Site Specific Human Health and Ecological Risk Assessment – The Haymarket (For The Haymarket Planning Applications)

Prepared for: Lend Lease Development Pty Ltd

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EnRiskS

Document History and Status

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Limitations

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It is prepared in accordance with the scope of work and for the purpose outlined in the **Section 1** of this report.

The sources of information used are outlined in this report and include development scenarios, investigation reports and other material provided to Environmental Risk Sciences by Lend Lease Development Pty Ltd. Environmental Risk Sciences has made no independent verification of this information beyond the agreed scope of works and assumes no responsibility for any inaccuracies or omissions in the material provided to Environmental Risk Sciences by Lend Lease Development Pty Ltd. No indications were found that information provided by Lend Lease Development Pty Ltd was false.

This draft report was prepared in March and revised in April, May, October and November 2013 and is based on the information provided and reviewed at that time. Environmental Risk Sciences disclaims responsibility for any changes that may have occurred after this time.

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Glossary of Terms

ADI	Acceptable Daily Intake
ANZECC	Australia and New Zealand Environment and Conservation Council
AT	Averaging Time
BGL	Below ground level
BTEX	Benzene, toluene, ethylbenzene and total xylenes
BW	Body weight
CF	Unit conversion factor
ED	Exposure duration
EF	Exposure frequency
EIL	Ecologically-based Investigation Level
EPA	Environment Protection Authority
ET	Exposure time
HI	Hazard Index
HIL	Health investigation level
HQ	Hazard Quotient
HHERA	Human Health and Ecological Risk Assessment
LOR	Limit of Reporting
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure – Assessment of Site Contamination
NHMRC	National Health and Medical Research Council
NSW DECC	New South Wales Department of Environment and Climate Change
PAH	Polycyclic aromatic hydrocarbon
RfC	Reference Concentration
RfD	Reference Dose
RME	Reasonable maximum exposure
TC	Tolerable Concentration
TDI	Tolerable Daily Intake
TDS	Total dissolved solids
TPH	Total petroleum hydrocarbons
TPHCWG	Total Petroleum Hydrocarbon Criteria Working Group
UPSS	Underground Petroleum Storage System
US EPA	United States Environmental Protection Agency
UST	Underground storage tank
VIC EPA	Victorian Environment Protection Authority
VOC	Volatile Organic Compound
WHO	World Health Organisation

Section 1 Introduction

1.1 Background

Environmental Risk Sciences Pty Ltd (enRiskS) has been commissioned by Lend Lease Development Pty Ltd to undertake a human health and ecological risk assessment (HHERA) for the development scheme at The Haymarket Precinct of the Sydney Exhibition and Convention Centre site at Darling Harbour (refer to **Figure 1** for location). Contamination has been identified in soil and groundwater in various locations due to historical filling at the site (Coffey 2013b).

1.1.1 Overview of Proposed Development

The Haymarket will include student housing, public car parking, a commercial office building, and four mixed use development blocks (retail/commercial/residential podium with residential towers above) centred around a new public square to be named Haymarket Square.

More specifically The Haymarket encompasses the following:

- Demolition of existing site improvements, including the existing Sydney Entertainment Centre (SEC), the Entertainment Centre car park, and part of the pedestrian footbridge connected to the Entertainment Centre car park and associated tree removal;
- North-west block – construction of a part public car park and part commercial/office building;
- North-east block – construction of a mixed use podium (comprising retail, commercial, above ground parking, and residential) with three residential buildings above;
- South-east block - construction of a mixed use podium (comprising retail, commercial, above ground parking, and residential) with three residential buildings above;
- South-west block - construction of a mixed use podium (comprising retail, commercial, above ground parking, and residential) with three residential buildings above;
- North block – construction of a mixed use building comprising retail, commercial and residential;
- Student housing – construction of two buildings providing for up to 1,000 beds;
- Public domain improvements including a new square, water features, new pedestrian streets and laneways, streetscape embellishments, and associated landscaping. (It is intended that a Stage 2 DA seeking approval for parts of the public domain (The Boulevard and Haymarket Square) will be lodged with the first residential stage);
- Reconfiguration and upgrade of Darling Drive (part).

1.1.2 Project Background

The existing convention, exhibition and entertainment centre facilities at Darling Harbour were constructed in the 1980s and have provided an excellent service for Sydney and NSW.

The facilities however have limitations in their ability to service the contemporary exhibition and convention industry which has led to a loss in events being held in Sydney.

The NSW Government considers that a precinct-wide renewal and expansion is necessary and is accordingly committed to Sydney reclaiming its position on centre stage for hosting world-class events with the creation of the Sydney International Convention, Exhibition and Entertainment Precinct.

Following an extensive and rigorous Expressions of Interest and Request for Proposals process, Darling Harbour Live (formerly known as 'Destination Sydney'- a consortium comprising AEG Ogden, Lend Lease, Capella Capital and Spotless) was announced by the NSW Government in December 2012 as the preferred proponent to transform Darling Harbour and create the new Sydney international convention, exhibition and entertainment Precinct.

Key features of the Darling Harbour Live Preferred Master Plan include:

- Delivering world-class convention, exhibition and entertainment facilities, including:
  - Up to 40 000 m^2 exhibition space;
  - Over 8 000 m^2 of meeting rooms space, across 40 rooms;
  - Overall convention space capacity for more than 12 000 people;
  - A ballroom capable of accommodating 2 000 people; and
  - A premium, red-carpet entertainment facility with a capacity of 8 000 persons.
- Providing up to 900 hotel rooms in a hotel complex at the northern end of the precinct.
- A vibrant and authentic new neighbourhood at the southern end of the precinct, called 'The Haymarket', home to an IQ Hub focused on the creative industries and high-tech businesses, apartments, student accommodation, shops, cafes and restaurants.
- Renewed and upgraded public domain, including an outdoor event space for up to 25 000 people at an expanded Tumbalong Park.
- Improved pedestrian connections linking to the proposed Ultimo Pedestrian Network drawing people between Central, Chinatown and Cockle Bay Wharf as well as east-west between Ultimo/Pyrmont and the City.

1.2 Scope

The overall objective of the HHERA presented in this report is:

- To conduct an assessment of risks to human health in relation to contamination for the following exposure scenarios:
  - Residential (high density and student accommodation)
  - Commercial/retail worker
  - Recreational (open space)
  - Car Park User
  - Intrusive Worker
  - Construction worker
  - Worker accessing stormwater culverts
- To conduct an assessment of risks to ecological systems in relation to contamination for the following exposure scenarios:
  - Plants in turfed areas where trees will be planted into existing soil
  - Aquatic organisms in Cockle Bay

Reuse criteria for soil from the site will also be developed.

1.3 Methodology

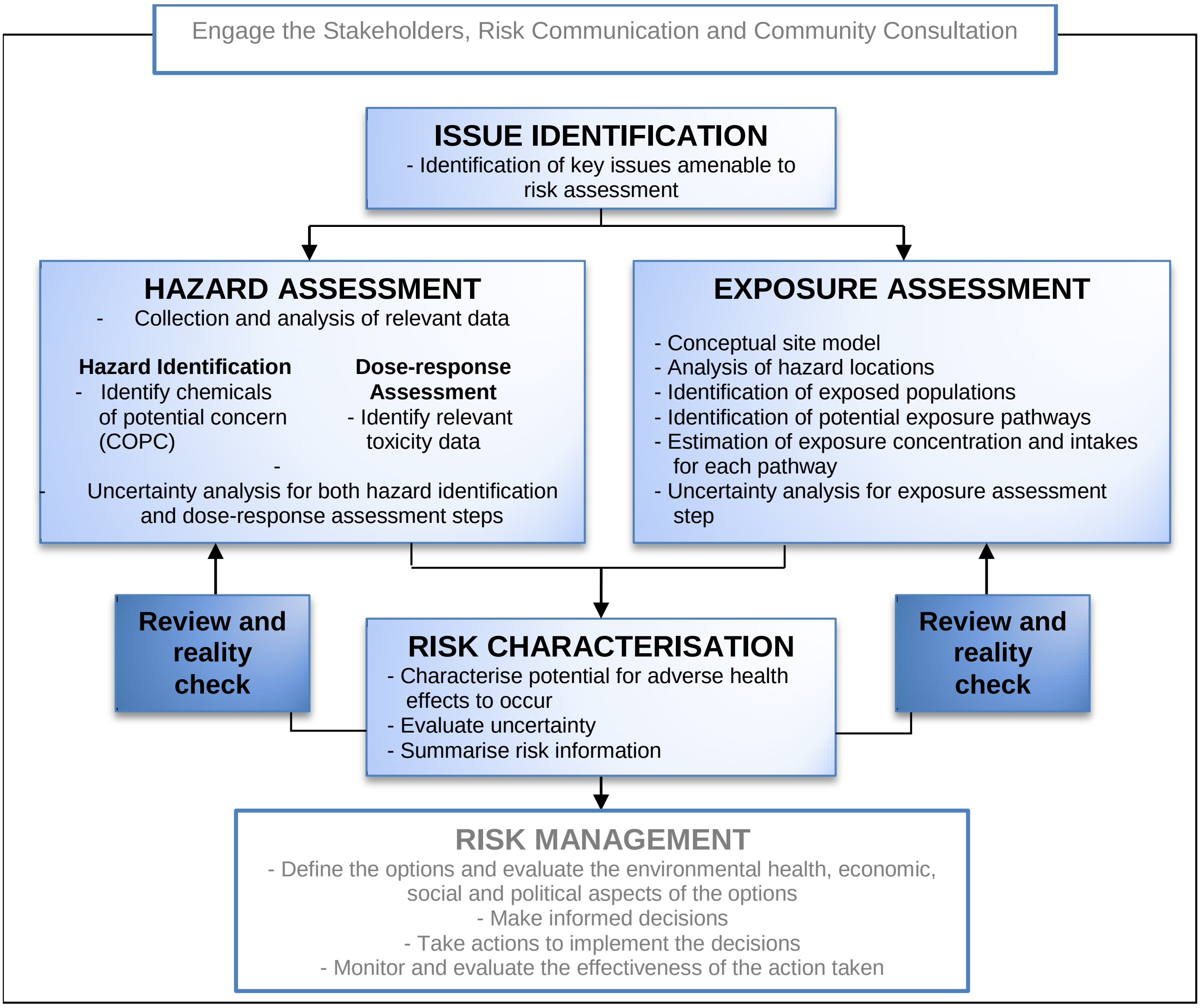
The approach taken in this HHERA for the quantitative assessment of human health risks is in accordance with guidelines/protocols endorsed by Australian regulators, including:

