately conservative response to the nature and extent of residual risks associated with the Site.

My opinion is also based on a comparison of the Consultant's work against the NSW EPA's Checklist for Site Auditors<sup>2</sup> in which data quality, assessment criteria and risk assessment are considered.

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<sup>1</sup> NEPC(1999). "National Environment Protection (Assessment of Site Contamination) Measure – Schedule B(6) – Guideline on Risk Based Assessment of Groundwater Contamination

<sup>2</sup> NSW EPA (1998) Checklist for Site Auditors using the EPA Guidelines for the NSW Site Auditor Scheme, prepared by NSW EPA, 14 September 1998 (version 2.0).

19 October 2004

Page 2

More specifically, the HLA report provides the following information in relation to the NEPM B(6) guidance:

on-site sources (type of source)

The likely former **primary** source of groundwater contamination was identified as the former in-ground neutralisation tank) that has been removed.

Possible **secondary** sources may have been associated with activities in the vicinity of

- o a former caustic tank (located up-gradient of MWS8);
- o a former Tanker Washer Bay, located immediately east of MWS8; and
- o storage of drums believed to have contained chlorinated solvent compounds, on the neighbouring property, to the south of the Site, and adjacent to MWS8 and MWS10.

contaminant sources unrelated to the site

As noted above, there appears to be an up-gradient source of chlorinated solvent compounds migrating into the groundwater and onto the Chester Hill Site.

whether sources(s) has been removed

As noted above, all identified primary and second sources within the Chester Hill Site have been reported to have been removed. It is unclear as to the status of the alleged up-gradient source.

permeability of the strata on the site

The Consultant estimates a groundwater velocity to be very slow, and in the order of 0.013 to 1.3 metres per year. This range is based on the estimated character of the Site's residual clays identified during groundwater well construction, as well as from an estimated hydraulic gradient of 0.025 metre/metre) calculated from recent on-site well head measurements.

known or expected depth to the local water table

Shallow groundwater has been measured in the final groundwater monitoring round (June 2004) to be at between AHD18.59m (MWS5) to AHD20.65m (MWS10). The depth to the local water table across the site varies from 1.48m (MWS10) to 2.31m (MWS6).

ambient groundwater quality

In the last groundwater monitoring round report, the ambient heavy metal water quality is described by the Consultant to be generally below the ANZECC 2000 Water Quality Guidelines for Fresh waters, except for:

Nickel at 0.528 mg/L (MWS8) against an ANZECC threshold of 0.011 mg/L.

19 October 2004

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Based on comparison against the previous six years of monitoring data, this reported Nickel exceedence appears to be an ambient background condition rather than a contaminant arising from the Chester Hill Site.

Other contaminants of concern (TPH, BTEX, PAHs, Cyanides) levels were at local background conditions, below ANZECC 2000 threshold levels, or were below appropriate method detection limits.

Volatile organic compounds (VOCs) continued to be detected across the Site, but the monitoring wells that were considered to be representative of groundwater that may be leaving the down-gradient area of the Site showed either non-detect or very low levels that appeared to be representative of the Site's natural attenuation of these contaminants. This natural attenuation was reflected in comparisons against the previous 6 years of groundwater monitoring data, and by a review of the reported formation of typical daughter products that arise from the natural decay of the contaminants of concern.

The Site Management Plan was considered to be appropriate to ensure that the ongoing use of the Site was not adversely impacted by the identified residual VOC.

quantity of contaminant and its mobility characteristics

The mobility of the identified VOC contaminants of concern was considered to be low in both the vertical and horizontal directions, due to the physical characteristics of the residual soils, the low hydraulic head across the Site, and the broad coverage of the Site by an effectively impermeable surface covering (concrete slab). Furthermore, any potential for adverse impacts that could arise from contaminant mobility have been adequately addressed in the SMP.

identification of potential receptors

The nearest sensitive receptor is believed to be Prospect Creek, located more than 3,000 metres to the west/southwest. It is unlikely that the identified impacted groundwaters would have any adverse impact on this nearest sensitive receptor.