- enHealth (2012a) Environmental Health Risk Assessment, Guidelines for Assessing Human Health Risks from Environmental Hazards
- enHealth (2012b) Australian Exposure Factor Guide
- NEPM (1999) National Environmental Protection Measure – Assessment of Site Contamination including:
  - Schedule B(1) Investigation Levels for Soil and Groundwater
  - Schedule B(4) Guideline on Health Risk Assessment Methodology
  - Schedule B(6) Guideline on Risk Based Assessment of Groundwater Contamination
  - Schedule B(7) Guideline on Health-Based Investigation Levels and
  - Schedule B(7) Appendix B Guideline on Exposure Scenarios and Exposure Settings;
- NEPM (1999 amended 2013) National Environmental Protection Measure – Assessment of Site Contamination including:
  - Schedule B(1) Investigation Levels for Soil and Groundwater
  - Schedule B(4) Guideline on Health Risk Assessment Methodology
  - Schedule B(6) Guideline on Risk Based Assessment of Groundwater Contamination
  - Schedule B(7) Guideline on Health-Based Investigation Levels and
  - Schedule B(7) Appendix B Guideline on Exposure Scenarios and Exposure Settings;
- The Health Risk Assessment and Management of Contaminated Sites" (CSMS 1991, 1993, 1996 and 1998 and enHealth 2003); and
- ANZECC/NH&MRC (1992[1]) Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites.

The above documents were originally adapted from the more detailed protocols and guidelines developed by international agencies such as the US EPA (1989, 1992, 2002, 2004 and 2009). These original documents have also been consulted to provide supplementary guidance, where required, in line with general guidance from NSW EPA and the various national guidance documents listed above.

The overall approach to health risk assessment recommended by the enHealth 2012 national risk assessment guidance document is outlined in the following **Figure** (modified from enHealth 2012a).

[1] Guidance is noted to have been rescinded by NHMRC, however there are a number of aspects associated with the assessment of risks to human health that are addressed in this document that have not been taken up into more recent and more general guidance provided by NEPM and enHealth.



Following this guidance the HHERA has been undertaken to include the following:

- A review of the proposed Haymarket Precinct development scheme and the contamination at the site (**Section 2**);
- Identification of toxicity information that is relevant to the identified hazards (**Section 3**);
- Assessment and quantification of potential exposures on the site, relevant to the proposed development scheme (**Section 4**);
- Quantification and characterisation of exposure and potential risks to human health (**Section 5**);
- Ecological risk assessment for contaminated soil and groundwater (**Section 6**);
- Conclusions of the HHERA and identification of appropriate risk management measures with consideration of the quantitative assessment presented and the uncertainties identified (**Section 7**).

Section 2 Site Characterisation

2.1 General

This section provides a summary of the site characteristics and the contamination identified in soil and groundwater at the site relevant to the assessment of potential exposures on the site.

This has been based on a review of information relevant to the site presented in the following reports (provided for the purpose of this assessment):

- Coffey (2011) Contamination Investigation – Sydney International Convention and Entertainment Centre
- Coffey (2012a) Geotechnical Investigation – Proposed Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) Darling Harbour
- Coffey (2012b) Stage 1 – Preliminary Environmental Investigation – Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) Darling Harbour, Sydney
- Coffey (2012c) Stage 2 – Detailed Site Investigation – Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) Darling Harbour, Sydney
- Coffey (2012d) Supplementary Site Investigation – Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) Darling Harbour
- Coffey (2013a) Supplementary Site Investigation: Factual Report – Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) Darling Harbour
- Coffey (2013b) Overarching Remedial Action Plan – Haymarket Precinct, Darling Harbour, Sydney, NSW

2.2 Site Description

2.2.1 General

The SICEEP Site is located within Darling Harbour. Darling Harbour is a 60 hectare waterfront precinct on the south-western edge of the Sydney Central Business District that provides a mix of functions including recreational, tourist, entertainment and business.

With an area of approximately 20 hectares, the SICEEP Site is generally bound by the Light Rail Line to the west, Harbourside shopping centre and Cockle Bay to the north, Darling Quarter, the Chinese Garden and Harbour Street to the east, and Hay Street to the south.

The SICEEP Site has been divided into three distinct redevelopment areas (from north to south) – Bayside, Darling Central and The Haymarket. The Application Site area relates to The Haymarket as shown in **Figure 2**.

The Haymarket Precinct site covers an area of approximately 4.2 hectares. The site is currently occupied by the Sydney Entertainment Centre and the adjoining car park. The site is surrounded on its west, south and east sides by commercial and high density residential developments as outlined in **Table 1**.

Table 1 Surrounding Land Uses

Direction (Relative to site)	Site Use (Nature of Activity)
North	Sydney Conference and Exhibition Centre (SCEC), Tumbalong Park and surrounding Darling Harbour public realm exist to the north/northwest. The Novotel Rockford Hotel is located immediately north of Little Pier Street at the eastern part of the site, beyond which lies the Sydney Chinese Garden of Friendship.
East	Harbour Street and a variety of restaurants and hotels beyond.
South	Immediately south lies the light rail monorail corridor. Paddy's Markets and UTS Library are located further south beyond the light rail corridor.
West	The light rail corridor and the Powerhouse Museum beyond.

2.2.2 Site Geology

The former bay and its tributaries originally extended almost 1 km inland from the southern boundary of Cockle Bay. The shoreline has been progressively reclaimed since the 1820s (Coffey 2011).

Extensive filling has been undertaken at the site. Such work commenced during the early history of Sydney – in the first half of the 1800s. Fill has been observed to be between 0.25 m and 14.5 m below ground level (m BGL) generally increasing from east to west. Fill materials are described as a heterogeneous mixture of sand, sandy gravel, clay and sandy clay/silt with cobbles and occasional boulder sized rocks (Coffey 2013a).

The fill material overlies Quaternary aged alluvium made up of gravel, sand, silt and clay deposits. The alluvial deposits are underlain by residual rock and shale of Triassic aged Hawkesbury Sandstone Formation. The sandstone bedrock below is intersected by the Great Sydney Dyke which is a dolerite intrusion into the sandstone oriented in a southeast-northwest orientation (Coffey 2013a).

Review of the 1:25 000 Parramatta River Topographic Map (91303N) indicates the site lies at an elevation of 0 to 10 m AHD. The surrounding land generally exhibits an increasing elevation towards the south, east and west. The site is approximately 500 m to the south of the foreshore of Darling Harbour (Coffey 2011).

2.2.3 Site Hydrogeology and Groundwater Use

Groundwater is found beneath the site at a depth of between 2.4 and 3.0 m BGL, and the direction of flow is towards the north and Cockle Bay. The groundwater is connected with Cockle Bay and may be subject to tidal fluctuations. It is possible that groundwater may perch at shallower depths where shallow bedrock is present and the depth to groundwater may decrease during periods of heavy and/or prolonged rainfall (Coffey 2011).

Standing groundwater levels were measured in MW120 continually between 10 and 14 January 2013 using a data logger to assess possible influence from tidal fluctuations in Cockle Bay (Coffey 2013a). Groundwater levels measured over this 5 day period ranged between 0.751 m AHD and 0.788 m AHD. The observed period of variation was between one and several days, which suggests that tidal fluctuations in Cockle Bay have negligible influence on groundwater levels beneath the site (Coffey 2013b).

A review of the NSW Natural Resource Atlas found no registered bores within 500 m of the site (Coffey 2011).

2.2.4 Acid Sulfate Soils

A review of acid sulfate soil (ASS) risk maps presented on the Australian Soil Resource Information System (ASRIS) website (http://www.asris.csiro.au/index_ie.html#) indicate a low probability for the presence of ASS beneath the site (Coffey 2011).

The maps indicate, however, that there is a high probability of ASS in the sediments in Darling Harbour and Sydney Harbour. There is evidence that the site and surrounding area has been reclaimed using harbour sediment possibly along with other sources of fill material. As such, it is possible that the fill material at the site could contain ASS (Coffey 2011).

Within the alluvial deposits potential and actual acid sulfate soils have been found (Coffey 2013a).

2.3 Site History

The site has been in use since the early history of Sydney. It has been used for a wide variety of purposes as outlined in **Table 2** (Coffey 2013b).

Table 2 Chronological summary of historical site uses (Coffey 2013b)

Period	Description of Land Uses
1813	Commenced use of the land for grinding corn, soap making, brewing, and salting beef
c.1826	Reclamation of Long Cove (i.e. Cockle Bay) shoreline commenced. A review of historic maps indicated that Cockle Bay (referred to historically as Long Cove), extended south beyond the current alignment of Hay Street. The material used for reclamation comprised '*sand and silt ….. obtained by dredging in various parts of the harbour, the material being deposited where possible'*
1831-1836	Construction of a mill/warehouse was completed on the reclaimed land.
1840s-1860s	The land was leased to several tenants and used for various purposes including storage, and manufacture and bottling of soda water.
1868	Lease of the land was transferred to Simon Zollner and a galvanising iron works established. Additional metal works were also conducted on-site throughout this period.
c.1890	Most of the land had been covered and was used as storage space. Railway had been established to the north of Pier Street.
1905-1925	A Salvation Army shelter was established on the site.
1932-1937	Most of the site was demolished to allow construction of a Council Depot.
1949	Site used as a City Market place.
1983	Sydney Entertainment Centre was officially opened.

2.4 Availability and Suitability of Data

Quantitative data with respect to contamination in soil and groundwater from the site are available from intrusive investigations undertaken by Coffey between 2011 and 2013 (Coffey 2011, 2012b, c and d, 2013a and b).

Soil was sampled at 51 locations across the site in these investigations. Some of the locations were closely bunched to allow the extent of hot spots to be determined. Given the spacing of some of these clusters, the number of independent sampling locations as defined by the NSW EPA Sampling Design Guidelines was 39 (Coffey 2013b).

Soil samples were analysed for heavy metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), benzene, toluene, ethylbenzene and xylenes, volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), and asbestos which are all relevant for the former uses of the site and common in historical fill materials (Coffey 2013b).

Groundwater has been sampled from 9 locations around the site. Groundwater samples were analysed for petroleum hydrocarbons, PAHs, benzene, toluene, ethylbenzene and xylenes, VOCs and SVOCs which are all relevant for the former uses of the site and common in historical fill materials (Coffey 2013b).

Figure 3 shows the various locations where soil and groundwater samples were taken.

Selected soil samples were analysed using the Australian Standard Leaching Procedure (ASLP) and the Toxicity Characteristic Leaching Procedure (TCLP) to assist in waste category classification of materials.

Review of the quality assurance and quality control (QA/QC) parameters (field and laboratory) for the data collected in the above reports has been undertaken. Overall the quality of the data was considered suitable for interpretative use.

In general, the available data is considered to be suitable for consideration in the HHERA as it has targeted the most significantly impacted areas on the site.

2.5 Review of Nature and Extent of Contamination in Soil

Soil investigations have been undertaken by Coffey in 2011, 2012 and 2013. This involved the collection and analysis of soil from 51 locations (refer to **Figure 3**).

Most locations were sampled at more than one depth, primarily within the top 3 m but some samples were taken to depths of 8-9 m BGL. A total of 197 samples were collected across the site. All soil results from these investigations have been reported by Coffey and are included in **Appendix A**. The locations are well distributed across the site or appropriately focused around a hot spot to determine extent.

The borehole logs for the sample locations indicate that most locations did not show odours or staining. A number of locations were found to have hydrocarbon odours as the boreholes were drilled. The boreholes with these odours were those that were found to have elevated TPH or PAHs when analysed. Bitumen/asphalt was identified in BH10 and BH11.

This review has been undertaken to identify whether the concentrations reported exceed available human health risk based investigation levels, or screening guidelines. With respect to the assessment of contamination in soil at the site and the proposed use the following guidelines are available:

- **NEPM Health Based Investigation Levels.** The NEPM (1999 amended 2013) provides risk-based Health Investigation Levels (HIL) for selected organic and inorganic chemicals in soils. Different levels are provided for a variety of exposure settings including residential, open-space / parks / recreational and commercial / industrial land uses. The NEPM HILs have been developed to be protective of human health and do not take into account environmental concerns. Soil results have been compared to NEPM Level B (High Density Residential) HILs;

  - **CRC CARE Health Screening Levels (HSLs) (Friebel & Nadebaum 2011).** The current NEPM HILs do not include investigation levels for petroleum hydrocarbons. The development of HSLs for petroleum hydrocarbons included criteria for soil for a range of land uses that include HSL-B: high density residential land-use. The HSLs have been developed to address risks associated with direct contact exposures (ingestion and dermal contact) as well as vapour inhalation within buildings. For the purpose of this assessment HSL-B, relevant to the most porous soil type (sand) and shallow materials 0-2 m depth, have been used which is the most conservative option and allows for appropriate screening of chemicals that need more detailed review. Intrusive workers are addressed more specifically in the detailed risk assessment in **Section 4** and **5**.

Based on the data presented in **Appendix A** and consideration of the proposed development at the site, the following can be noted:

- **Benzene –** Benzene concentrations at the site range from <0.1 to 0.1 mg/kg. The CRC Care HSL-B value is 0.5 mg/kg at all depths so no further assessment is required.
- **Toluene –** Toluene concentrations range at the site range from <0.1 to 0.1 mg/kg. The CRC Care HSL-B value is 160 mg/kg at the surface so no further assessment is required.
- **Ethylbenzene** – Ethylbenzene concentrations range from <0.1 to 0.4 mg/kg. The CRC Care HSL-B value is 57 mg/kg at the surface so no further assessment is required.
- **Xylenes –** The total xylenes concentrations range from <0.1 to 1.4 mg/kg. The CRC Care HSL-B value is 40 mg/kg at the surface so no further assessment is required.
- **TPH**
  - **C6-9** – Samples had TPH C6-9 levels ranging from <10 to 21 mg/kg. The CRC Care HSL-B (for impacts beneath a building) for sandy soil is 260 mg/kg for 0-1 m and 370 mg/kg for 1-2 m. Further detailed assessment of TPH C6-9 will not be required in this HHERA.
  - **C10-14 –** Samples had TPH C10-14 concentrations ranging from <50 to 660 mg/kg. The CRC Care HSL for high density residential sites is 110 mg/kg at the surface of a site. While it is considered likely that the elevated concentrations of TPH in this fraction range reflects the presence of elevated concentrations of PAHs (noted below), further detailed assessment of the risk posed by C10-14 TPH has been presented.
  - **C15-36 –** Concentrations ranged from <100 to 6 200 mg/kg. While it is considered likely that the elevated concentrations of TPH in this fraction range reflects the presence of elevated concentrations of PAHs (noted below), further detailed assessment of the risk posed by heavy end TPH has been presented.
- **PAHs** – Total PAHs concentrations in the soil samples at the site range from <1 mg/kg to 3 200 mg/kg. The HIL-B value for total PAHs is 400 mg/kg total PAHs. Further screening assessment of the potential risks posed by all individual PAHs at the site is required.

- **Acenaphthene** – Acenaphthene concentrations in soil samples at the site range from <0.5 to 54 mg/kg. The US EPA regional screening level for acenaphthene in residential soil is 3 400 mg/kg so no further assessment of this compound is required.
- **Acenaphthylene** – Acenaphthylene concentrations in soil at the site range from <0.5 to 1 mg/kg. The US EPA regional screening level for acenaphthene in residential soil is used as a surrogate for this compound. The concentrations present at the site are much lower than the screening level of 3 400 mg/kg so no further assessment is required.
- **Anthracene** – Anthracene concentrations in soil at the site range from <0.5 to 110 mg/kg. The US EPA regional screening level for anthracene in residential soils is 17 000 mg/kg so no further assessment is required.
- **Benzo[a]anthracene** – Benzo[a]anthracene concentrations range from <0.5 to 260 mg/kg. This compound is one of the carcinogenic PAHs that can be assessed using the TEFs for benzo[a]pyrene. The US EPA regional screening level for this compound in residential soils is 0.15 mg/kg. For both reasons further assessment has been presented.
- **Benzo[b&k]fluoranthene** – Benzo[b&k]fluoranthene concentrations range from <1 to 340 mg/kg. This compound is one of the carcinogenic PAHs that can be assessed using the TEFs for benzo[a]pyrene. The US EPA regional screening level for this compound in residential soils is 0.15 mg/kg. For both reasons further assessment has been presented.
- **Benzo[a]pyrene** – Benzo[a]pyrene concentrations in the soil samples at the site range from <0.5 to 200 mg/kg. The HIL-B value for benzo[a]pyrene is 4 mg/kg so further assessment of benzo[a]pyrene is required.
- **Benzo[ghi]perylene** – Benzo[ghi]perylene concentrations range from <0.5 to 62 mg/kg. This compound is one of the carcinogenic PAHs that can be assessed using the TEFs for benzo[a]pyrene. The US EPA regional screening level for a surrogate for this compound in residential soils is 0.15 mg/kg. For both reasons further assessment has been presented.
- **Chrysene** – Chrysene concentrations range from <0.5 to 300 mg/kg. This compound is one of the carcinogenic PAHs that can be assessed using the TEFs for benzo[a]pyrene. The US EPA regional screening level for this compound in residential soils is 15 mg/kg. For both reasons further assessment has been presented.
- **Dibenzo[ah]anthracene** – Benzo[ah]anthracene concentrations range from <0.5 to 19 mg/kg. This compound is one of the carcinogenic PAHs that can be assessed using the TEFs for benzo[a]pyrene. The US EPA regional screening level for this compound in residential soils is 0.015 mg/kg. For both reasons further assessment has been presented.
- **Fluoranthene** – Fluoranthene concentrations range from <0.5 to 570 mg/kg. The US EPA regional screening level for this compound in residential soils is 2 300 mg/kg so no further assessment is required.
- **Fluorene** – Fluorene concentrations range from <0.5 to 68 mg/kg. The US EPA regional screening level for this compound in residential soils is 2 300 mg/kg so no further assessment of this compound is required.