Onsite receptors are limited to commercial/industrial uses which are controlled by the SMP.

other site-specific issues, as applicable.

As noted above, an ongoing site management plan (SMP) has been developed and implemented at the Site to ensure the ongoing protection of the commercial users of the Site.

19 October 2004

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### AUDITOR'S OPINION

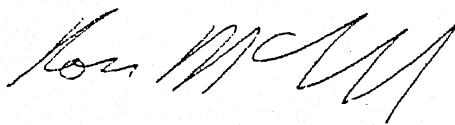
Based on the information provided, it is my opinion that:

- ❖ the likely on-site sources of groundwater contamination have been removed;
- ❖ the groundwater monitoring program undertaken from 1999 to June 2004 has concluded that the identified contaminants arising from the Chester Hill Site are undergoing natural attenuation within the Site's boundaries;
- ❖ Given the results to-date, there does not appear to be a need for further groundwater monitoring, unless the Site is considerably modified, such as by the removal of significant areas of the Site's concrete slabs or other activities that may increase the potential mobility of the identified groundwater contamination;
- ❖ the identified groundwater contamination is not considered to pose any adverse impact on the normal use of the Site for its continued commercial purposes, provided the SMP continues to be implemented.

I would be pleased to provide further information on this review, at your request.

This review should be read in conjunction with my completed Site Audit Statement and associated site Audit Report, dated August 2002 (my Reference 2002/13).

Yours sincerely  
CH2MHILL AUSTRALIA PTY LTD



Ross McFarland  
NSWEPA Site Auditor No. 9819



15 May 2002

J1698

Mr David Tubb  
PacLib Management Pty Limited  
Suites 3 & 4, 22 Elizabeth Street  
Artarmon, NSW 2064

TO  
PETER STEINHART

6 PAGES

**Site Management Plan**  
191 Miller Road  
Chester Hill, NSW

Dear David

This letter provides a summary of potential site contamination issues that may require management following completion of remediation and issuance of the site audit. These do not include any issues related to future occupants and their operations at the site. It is noted that the site auditor may have different requirements to those presented herein.

### OBJECTIVES

The objective of the site management plan (SMP) will be to provide a manual for use by the management and operational staff at the site. It also forms an advisory document to regulatory agencies and stakeholders. The objectives of the SMP include:

- Summarise background environmental information and current conditions at the site;
- Prevent any adverse affects on the environment and human health; and
- Outline safety controls.

The main use of the SMP would be if excavation work were required in the areas where potentially contaminated soil exists (eg in the north western portion of the site). The SMP will detail the actions required to ensure effective containment of any contaminants, if exposed. Additionally it would detail procedures to be undertaken for any routine or emergency maintenance of works that may occur in area of potentially contaminated land.

### SPECIFIC ISSUES

Specific issues that may require management following remediation of the site include:

- Excavation of potentially contaminated soil (eg underground service installation or building construction) in the hatched areas on the attached Figure 1.
- On going monitoring of groundwater, if required.