- **Indeno[123-cd]pyrene** – Indeno[123-cd]pyrene concentrations range from <0.5 to 60 mg/kg. This compound is one of the carcinogenic PAHs that can be assessed using the TEFs for benzo[a]pyrene. The US EPA regional screening level for this compound in residential soils is 0.15 mg/kg. For both reasons further assessment has been presented.
- **Naphthalene –** Concentrations of naphthalene in soil at this site ranged from <0.5 mg/kg to 16 mg/kg. The CRC Care HSL for high density residential areas is 3 mg/kg at the surface. Further detailed assessment of naphthalene is required.
- **Phenanthrene** – Phenanthrene concentrations range from <0.5 to 580 mg/kg. The US EPA regional screening level for pyrene in residential soil is used as a surrogate for phenanthrene. The screening level is 1 700 mg/kg so no further assessment is required.
- **Pyrene** – Pyrene concentrations range from <0.5 to 540 mg/kg. The US EPA regional screening level for pyrene in residential soil is 1 700 mg/kg so no further assessment is required.

- **Arsenic** – Arsenic concentrations at the site range from <2 to 21 mg/kg. The HIL-B value for arsenic is 500 mg/kg so no further assessment is required.
- **Cadmium** – Cadmium concentrations at the site range from <0.4 to 0.5 mg/kg. The HIL-B value is 150 mg/kg so no further assessment is required.
- **Chromium** – Chromium concentrations range from <5 to 260 mg/kg. The HIL-B value is 500 mg/kg so no further assessment is required.
- **Copper** – Copper concentrations at the site range from <5 to 560 mg/kg. The HIL-B value is 30 000 mg/kg so no further assessment is required.
- **Lead** – All but one of the samples at the site are below the HIL-B value – 1 200 mg/kg. One location had a result of 2 700 mg/kg. The 95% UCL value for the data for the site is 211 mg/kg which is well below the HIL-B for lead in soils and, in fact, all of the HILs for lead. The maximum value at the site is less than 250% of the relevant HIL value. The standard deviation for the lead data is 260 mg/kg which is less than 50% of the HIL value. Considering this additional data analysis as specified in the NEPM, no further assessment of lead is required for the site.
- **Mercury** – The mercury concentrations at the site range from <0.05 to 4.9 mg/kg. The HIL-B value for mercury is 120 mg/kg so no further assessment is required.
- **Nickel** – Nickel concentrations at the site range from <5 to 26 mg/kg. The HIL-B value for nickel is 1 200 mg/kg so no further assessment is required.
- **Zinc –** Zinc concentrations at the site range from <5 to 2 200 mg/kg. The HIL-B value for zinc is 60 000 mg/kg so no further assessment is required.
- **4-Nitrophenol** – A single detection of 4-nitrophenol was found at the site. The concentration detected was 1.8 mg/kg. The US EPA Drinking Water Health Advisories (US EPA 2012) recommend an oral reference dose of 0.008 mg/kg/d for this chemical. Using the regional screening levels on-line calculator for preliminary remediation goals, a soil screening level of 489 mg/kg has been calculated for a residential scenario. The reference dose, the climate zone and site area were the only parameters entered into the calculation that were different from default values – all other parameters were left at the US EPA's default settings for residential exposure to soil. Given this value no further assessment of this chemical is required.

- **2-Naphthylamine** – A single detection of 2-naphthylamine was found at the site. The concentration detected was 0.8 mg/kg. The US EPA regional screening levels indicate that for low density residential areas concentrations should be below 0.27 mg/kg. The detection at the site is more than 250% of this value so further assessment of this chemical is required.
- **Gamma-BHC (Lindane)** – A single detection of lindane at 1.3 mg/kg was found at the site. The US EPA regional screening levels indicate that for low density residential areas concentrations should be below 0.52 mg/kg. The detection at the site was approximately 250% of this value which indicates that it is within the requirements of the NEPM test as all other locations were less than the detection limit. No further assessment is required.

On the basis of the above, further assessment of soil contamination is required for this site for the key contaminants – naphthalene, benzo[a]pyrene (carcinogenic PAHs), TPH C15+, TPH C10-14 and 2-naphthylamine.

2.6 Review of Nature and Extent of Contamination in Groundwater

Investigations of groundwater contamination have been completed by Coffey between 2011 and 2013. Sampling locations are shown in **Figure 3**. The analytical data are presented in **Appendix B**.

During the course of investigations conducted at the site, 8 bores have been installed at the site. BH1, BH12 and BH13 were sampled once in 2011. Wells MW25 and MW30 were sampled twice in 2012 and once in 2013. Well MW6 was sampled once in 2012 and once in 2013. Wells MW120 and MW124 do not appear to have been sampled although MW120 was used to evaluate the potential effect of the tide at the site in 2013.

In 2011 BH1 and BH13 had no organics present and elevated levels of metals although the results table does not identify whether the samples were filtered before analysis. If not, this would explain the difference between the 2011 results and the results in 2012 and 2013 which were all on filtered samples. BH12 had some BTEX present but no TPH or PAHs and metals concentrations were in line with the other two wells. BH12 was located closer to one of the identified hot spots on the site.

In May 2012 wells MW25 and MW30 had no organics and much lower metals levels than the 2011 sampling round found – these analyses were identified as dissolved metals. In August 2012 MW25 and MW30 again had no organics in the groups analysed and metals were not checked. In 2013 a ten-fold lower detection limit was used for the PAH analyses and low levels were found in the groundwater samples. These samples had low levels of metals.

MW6 was analysed in August 2012 where no organics were found and metals were not measured and in January 2013 where no organics were found and metals were low.

The groundwater concentrations reported have been reviewed. This review has been undertaken to identify the following:

- Whether the analyte detected is considered volatile[2]; and
- Whether the concentration reported exceeds available human health risk based investigation levels, or screening guidelines. With respect to the assessment of contamination in

[2] A chemical is considered sufficiently volatile if it has a Henry's law constant greater than 1 x 10^{-5} atm m^3/mol and the vapour pressure is greater than 1 mm Hg at room temperature (NEPM 1999 amended 2013, DECCW 2010).

groundwater at the site the following guidelines have been adopted for the purpose of screening:

- **Australian Drinking Water Guidelines (ADWG), 2011**. The National Health and Medical Research Council (NHMRC) and the Agriculture and Resource Management Council of Australia and New Zealand have developed the Australian Drinking Water Guidelines, recently updated in 2011. The guidelines provide health-based and aesthetic values for a range of micro-organisms, physical quality, inorganic chemicals, organic chemicals, radiological quality and pesticides. The health-based guideline values, which have been used to identify chemicals of potential concern (COPCs) in the groundwater, are concentrations, which, based on present knowledge, do not result in any significant risk to the health of a consumer of the water over a lifetime. These guidelines are recognised within the NEPM (1999 amended 2013) *Schedule B(6) Guideline on Risk Based Assessment of Groundwater Contamination* as relevant Groundwater Investigation Levels (GILs) for the assessment of human health issues at the point of extraction (for use as drinking water – protection of human health issues associated with use of water as domestic supply within households[3]). This approach is conservative for the assessment of groundwater at this site, as groundwater in the area is not used for any purpose due to its salinity and location.
- **World Health Organisation Guidelines for Drinking Water (WHO DWG, 2011),** The WHO has also developed drinking water guidelines using the same approach as in the ADWG. The health-based guideline values, which have been used to identify COPCs in the groundwater, are concentrations, which, based on present knowledge, do not result in any significant risk to the health of a consumer of the water over a lifetime.
- **US EPA Regional Screening Levels (RSLs), 2012**. The US EPA has derived screening levels for a range of media, including tap water that are based on the protection of human health. In the absence of guidelines from the above sources, US EPA RSLs for tap water (assuming residential water consumption) have been used for the purpose of identifying COPCs in groundwater that require further assessment.

Where concentrations reported in groundwater exceed the adopted health based screening guidelines they have been considered key chemicals, or chemicals of potential concern (CoPCs) that warrant further consideration in this HHERA. Review against the above guidelines, with identification of whether the chemical is considered volatile and a key chemical for further assessment is presented in **Table 3**. Only analytes reported above the laboratory limit of reporting (LOR) have been included in this table.

[3] Australian Drinking Water Guidelines (NHMRC, 2011) provide guideline values for water that are considered to be safe for "*human consumption, either directly, as supplied from the tap, or indirectly, in beverages, ice or foods prepared with water. Drinking water is also used for other domestic purposes such as bathing and showering*". The guidelines apply to any water intended for drinking irrespective of the source (municipal supplies, rainwater tanks, groundwater bores etc.). The methodology used to derive the guidelines allows for exposures other than ingestion (dermal contact and inhalation including inhalation of volatiles during activities such as showering in heated water). Hence, the guidelines are considered relevant for the assessment of pathways of exposure that may be associated with use of groundwater.