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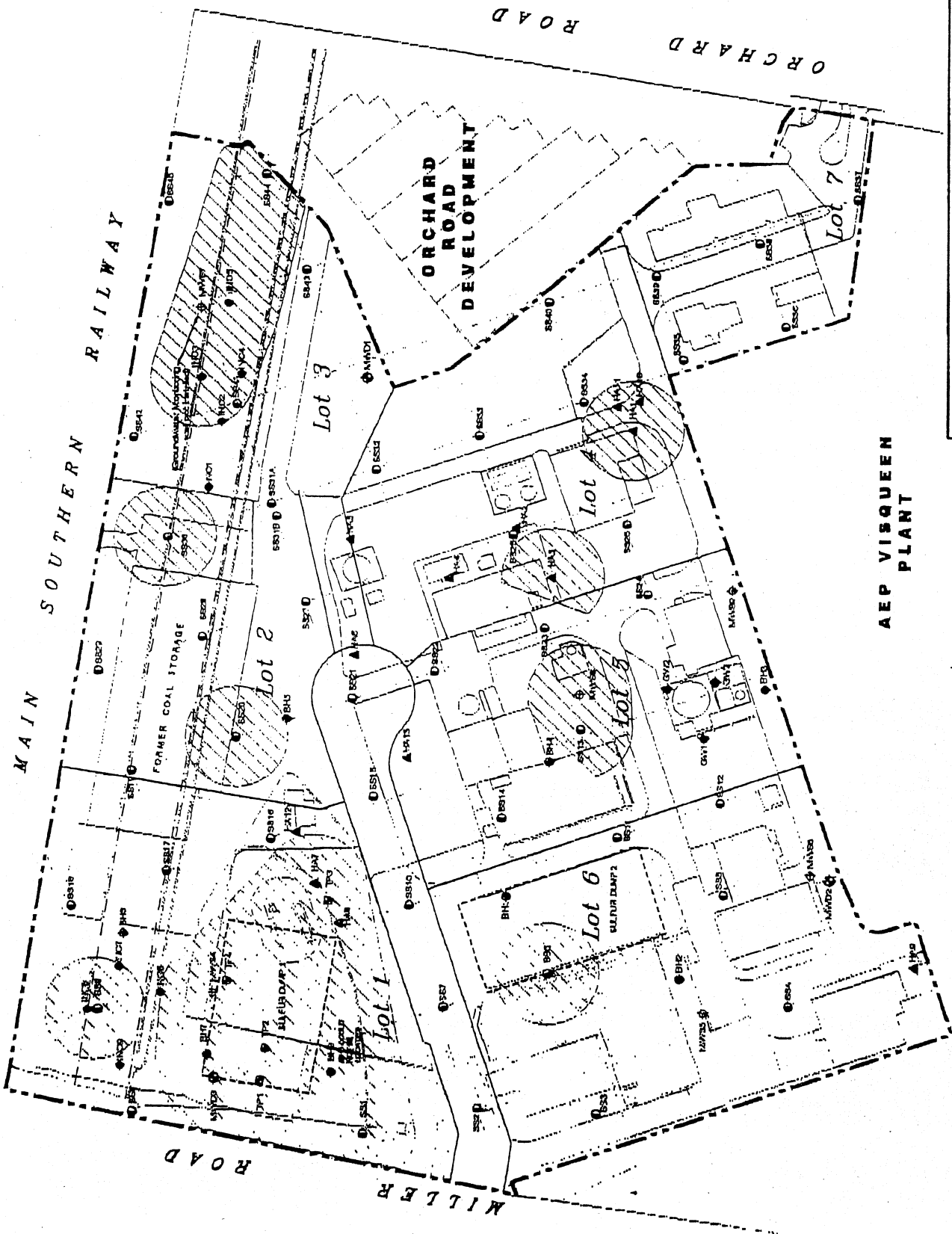
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**Appendices**

- Appendix A SMP Acknowledgement Record
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- SITE BOUNDARY
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- GROUNDWATER MONITORING WELL (GOLDER ASSOCIATES, 1998)
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- HAND AUGER HOLE LOCATIONS (DAMES & MOORE, DEC, 1997)
- TEST PIT LOCATION (DAMES & MOORE, DEC, 1997)
- SAMPLING LOCATIONS (DAMES & MOORE, 15 MAY, 1998)
- AREAS WITH POTENTIALLY CONTAMINATED SOIL THAT REQUIRE REVIEW OF THE SMP AND VALIDATION REPORT PRIOR TO SURFACE EXCAVATION



**POTENTIAL MANAGEMENT AREAS**

SCALE 1

Site Management Plan  
101 Miller Road, Chester, H21 8BQ

DATE: May 2002

REVISED DATE

PREPARED BY: [Signature]

PROJECT FILE NUMBER: J1004-016

DRAWN: LJE

HLA Environmental Pty Limited  
55-55 Grandview Street  
Pymble, NSW  
1572 0004 4422

15 May 2002  
J1698  
Mr David Tubb  
PacLib Management Pty Limited  
Page 3

### Groundwater Monitoring

Periodic groundwater monitoring may be required, depending on validation results and the requirements of the site auditor. Monitoring would include the sampling and analysis of groundwater samples from selected on site wells. Any on going groundwater-monitoring results would need to be reviewed and approved by a NSW EPA site auditor.

### CONCLUSION

The site management plan will be developed following completion of remediation and validation, and would incorporate any additional requirements from the auditor.

We have attached a generic table of contents for a site management plan for reference. If you need any additional information please call.

### HLA-ENVIROSCIENCES PTY LIMITED



Brad Eismen  
Principal Hydrogeologist

J1698/P:\J JOBS\J1650 to J1699\J1698\Correspondence\J1698.ltr\7\_15May02.doc/BE:be

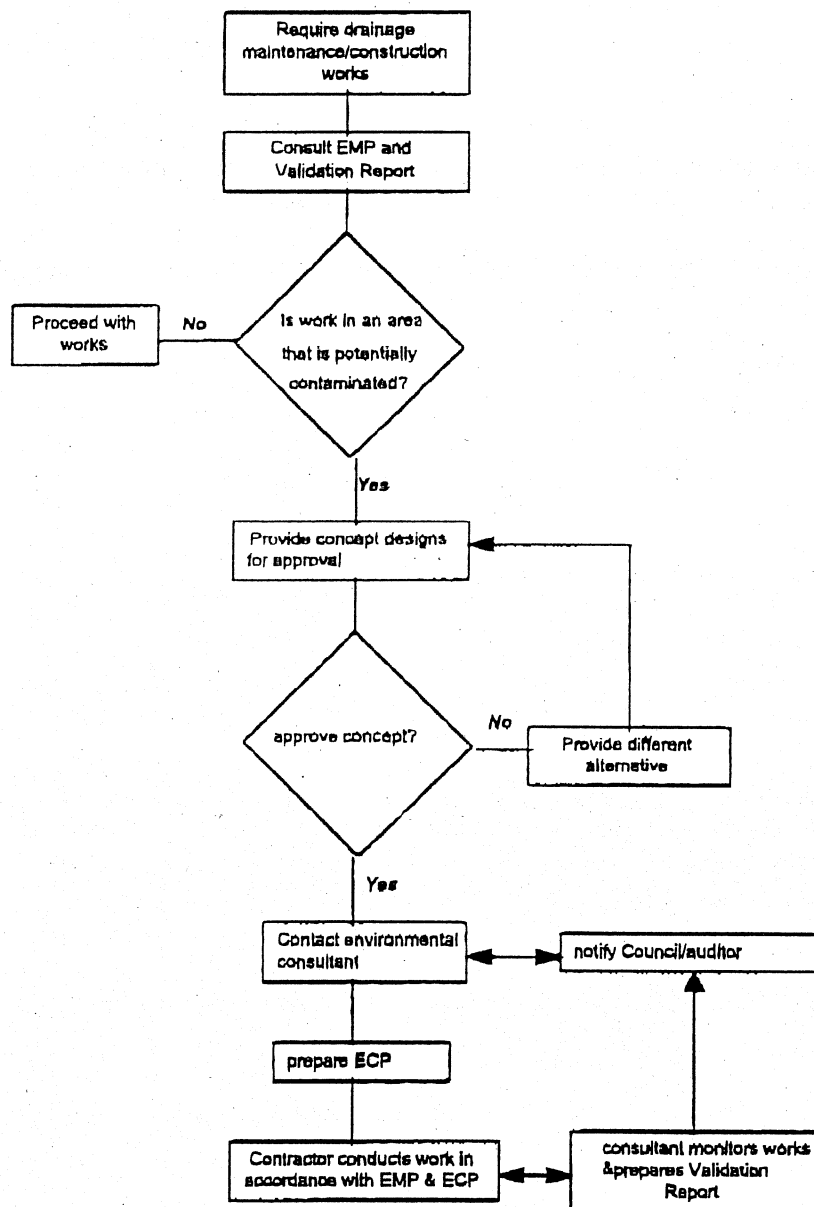
Enclosures      Figure 1  
                     Example Table of Contents

cc:                Greg Gibbins, FCL - (03) 9396 9099  
                     Peter Steinhour, Knight Frank - (02) 9761 1880  
                     Eddie Anderson, Environmental and Landscape Solutions (by e-mail)  
                     Ross Macfarland, CH2MHILL (02) 9950-0600