Table 3 Summary of Groundwater Data (mg/L)

Contaminants	Maximum concentration (well/round)	Human Health Screening Level	Key CoPCs (Y/N)?	Volatile (Y/N)?
Benzene	<0.0005	0.001[a]	N	Y
Toluene	0.013 (BH12 2011)	0.8 [a]	N	Y
Ethylbenzene	0.0005 (BH12 2011)	0.3 [a]	N	Y
Xylenes	0.004 (BH12 2011)	0.6 [a]	N	Y
Acenapthene	0.00002 (MW25 2013)	0.4[U]	N	N
Anthracene	0.00001 (MW25 2013)	1.3[U]	N	N
Benz[a]anthracene	0.00001 (MW25 2013)	0.0001[a TEF]	N	N
Benzo[a]pyrene	0.00001 (MW30 2013)	0.00001[a]	N	N
Benzo[b&k]fluoranthene	0.00002 (MW30 2013)	0.0001[a TEF]	N	N
Pyrene	0.00008 (MW30 2013)	0.087[U]	N	N
TPH C6-C9	<0.02	15[W]	N	Y
TPH C10-C14	<0.05	0.09-0.3[W]	N	Y
TPH C15+	<0.1	0.09-0.3[W]	N	N
Arsenic	0.008 (MW25 2013)	0.01[a]	N	N
Cadmium	0.0003 (MW30 2013)	0.002[a]	N	N
Chromium	0.007 (BH1 2011)	0.05[a]	N	N
Copper	0.021 (BH1 2011)	2[a]	N	N
Lead	0.009 (BH1 2011)	0.01[a]	N	N
Nickel	0.003 (BH1,12 and 13 2011)	0.02[a]	N	N
Zinc	0.53 (BH1 2011)	3[a]	N	N

Notes:
Refer to **Appendix B** for full analytical results
Human Health
a = Australian Drinking Water Guideline (NHMRC 2011)
W = WHO Drinking water Guidelines (2011). Range presented for TPH reflects range relevant for aromatic and aliphatic fractions.
U = US EPA RSL for tap water (2011).
S = surrogate (guideline for isopropylbenzene (cumene) adopted for n-propylbenzene)
TEF = used CCME TEFs to translate Benzo[a]pyrene value from Australian Drinking Water Guidelines (2011)

Based on the review presented in **Table 3**, none of the detected chemicals are at levels requiring further assessment for their potential risk to human health.

2.7 Sources of Contamination

The following summary of the sources of contamination at the site is provided in **Section 8.1** of the Remedial Action Plan (RAP) (Coffey 2013).

Based on the findings of recent ground investigations and discussion of contamination within each area of environmental concern presented in **Section 7** of the RAP (Coffey 2013), the following presents a summary of the contamination identified:

- Widely distributed contamination, being -

- PAH (and TPH) contamination encountered in unsaturated fill materials that potentially derive from the land reclamation activities and periodic redevelopment of the site over the past 150years.
- Potential and actual acid sulfate soils derived within naturally occurring alluvial soils present along the former paleochannel of Cockle Bay (i.e. Long Cove).

- Localised contamination within the site, including -
  - Localised TPH (as oil) contamination encountered at:
    - NBH29 which is likely to have derived from historic land uses which may include the former City Market, hydraulic pumping station and/or Dixon Steam complex,
    - BH124 – which may originate as off-site contamination which has moved preferentially beside a water intake conduit associated with the former Ultimo power station
    - EB1 – which may be associated with historic spillages/leaks from within the former council depot.
  - Localised lead contaminated fill located at BH121A and BH126 that may be attributable to inclusions of rusted metal pieces, possibly as lead based paint, solder or plumbing material.
  - Semi-volatile hydrocarbon contamination encountered at BH124. A possible source of this contamination impact may relate to fill materials present at this location, or off-site impact from the adjoining former Ultimo Power Station
  - Semi-volatile hydrocarbon contamination encountered at BH128. No direct correlation has been identified with known historical land uses in this part of the site.
  - Asbestos containing materials comprising bonded ACM and asbestos fines encountered in shallow fill materials at BH119 and BH13.

2.8 Uncertainties

The source of soil and groundwater impacts has been identified at the site. A number of rounds of soil monitoring data have been collected and hot spots have been revisited to determine their extent. Groundwater data has been collected on a number of occasions. Given the size of the site, that the contamination is due to filling that occurred historically and that contamination is mainly limited to two hot spots which have been examined to determine their extent, the monitoring dataset is considered sufficient to undertake the HHERA.

The validation of soil on the site is based on the sampling of discrete locations and hence concentrations between sample locations can only be inferred.

Section 3 Toxicity of Key Chemicals

3.1 General

The quantitative assessment of potential risks to human health for any chemical requires the consideration of the health end-points and where carcinogenicity is identified; the mechanism of action needs to be understood.

For chemicals that are not carcinogenic, a threshold exists below which there are no adverse effects (for all relevant end-points). The threshold typically adopted in risk calculations (a tolerable daily intake [TDI] or tolerable concentration [TC]) is based on the lowest no observed adverse effect level (NOAEL), typically from animal or human (e.g. occupational) studies, and the application of a number of safety or uncertainty factors. Intakes/exposures lower than the TDI/TC is considered safe, or not associated with an adverse health risk (NHMRC, 1999).

Where the chemical has the potential for carcinogenic effects, the mechanism of action needs to be understood as this defines the way that the dose-response is assessed. Carcinogenic effects are associated with multi-step and multi-mechanism processes that may include genetic damage, altering gene expression and stimulating proliferation of transformed cells. Some carcinogens have the potential to result in genetic (DNA) damage (gene mutation, gene amplification, chromosomal rearrangement) and are termed genotoxic carcinogens. For these carcinogens it is assumed that any exposure may result in one mutation or one DNA damage event that is considered sufficient to initiate the process for the development of cancer sometime during a lifetime (NHMRC, 1999). Hence no safe-dose or threshold is assumed and assessment of exposure is based on a linear non-threshold approach using slope factors or unit risk values.

For other (non-genotoxic) carcinogens, while some form of genetic damage (or altered cell growth) is still necessary for cancer to develop, it is not the primary mode of action for these chemicals. For these chemicals carcinogenic effects are associated with indirect mechanisms (that do not directly interact with genetic material), where a threshold is believed to exist.

Dose-response values (threshold or non-threshold) that are considered relevant to the characterisation of potential health effects associated with exposure to the key chemicals identified have been selected from credible peer-reviewed sources as outlined in enHealth (2002) and NEPC (1999).

3.2 Identification of Dose-Response Values for CoPCs

3.2.1 Naphthalene

General

Naphthalene (also known as tar camphor, albocarbon, naphthene, mothballs and white tar) is a white solid with a characteristic odour of mothballs. It is a volatile polycyclic aromatic hydrocarbon (PAH) composed of two fused benzene rings.

Exposure, Absorption, Health Effects

Exposure to naphthalene may be derived from environmental and occupational sources and from consumer products. The most likely pathway by which the general public is exposed to naphthalene is by inhalation due to the release of this substance from combustion fuels, moth repellents, and cigarette smoke.

Lipophilic PAHs, including naphthalene, can be absorbed through the lungs, the GI tract and the skin. Reports that establish associations between naphthalene exposure and health effects in humans are restricted to numerous reports of haemolytic anaemia or cataracts following acute exposure or occupational exposure to naphthalene, either by ingestion or by inhalation of naphthalene vapour. Other effects include gastrointestinal, CNS, liver, kidney and reproductive effects.

Classification

Human data are insufficient with regard to the evaluation of carcinogenicity of naphthalene. Testing in animals has indicated that naphthalene was carcinogenic to rats and mice following inhalation exposure. Naphthalene is classified as a "possible" human carcinogen (Category C) by the US EPA for all routes of exposure based upon limited evidence from animal studies. IARC (review in 2002) has classified naphthalene in Group 2B (possibly carcinogenic to humans) based on inadequate evidence in humans but sufficient evidence in animals.

Quantitative Toxicity Values

Review of the available studies presented in UK (2003), EU (2003) and OEHHA (2004) indicate that the tumours observed following inhalation exposure did not arise by a direct genotoxic mechanism. On this basis, use of a non-threshold approach is not considered appropriate in the quantification of risk associated with naphthalene. Hence the quantification of dose-response associated with exposure to naphthalene has been undertaken using a threshold approach based on the most sensitive end-point. The following chronic data are available from Level 1 Australian and International sources:

Table 4 Summary of Relevant Toxicity Information for Naphthalene

Source	Value	Basis/Comments
Australian		
ADWG	No evaluation available	
International		
WHO DWG	No evaluation available	
EU (2003)	No ADI or TDI derived	For the key health effect of haemolytic anaemia, repeated inhalation toxicity and carcinogenicity have been identified, however no NOAEL could be identified from available data. For other effects associated with inhalation exposure such as tissue damage a NOAEL could not be identified from available studies. A LOAEL of 5 mg/m^3 has been identified on the basis of nasal lesion in rate for use in the risk characterisation for repeated inhalation toxicity including carcinogenicity.
UK (2003)	TDI = 0.02 mg/kg/day TC = 0.003 mg/m^3	TDI value adopted derived from the same approach as considered by the US EPA. TC adopted based on the lower value derived from ATSDR (review available before 2005) and US EPA. The values are derived using the same study with the difference in values associated with the use of uncertainty factors. The more conservative uncertainty factors adopted by the US EPA were considered appropriate.
RIVM (2001)	TDI = 0.04 mg/kg/day	TDI adopted for naphthalene based on evaluation of total petroleum hydrocarbons with the TDI of 0.04 mg/kg/day recommended for aromatic compounds with EC >9 to 16.
OEHHA (current)	CREL = 0.009 mg/kg/day	Chronic Reference Exposure Level (CRELO) derived on the basis of a LOAEL of 10 ppm associated with nasal/respiratory effects in a 104-day mouse study and an uncertainty factor of 1000. This is the same study as considered by the US EPA, the only difference is the application of uncertainty factors. OEHHA has also derived non-threshold values.
ATSDR (2005)	No chronic oral MRL derived Inhalation MRL = 0.003 mg/m^3	No chronic oral MRL was established, however an acute and intermediate duration MRL of 0.6 mg/kg/day was derived. Inhalation MRL derived on the basis of a LOAEL (HEC) of 1 mg/m^3 associated with nasal lesions in rats and an uncertainty factor of 300.
US EPA (IRIS)	**RfD = 0.02 mg/kg/day** **RfC = 0.003 mg/m^3**	Oral RfD (last reviewed in 1998) based on a NOAEL of 100 mg/kg/day (adjusted) associated with decreased weights in a subchronic oral rat study and an uncertainty factor of 3000.

Source	Value	Basis/Comments
		Inhalation RfC (last reviewed 1998) based on a LOAEL (HEC) of 9.3 mg/m^3 associated with nasal/respiratory effects in a chronic mouse inhalation study and an uncertainty factor of 3000.

There is little quantitative data available, and few qualitative evaluations. Hence use of the US EPA chronic oral and inhalation values is considered appropriate.

No quantitative data are available to assess dermal exposures; therefore the oral value has been adopted for the purpose of assessing both oral and dermal exposures. Other physical/chemical properties relevant to the quantification of volatilisation have been obtained from RAIS (2013). Background intakes have been estimated to comprise 5% of the available threshold values above based on available data from the UK (2003). These background intakes are only of significance for the assessment of chronic exposures, and where the data is from one source only. Where the data is from measured air concentrations that include all significant air sources then background intakes from water or food are negligible.

3.2.2 Benzo(a)pyrene and PAHs

General

Several comprehensive reviews of polycyclic aromatic hydrocarbons (PAHs) and benzo(a)pyrene (BaP) in the environment and toxicity to humans are available (ATSDR 1995; WHO 1998; CCME 2008).

PAHs are a large group of organic compounds with two or more fused aromatic rings made up of carbon and hydrogen atoms. PAHs are formed from incomplete combustion of organic materials such as processing of coal, crude oil, combustion of natural gas, refuse, vehicle emissions, heating, cooking and tobacco smoking as well as natural processes including carbonisation. The natural background level is due to PAH production in plant species. Because of such widespread sources, PAHs are present almost everywhere. Food is considered to be the major source of human exposure to PAH due to the formation of PAH during cooking or from atmospheric deposition of PAHs on grains, fruits and vegetables (WHO 1998).

There are several hundred PAHs, including derivatives of PAHs. The best known (and studied) is benzo[a]pyrene (BaP). While there are hundreds of PAHs, typically only 16 individual PAHs are analysed in site contamination investigations. These individual PAHs address a broad range of the equivalent carbon spectrum and are therefore more commonly reported and assessed.

The major sources of PAHs to soils at any given location invariably contribute a mixture of PAHs, not just single compounds. Various PAH source types can be distinguished based on the characteristic compositions of PAH mixtures and information on the site history, but the contaminated soil matrix is nonetheless challenging from an environmental risk assessment perspective, since in a PAH contaminated soil there is likely to be a diverse compositional range of non-carcinogenic, and carcinogenic PAHs of varying potency.

The major approach advocated by regulatory agencies such as the NEPC (1999 and Fitzgerald 1991 and 1998), California EPA (OEHHA), Netherlands (RIVM 2001), the UK (UK EA 2002), Canada (CCME 2008) and US EPA (2010 draft) for assessing the human health risks of PAH-containing mixtures involves the use of "toxicity equivalence factors" (TEFs). This approach relates the toxicity of other (potentially carcinogenic) individual PAHs relative to that of BaP, the most widely studied PAH.

There are more than a dozen sets of equivalency numbers that have been proposed over the last two decades. The most recent (published final) review of TEFs and their basis, presented by CCME (2008) suggests the use of TEFs recommended by the World Health Organization (WHO, 1998), with minor modifications. This is a scheme based on order of magnitude cancer potency.

Any finer-scale assertions about relative potency for more generic application are hard to justify given the current state of knowledge and confounding influences such as the route of exposure, or non-additive effects in complex PAH mixtures. It is not currently possible to develop different relative potency schemes across different exposure routes (oral, dermal, inhalation), owing to a lack of data. Hence the TEFs adopted have been applied for all routes of exposure for the carcinogenic PAHs assessed. Application of the TEFs are relevant to the assessment of PAHs that are considered to be carcinogenic. Other PAHs that are not carcinogenic should be assessed separately on an individual basis.

The following table presents a summary of the TEFs adopted for the assessment of carcinogenic PAHs (CCME 2008):

Table 5 TEFs for PAHs (CCME 2008)

PAH	IARC Classification	US EPA Classification	TEF
Benzo(a)anthracene	2B	B2	0.1
Benzo(a)pyrene	1	B2	1
Benzo(b+j)fluoranthene	2B	B2	0.1
Benzo(k)fluoranthene	2B	B2	0.1
Benzo(g,h,i)perylene*	3	D	0.01
Chrysene	2B	B2	0.01
Dibenz(a,h)anthracene	2A	B2	1
Indeno(1,2,3-cd)pyrene	2B	B2	0.1

Notes: 1/A= Human Carcinogen, 2A/B2= Probable Human Carcinogen, 2B/C=Possible Human Carcinogen, 3/D= Not classifiable.
* Benzo(g,h,i)perylene included due to positive findings in genotoxicity studies (WHO, 1998). Note there are insufficient data available to determine carcinogenicity.

The toxic effects of different PAH compounds in a mixture are additive. Experimental evidence suggests that this is a fair assumption (Fitzgerald 1991 and 1998, CCME 2008).

The following relates to the approach used to assess BaP (which can be used for the assessment of BaP alone or for carcinogenic PAHs using the above TEFs).

Background

Intakes of BaP from sources other than soil have been considered by Fitzgerald (1991) to range from 0.166-1.6 µg/day (from US EPA 1980) with intakes derived from food identified as the most significant.

Classification

The International Agency for Research on Cancer (IARC 2010) has classified BaP as 1: human carcinogen.

The US EPA has classified BaP as B2: probable human carcinogen.

Toxicity Reference Values

BaP has been shown to be carcinogenic via all routes of exposure. BaP is an indirect carcinogen, that is, its carcinogenicity results from its metabolites, primarily various epoxides, as opposed to BaP itself. Several different types of tumours have been observed as a result of exposure to BaP, although tumour development is closely related to route of administration, i.e., dermal application induces skin tumours and oral administration induces gastric tumours. Exposure to BaP causes disruption to cellular genetic material, in particular DNA adducts are formed as a result of exposure and BaP is considered to be a genotoxic carcinogen (WHO 1998).

In addition BaP has been demonstrated to be a skin irritant and dermal sensitiser (WHO 1998).

On this basis a peer-reviewed non-threshold reference value is recommended for BaP. The following non-threshold values are available from Level 1 Australian and International sources:

Table 6 Adopted Toxicity Reference Values for PAHs/Benzo[a]pyrene

Source	Value	Basis/Comments
Australian		
ADWG (NHMRC 2011)	Not available	Current guideline of 0.00001 mg/L established in ADWG (NHMRC 2011) is based on the consideration of health effects in relation to the limit of determination for analysis. The assessment provided by the WHO is noted.
OCS (2012)	No evaluation available	
International		
WHO	SF = 0.5 $(mg/kg/day)^{-1}$ **UR =8.7x10^{-5} $(ng/m^3)^{-1}$**	WHO (2011) derived a drinking water guideline of 0.0007 mg/L on the basis of an excess lifetime cancer risk of10^{-5} from an oral carcinogenicity study (Neal & Rigdon 1967) and a two-stage birth-death mutation model. Slope factor has been calculated on the basis of a 70kg adult and consumption of 2 L water per day. Inhalation UR derived (WHO 2000 and 2010) based on observations in coke oven workers to mixtures of PAHs. It is noted that the composition of PAHs to which coke oven workers are exposed may differ from that present in ambient air, or derived from soil contamination. It is noted that an inhalation UR is in the same order of magnitude as that derived using a linear multistage model associated with lung tumours in a rat inhalation study of coal tar/pitch condensation aerosols.
MfE (2011)	**SF = 0.233 $(mg/kg/day)^{-1}$**	Review of the carcinogenic reference values available for oral intakes by MfE (2011) considered the range of values available and differences in approaches adopted for low dose extrapolation. The application of cross-species scaling appeared to be the most significant factor affecting the cancer potency estimates. It was recommended that cross-species scaling should not be applied, consistent with the approach outlined in NHMRC (1999). Review of available studies (14 risk estimates using 4 databases) resulted in the calculation of a geometric mean based on data without scaling that was recommended for use in the derivation of a soil guideline value.
UK (UK EA 2002)	Derived index doses from WHO evaluations	Oral index dose derived on the basis of WHO approach and a lifetime cancer risk of 10^{-5}. Inhalation index dose based on WHO approach and adopting an air guideline of 0.25 ng/m^3. The air guideline is equivalent to a lifetime cancer risk of 4x10^{-5}.
RIVM (2001)	SF = 0.2 $(mg/kg/day)^{-1}$	Oral SF derived by RIVM based on a chronic oral carcinogenic rat study and linear multistage model. The study considered was more recent than that considered by the WHO. No inhalation assessment is provided by RIVM.
CCME (2008)	SF = 2.3 $(mg/kg/day)^{-1}$	Oral SF derived from a less than lifetime diet study on inbred CFW-Swiss mice associated with incidence of papillomas and squamous cell carcinomas and linear extrapolation. This is the same study as used by the US EPA in the derivation of their oral slope factor. The CCME review also noted that dermal exposures and primary oral exposures result in different kinds of cancers. Health Canada is currently reviewing data with respect to the derivation of a dermal cancer slope factor, which may require consideration when peer-reviewed and published. The oral slope factor has been used to derive a soil guideline associated with exposures via oral, dermal and inhalation exposures.
OEHHA (CEPA 1999)	SF = 11.5 $(mg/kg/day)^{-1}$ UR = 0.0011 to 0.0033 $(ug/m^3)^{-1}$	Oral SF derived using the same model and study as reported by the US EPA (IRIS 2010) and CCME (2008), with the upper end of the range of values adopted by OEHHA. Inhalation UR derived on the basis of respiratory tract tumours in an inhalation study

Source	Value	Basis/Comments
		in hamsters and a linearised multistage model.
US EPA (IRIS 2012)	SF = 7.3 $(mg/kg/day)^{-1}$	Oral SF (last reviewed in 1994) derived on the basis of the same study considered by CCME (above) where a range of slope factors were derived (4.5 to 11.7 $(mg/kg/day)^{-1}$). The geometric mean was adopted as the recommended slope factor for derivation of a drinking water guideline. No assessment of inhalation toxicity is available.