15 May 2002  
 J1698  
 Mr David Tubb  
 PacLib Management Pty Limited  
 Page 2

## Soil Excavation

The SMP would provide a specific set of procedures required if potentially contaminated soil was excavated during future subsurface work. A decision tree is presented below.





## HLA-Envirosiences Pty Limited

ABN 34 060 204 702

18 April 2002

J1698

Mr David Tubb  
PacLib Management Pty Limited  
Suites 3 & 4, 22 Elizabeth Street  
Artarmon, NSW 2064

ATTN  
PETE  
STENHOUR

**Contamination Issues**  
191 Miller Road  
Chester Hill, NSW

Dear David

This letter provides a summary of:

- Contamination related work (including previous investigations) completed at the site to date,
- Work that needs to be conducted prior to occupancy,
- Work that needs to be conducted to complete the Site Audit, and
- Work required by the RAP that will not be conducted based on changes to the subdivision.

This letter replaces our letters dated 11 and 15 April 2002 and provides additional information.

### Work Completed to Date

- Combined Phase 1 and 2 investigation conducted by Woodward Clyde Consultants (August 1999). The report included previous assessments by Dames and Moore and Golder Associates. Based on our review the investigation was generally conducted in accordance with NSW EPA guidelines.
- Additional soil investigation by Woodward Clyde Consultants (December 1999). The report described the results of sampling of an additional forty-five boreholes drilled across the site on an approximate 35m grid pattern. Based on our review the investigation was generally conducted in accordance with NSW EPA guidelines.
- Development of a RAP by HLA (August 2001) for the subdivision work including proposed Lots 1, 2, 3, 4, 7 and a portion of Lot 5 (Sulphur Shed). The subdivision work proposed included (*note all work not completed – see below*):
  - Relocation of the metal canopy attached to the western side of the warehouse building on proposed Lot 2 to the eastern side of the warehouse.
  - Demolition of all remaining structures on proposed Lots 4 and 7 to ground level including removal of any associated paved surfaces (footings and floor slabs).
  - Construction of a bitumen access road adjoining Miller Road.

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Mr David Tubb  
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Page 2

- Relocation of the earthen soil mound currently located in the north eastern corner of the site (proposed Lot 3).
- Excavation and removal of the decommissioned UST located in the north western portion of the site (proposed Lot 1).
- Removal of asbestos containing building materials for the buildings to be demolished (certificates to be provided by PacLib), including the awning of the building on Lot 2.
- Demolition of the Sulphur Shed on proposed Lot 5. Foundation and floor slab concrete has been stockpiled on site prior to re-use or removal.
- Removal and validation of the diesel UST on proposed Lot 1 (see HLA validation letter report dated 29 January 2002).
- Validation of the Soil Mound on Lot 3 for beneficial re-use on site (see HLA letter report dated 18 October 2001). Soil from the mound has been used to backfill the UST excavation and sewer pipe work in the southern portion of the site.

#### **Work to be Conducted for Occupancy**

- Address the hot spots on Lot 2.
  - The hot spot at SS30 will be addressed by the installation of the truck loading bays on the east site of the existing building. Soil excavated during construction of the bays will need to be sampled and disposed of in accordance with NSW EPA guidelines or beneficially re-used on site if results indicate the material is suitable. The excavation(s) will also need to be validated.
  - The hot spot at SS20 may need to be delineated, removed and validated. Previous development plans show a proposed office building at this location, which we understand will not be built. However, it is our understanding that this area is currently paved and if the pavement remains intact, no further action would be required.
- Address the hot spots on Lot 1. The RAP proposed placing soil, excavated from the proposed roadway, over Lot 1 to minimise potential exposure. Because the road is not going to be constructed and the excavated material moved to Lot 1, the hot spots may need to be delineated, removed and validated. However, it is our understanding that the entire surface of Lot 1 may be concreted. If this is the case the material should be allowed to remain.