There is a wide range of non-threshold reference values available for oral intakes of BaP. The most recent review, where the methodology used for low dose extrapolation was reviewed, was conducted by MfE (2011). The evaluation presented considered all the available and relevant studies noted in the above tables and identified an oral reference value based on the geometric mean. This value from MfE (2011) was recommended in **Appendix A2** of **Schedule B7** of the NEPM as the toxicity reference value to be adopted for site specific risk assessments and it has been adopted in this assessment.

The data available on inhalation exposures are dominated by occupational studies associated with exposure to coke oven emissions or coal tar pitch aerosols. BaP is not volatile and hence the relevance of these studies to the assessment of dust issues derived from contaminated sites is not clear. It is therefore recommended that the MfE oral reference value be considered for the assessment of all pathways of exposure.

Note on Age Adjustment Factors

The US EPA (2005) has concluded that BaP (and carcinogenic PAHs assessed on the basis of TEFs) acts via a mutagenic mode of action and recommends that susceptibility associated with early lifetime exposures be addressed. No non-threshold values available for BaP have been derived to specifically address early lifetime susceptibility and hence these issues may need to be addressed when characterising exposure to BaP.

The NEPM also recommends consideration of the use of the US EPA (2005) approach for the assessment of early life stage exposure to carcinogens. This approach applies additional uncertainty factors where exposure to a mutagenic chemical may occur during childhood. These adjustment factors are used in the calculation of the HILs which may include exposure as a child. As noted in the NEPM, in assessments where children may be exposed to the site contamination, it is appropriate to consider the inclusion of these factors in site specific risk assessments. Exposure as a child is possible for this site so these factors have been included in the calculation of site-specific trigger levels for remediation of the site.

Note on Dermal Exposures

BaP is suggested to act largely as a point-of-contact carcinogen (Knafla et al. 2006), as opposed to systemically, hence it is more appropriate to derive soil guideline values for the dermal route of exposure using a route-specific slope factor, as opposed to considering it on the basis of systemic absorption and use of the oral slope factor.

For most compounds such data are not available, however for BaP Knafla et al. (2011) have derived a dermal slope factor, normalised to a per unit skin surface area basis, that is relevant to the assessment of BaP in soil in skin. The dermal slope factor of 3.5 $(\mu g/cm^2/day)^{-1}$ was derived by Knafla et al. (2011) and appropriate methods and parameters have been suggested by Knafla et al. (2011) for the use of this factor in the assessment of soil exposures. The dermal slope factor is an extension of previous work published by Knafla et al. (2006) where a dermal slope factor was derived on the basis of skin carcinogenicity from skin painting studies with mice. The revised dermal slope factor (Knafla et al. 2011) considered various factors for interspecies extrapolation, particularly in relation to sensitivity (to tumour development) and differences in epidermal (target tissue) thickness. This dermal slope factor has not yet been adopted for use by other international agencies, however CCME (2008) indicate that Health Canada may consider the revised dermal slope factor once published (as occurred in 2011).

The dermal slope factor as proposed by Knafla et al. (2011) has been considered in the uncertainty evaluation presented in **Section5.6**, in addition to the use of the oral TRV.

Note on Sensitivity Analysis

Section 1.5 of **Appendix A2** of **Schedule B7** of the NEPM undertakes a sensitivity analysis of all the information outlined above before finalising the choice of a HIL for this chemical. The sensitivity analysis considers the toxicity reference values recommended by MfE (2011) (0.233/(mg/kg/d)) and the WHO drinking water guidelines (0.5/(mg/kg/d)) (the next most recent review in line with Australian guidance); the inclusion or exclusion of early life stage adjustment factors; and further information on dermal exposures to tars and other more bioavailable forms of PAHs. In varying these issues in line with the ranges identified in the **Appendix**, the HIL-A varies from 0.3 to 20 mg/kg.

The NEPM process decided that a value for HIL-A of 3 mg/kg was appropriate and conservative for screening all sites which may have PAHs present particularly those where little information may be available regarding the sources of PAHs at the site. This value was based on the WHO drinking water guideline toxicity reference value and inclusion of early life stage adjustment factors but did not include the additional information regarding dermal exposures to tars. These choices were made to ensure that the HIL-A was appropriately conservative when information was limited.

The NEPM guidance expects that a site-specific risk assessment will choose the appropriate combination of variables that apply to a site. Different choices from those made in the NEPM can be made depending on:

- Source of the PAHs (ash or charcoal versus coal tars)
- Presence of children at the site
- Amount of time people may be in contact with soils
- Whether activities may occur at site which may uncover more contaminated materials, particularly if contact with coal tars might be able to occur.

For this site:

- the source of PAHs is more likely to be ash or charcoals (i.e. material where PAHs are less available)
- once construction has occurred:
    - it is unlikely that activities will occur that will uncover contaminated materials
    - children will be present but access to site soils will be limited to a few small areas.

On the basis of the discussion above, the following toxicity reference values (TRVs) have been adopted for the assessment of risks posed by BaP at this site:

- Oral TRV (TRV_O) = 0.233 $(mg/kg/day)^{-1}$ (MfE 2011) for all routes of exposure

- Dermal absorption factor (DAF) = 0.06 (or 6%) (MfE 2011)
- BaP equivalents to be determined for carcinogenic and potential genotoxic PAHs only using TEFs presented by CCME (2008)
- Age adjustment factors for early life stage exposure included

3.2.3 TPH/TRH

General

TPH/TRH is a complex mixture of hundreds of individual components that can vary in nature depending on the type of TPH/TRH, i.e. petrol, diesel, heating oil, and on the extent of weathering.

Exposure, Absorption, Health Effects

Because TPH/TRH is a complex mixture with variable composition depending on sources and time, a generic assessment of the toxicity of TPH/TRH is difficult. However, a specific compound or range of compounds can be selected as surrogates to represent the toxicity of the type of TPH/TRH present at a given site. This surrogate selection approach has been applied for this risk assessment. Individual carcinogenic chemicals (such as benzene and carcinogenic PAHs) are assessed separately (note carcinogenic PAHs have not been identified as key chemicals on the site).

On the basis of the available information on TPH/TRH (as outlined by TPHCWG [1999], ATSDR [1999] and CCME [2008]), provided carcinogenic and genotoxic compounds are assessed on an individual basis, the remaining TPH/TRH fractions can be considered on the basis of a threshold approach. This is undertaken on the basis of aromatic and aliphatic fractions within the TPH/TRH and relevant indicator chemicals or surrogates to define toxicity.

Quantitative Toxicity Values

The following threshold toxicity values have been adopted for the purpose of quantifying potential oral (and dermal, on the basis of oral data) and inhalation exposures. It is noted that the TPHCWG fraction grouping differ slightly from the grouping reported during analysis of groundwater samples. The table also indicates how the TPHCWG fractions have been adopted for the TPH/TRH fractions assessed in this report. Physical/ chemical parameters relevant to the modelling of volatilisation have been obtained from TPHCWG (1999) and RAIS (2013).

Table 7 Adopted Toxicity Reference Values for TPH/TRH

TPHCWG Fractions	TPH/TRH Fractions Considered in this Assessment	Oral RfD (mg/kg/day)	Inhalation RfC (mg/m^3)
Aliphatic Fractions			
C6-C8	C6-C9	5	18.4
C8-C16	C10-C14	0.1	1
C16-C35	C15+	2	Not volatile hence inhalation pathway not assessed
Aromatic Fractions			
C5-C8	C6-C9	Assessed as BTEX – not relevant for this assessment	
C8-C16	C10-C14	0.04	0.2
C16-C35	C15+	0.03	Not volatile hence inhalation pathway not assessed

CCME (2008) considered that due to the lack of evidence for, and low probability of, ubiquitous environmental contamination of most TPH/TRH fractions, background intakes (i.e. intakes from other sources such as air, water and food) can be considered to be zero. The only fraction identified by CCME (2008) where background intakes may be of significance relates to inhalation of ambient levels of TPH/TRH fractions C6-C10 (excluding BTEX and PAHs). Intakes estimated for these fractions from indoor and outdoor air sources are presented by CCME. Due to the lack of data in Australia and the large number of compounds included within TPH/TRH, it may be relevant to consider a default allocation to background intakes. It is recommended that a default background intake of 10% be adopted for all TPH/TRH fractions to address background intakes.

3.2.4 2-Naphthylamine

General

2-naphthylamine was used in the manufacture of rubber and as an azo dye (HSDB).

Exposure, Absorption, Health Effects

The half-life of 2-naphthylamine in the atmosphere is 2 hours and it has been shown to photolyse in direct sunlight. In soil it is expected to have low mobility binding strongly with soil organic carbon. It will not evaporate from soils to any great extent given its Henrys Law constant. The pKa (4.16) indicates that some of what is there will be present as a cation which absorb more strongly to clays and organic carbon in soils. Biodegradation in soil is expected to be slow. In waters this chemical is likely to quickly adsorb onto suspended solids. It has low potential to bioaccumulate. It is not likely to hydrolyse (HSDB).

Exposure to people is expected to be low especially as it is now no longer produced. It can enter the body via ingestion, inhalation or dermal exposure (HSDB).