#### **Work to be Conducted for Completion of Site Audit**

- Removal and validation of the pit behind Sulphur Shed.
- Validation of above ground storage tank pads, as needed.
- Removal and validation of building slabs, as needed.
- Conduct tank integrity testing on existing UST on Lot 6.



18 April 2002  
J1698  
Mr David Tubb  
PacLib Management Pty Limited  
Page 3

- Excavation and validation of Dome Tank.
- Validation of soil stockpile (currently on Lot 7) for sewer pipe work.
- Site validation report.
- Development of a site management plan.

**Work that will not be Conducted Because of Change in Subdivision**

- Excavation of roadway for subdivision and placing material on Lot 1
- Placing the Soil Mound under roadway (mound was validated for beneficial re-use on site).

Based on the work conducted to date and following completion of the work to be conducted for occupancy, the site will be suitable for continued commercial/industrial use. It should be noted that the site was considered suitable for continued commercial/industrial land use without conducting any remedial activities prior to any redevelopment activities. Redevelopment activities at the site, as required by the proposed purchaser, have made it necessary to conduct the described remedial actions so that contaminated soil is managed in an appropriate manner to protect human health and the environment.

If you need any additional information, please call.

Yours faithfully

**HLA-ENVIROSCIENCES PTY LIMITED**

Brad Eismen  
Principal Hydrogeologist

J1698/P\J JOBS\J1650 to J1699\J1698\Correspondence\J1698.ltr12\_18Apr02.doc/BE:be

Enclosures

cc: Greg Gibbins, FCL - (03) 9396 9099  
Peter Steinhour, Knight Frank - (02) 9761 1880



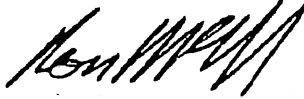
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# NSW Environment Protection Authority

## SITE AUDIT STATEMENT

Schedule 1, Form 2 (Contaminated Land Management Regulation 1998)

SITE AUDITOR (accredited under the *Contaminated Land Management Act 1997*):

Name: Mr Ross McFarland  Phone: 02 9950 0200  
Company: CH2M HILL Australia Pty Ltd Fax: 02 9950 0600  
Address: Level 7, 9 Help Street Accred. No: 9819  
CHATSWOOD, NSW 2065

SITE AUDIT STATEMENT NO: 2002/13

### SITE DETAILS:

Address: 191 Miller Street

Chester Hill, NSW Postcode: 2162

Lot and DP number: Lot 101 DP 851138.

Local government area: Bankstown City Council

### SITE AUDIT REQUESTED BY:

Name: Mr David Tubb  
Company: PacLib Industrial Pty Limited (ACN 097 555 649)  
Address: Suites 2 and 3, 22 Elizabeth Street  
ARTARMON NSW Postcode: 2069  
Phone: 02 - 9412-4555 Fax: 02 - 9412-4998

and

Name: The Manager  
Company: Villa World Limited (CAN 010 621 226)  
Address: Level 16, 50 Cavill Street  
SURFERS PARADISE QLD Postcode: 4217

and

Name: The Manager  
Company: Incitec Limited (ACN 010 767 263)  
Address: Paringa Road, Gibson Island  
MURARRIE, BISBANE QLD Postcode: 4170

and

Name: The Manager  
Company: Biga Nominees Pty Limited (ACN 005 186 158)  
Address: 672 Footscray Road  
FOOTSCRAY VIC Postcode: 3011

Name of contact person (if different from above): as above

Mr David Tubb, PacLib Industrial Pty Limited

Consultancy(ies) who conducted the site investigation(s) and/or remediation:

HLA Envirosciences Pty Ltd (HLA)

Title(s) of report(s) reviewed:

- HLA-Envirosciences Remedial Action Plan, Subdivision of 191 Miller Road, Chester Hill, NSW, 14 August 2001.
- HLA-Envirosciences Characterisation of Fill Mound - 191 Miller Road, Chester Hill, 18 October 2001
- HLA-Envirosciences UST Decommissioning Validation - 191 Miller Road, Chester Hill, 29 January 2002.
- HLA-Envirosciences Validation of Building Footprints - 191 Miller Road, Chester Hill, 14 June 2002.
- HLA-Envirosciences Site Management Plan - 191 Miller Road, Chester Hill, 22 August 2002.
- HLA-Envirosciences Groundwater Monitoring Report, 191 Miller Road, Chester Hill, 12 August 2002
- HLA-Envirosciences Site Validation Report - 191 Miller Road, Chester Hill, 2 August 2002

Other information reviewed:

Woodward-Clyde Phase 1 and 2 Assessment of Chester Hill Site, 191 Miller Road, Chester Hill, 30 August 1999, Volumes 1, 2 and 3.

Woodward-Clyde Phase 2C Soil Investigation of Incitec Chester Hill Site, 191 Miller Road, Chester Hill, 15 December 1999

Golder Associates Contamination Investigation, Waste Water Treatment Tank Area, Incitec Site - Chester Hill NSW, April 1998.

Dames and Moore Preliminary Contamination Assessment, Miller Road, Chester Hill Site for Incitec Ltd, December 1992.

Summary Site Audit Report Title:

Summary Site Audit Report for PacLib Industrial Pty Ltd, in relation to 191 Miller Street, Chester Hill, Site Assessment, Remediation, Validation and Ongoing Management.

Date: August 2002

I have completed a site audit (as defined in the Contaminated Land Management Act 1997) and reviewed the reports and information referred to above with due regard to relevant laws and guidelines. I certify that the site (tick all appropriate boxes):

(a) Is suitable for the following use(s):

Residential, including substantial vegetable garden and poultry

Don

- residential, including substantial vegetable garden excluding poultry;
- residential with accessible soil, including garden (minimal home grown produce contributing less than 10% fruit and vegetable intake) excluding poultry;
- residential with minimal opportunity for soil access, including units;
- daycare centre, pre-school, primary school;
- secondary school;
- park, recreational open space, playing field;
- commercial/industrial use;
- other (please specify): \_\_\_\_\_

subject to:

condition(s) (please specify):

- that this Site Audit Statement be read in conjunction with the associated Summary Site Audit Report;
- that the attached Site Management plan (SMP) be implemented; and
- that any works undertaken in relation to the SMP be reviewed by a NSW EPA accredited Site Auditor and results reported to the local Council.

~~(b) is not suitable for any beneficial use due to risk of harm from contamination.~~

(comment): \_\_\_\_\_

I am accredited by the NSW Environment Protection Authority under the Contaminated Land Management Act 1997 as a Site Auditor.

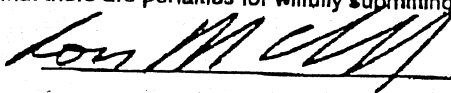
Accreditation Number: 8819

I certify that:

- (a) I have personally examined and am familiar with the information contained in this statement, including the reports and information referred to in this statement, and
- (b) this statement is, to the best of my knowledge, true, accurate and complete, and
- (c) on the basis of my inquiries made to those individuals immediately responsible for making the reports, and obtaining the information, referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties for willfully submitting false, inaccurate or incomplete information.

Signed:



Date:

30 August 2002

**FORWARD TO:**

Manager, Contaminated Sites Section  
NSW Environment Protection Authority  
PO Box A280  
SYDNEY SOUTH NSW 1232

Phone: 02 9995 5614

Fax: 02 9995 5999



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0	Greg Bartlett	Andrew Lau	Andrew Lau		23/10/07

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