Classification

2-naphthylamine is a known human carcinogen related to bladder cancer. It is classified by IARC as a group 1 carcinogen (HSDB).

Quantitative Toxicity Values

The US EPA regional screening values recommend an oral slope factor of 1.8 per mg/kg/day. This is the only toxicity value found from reliable (published peer reviewed) international sources (US EPA RSLs).

3.3 Uncertainties

In general, the available scientific information is insufficient to provide a thorough understanding of all of the potential toxic properties of chemicals to which humans may be exposed. It is necessary, therefore, to extrapolate these properties from data obtained under other conditions of exposure and involving experimental laboratory animals. The majority of the toxicological knowledge of chemicals comes from experiments with laboratory animals, although there may be interspecies differences in chemical absorption, metabolism, excretion and toxic response. There may also be uncertainties concerning the relevance of animal studies using exposure routes that differ from human exposure routes. In addition, the necessity to extrapolate results of short-term or subchronic animal studies to humans exposed over a lifetime has inherent uncertainty.

The assessment of TPH requires the consideration of a number of assumptions relevant to a group of chemicals. This has been undertaken in a detailed reviewed by the TPHCWG (1999), however effects associated with hydrocarbon mixtures addressed as TPH have not been specifically addressed.

With respect to the assessment of key chemicals identified in this HHERA, the approach for evaluating risks to mixtures of chemicals assumes dose additivity and does not account for potential synergism, antagonism or differences in target organ specificity and mechanism of action. In general, the additive approach has the effect of overestimating the risks. However, it is noted that the assessment of a range of petroleum related compounds presented in this report have similar toxicological endpoints (rather than the parent compound itself). For these compounds the consideration of cumulative exposure on the basis of additivity is considered appropriate.

Overall the toxicological data presented are considered to be current and adequate for the assessment of risks to human health associated with the potential exposure to the key chemicals identified in soil and groundwater.

Section 4 Exposure Assessment

4.1 General

The information presented in this section in relation to exposure assessment specifically relate to the quantitative assessment of exposure and risk to the CoPCs identified in soil and groundwater.

This section provides a short discussion on the potential receptors (human groups) and exposure pathways that are considered to be of significance in this assessment. In addition, where identified as of potential significance and warranting quantification in this assessment, the potential for exposure has been quantified using industry best practice and guidance available from US EPA (1989, 2002 and 2009).

The assessment presented has addressed potential worst-case exposure to COPCs and exposure has been calculated for a ***Reasonable Maximum Exposure (RME)*** scenario estimated by using intake variables and chemical concentrations that define the highest exposure that is reasonably likely to occur in the area assessed. The RME is likely to provide a conservative or overestimate of total exposure and therefore health risk.

The quantification of exposure has involved consideration of the following:

- Identification of relevant ***exposure parameters*** for each of the identified exposure pathways and receptors. The magnitude of the exposure is a function of a number of variables (termed exposure parameters), which describe the physical, and behavioural parameters relevant to the potentially exposed population. Where available, additional exposure data has been obtained from Australian sources (enHealth 2002, CSMS, 1991, 1993, 1996 and 1998, ANZECC 1992 and NEPC 1999); and
- Estimation of the ***chemical concentration*** in each medium relevant to the receptor groups and exposure pathways. This has involved consideration of the vapour conceptual site model and the relevant concentrations for the proposed development.

4.2 Identification of Complete Exposure Pathways

Based on the available information in relation to the nature and extent of contamination identified in soil and groundwater, the receptor and exposure pathways presented in **Table 8** have been identified. It is noted that the exposure pathways considered only relate to the potential presence of key chemicals in soil. No key chemicals were identified in groundwater and hence, while there may be the potential for workers involved in excavations (or in stormwater culverts where there is some groundwater seepage) to come into direct contact with groundwater, as there are no concentrations that are of concern with respect to human health, there are no significant exposures that require further assessment.

Table 8 Summary of Key Exposure Groups and Pathways

Receptor	Contaminated Media	Complete Exposure Pathway				Comments
		Inhalation Indoors	Inhalation Outdoors	Ingestion	Dermal Contact	
Construction Workers - intrusive	Soil		•	•	•	These activities may result in direct contact with soil remaining at the site. Inhalation of dust generated during these activities and vapours from volatile key chemicals identified may also occur.
Construction Workers – non intrusive	Soil		•	•	•	
Intrusive Workers post completion	Soil		•	•	•	
Residential (High density/student accommodation)	Soil	•	○	○	○	Based on the proposed development plans, the only significant and complete pathway of exposure for commercial/retail workers and residents is the inhalation of volatile key chemicals that may enter the buildings following occupancy. It is noted that some exposure may also occur during access and use of open space areas. These exposures are expected to be similar to those evaluated by recreational users of the area.
Commercial/retail worker	Soil	•	•	•	•	
Recreational User	Soil		•	•	•	A combined scenario of recreational user and residential user of the site has been presented in Section 5 which combines all 4 exposure pathways.
Childcare Centre User	Soil	•				Childcare centre is proposed for the upper floors of one of the commercial buildings. Only exposure pathway for this receptor is inhalation of volatile chemicals indoors and such exposures will be much less on the upper floors of a building than for retail and residential receptors on the ground and first floor. No further consideration required as is covered by residential receptor.
Car Park User	Soil	•				Exposures in the car park are associated with the inhalation of volatile key chemicals only and are effectively the same as that for the Commercial/Retail Worker given the location of the car parks in the current design.

Notes:
● = Complete exposure pathway
○ = Incomplete exposure pathway

4.3 Assumptions based on Development Plans

A range of assumptions were made as the basis for this risk assessment that were derived from the plans for The Haymarket development scheme. The assumptions include:

A. All existing improvements on the site including the Sydney Entertainment Centre and Sydney Entertainment Centre car park are to be assumed removed to ground level with the exception of piles and other deep structures which will remain below ground. This would include removal of existing ground slabs both within and external to the existing site improvements. Existing pavements (asphalt and paving) are to be assumed to be removed. The site will likely require regrading to conform to the level requirements assumed in the modelling of overland flows commensurate with forecast site flooding scenarios. Both localised cutting and filling of the site is to be assumed. No assumption should be made about contaminated soil remaining at a particular location or at a particular depth. It is intended that any filling of the site would be through the utilisation of existing site soils meeting any on site reuse criteria. There is therefore potential for the maximum concentration at any depth across the site to end up at the surface so the maximum concentrations should be used in the risk calculations.
B. While Lend Lease Development Pty Ltd has provided an indicative public realm landscape scheme to inform this HHERA, the final configuration of the scheme is subject to further design development and approvals. The scheme indicates a number of landscape scenarios which are expected to be utilised in the final landscape configuration (although exact locations are not determined at this stage) including:
    1. Areas of turf such as west of the NW development Lot – turf is proposed to be laid on up to 50 mm of imported soil laid over existing soils
    2. Areas of possible bio swales commensurate with principles of Water Sensitive Urban Design such as west of the NW development Lot – planting is proposed directly into existing soils, commensurate with surface scour protection that may include thin layers of pebbles and the like.
    3. Areas of planting directly into existing soil (such as adjacent the proposed student accommodation) – planting directly into the existing soil
    4. Areas of paving (non-trafficable) such as within the boulevard – concrete or stone pavers minimum 30 mm thick over 100-150 mm of cement stabilised sub base.
    5. Areas of trafficable (service vehicles only) paving such as within the boulevard – concrete or stone pavers minimum 30 mm thick over 100 mm concrete slab.
    6. Areas of tree planting through the paved areas indicated in 4 and 5 above – Trees in planter beds of 1 m indicative depth filled with imported soils
    7. Areas of water features – concrete slab lined ponds filled with water either recycled from development lots or from potable water supply. No use of site groundwater. Similar to other existing water features within the broader Darling Harbour precinct.
    8. Areas of vehicular crossings – concrete or stone pavers minimum 30 mm thick over 100 mm concrete slab.
    9. Decomposed granite may be used in some areas where high pedestrian traffic may occur – 75 mm of decomposed granite over 100-150 mm of cement stabilised sub base.
    10. Road pavements (such as Darling Drive) - road pavement mixture of concrete and asphalt, expected 200 mm total.
C. Large storm water culverts are present underground in some areas of the site. In addition, new culvert structures may be required to service the flooding needs of the proposed development.

D. Large infrastructure (e.g. drinking water or sewer mains) may be present at significant depths (8 m in the case of existing tunnelled sewer under the proposed student accommodation lot) otherwise intrusive works are expected to be up to 3 m below the ground.
E. Excavated material may be reused (at the discretion of Lend Lease Development Pty Ltd) on site, both within/below development lot buildings and the public realm generally, for the purposes of filling (Refer A above) so if any restrictions on reuse are required they should be included in the HHERA. Excavated material may be determined by Lend Lease Development Pty Ltd to be unsuitable for on site reuse for reasons other than those covered by the HHERA.
F. The various uses of each of the proposed development lots may change before the development scheme is finalised (such as in response to market conditions) so the HHERA will include assessment of the exposure scenarios across the whole site.
G. INSW have indicated that a long term management plan within areas of public realm is not preferred. Within development lots, Lend Lease Development Pty Ltd may consider long term management plans on the proviso that no active management is required.
H. Asbestos (both in the form of bonded asbestos or asbestos fibres) may be present at the site within the soil matrix. Asbestos is hazardous to human health. If any asbestos impacted soil is found during cut and fill work, the asbestos management plan as set out in **Section 12.4** of the RAP (Coffey 2013) will be implemented.
I. Child care is proposed within upper floors of the commercial building.
J. It is assumed that the construction will comply with the minimum requirements of the Building Code of Australia for slab thickness, ceiling height and ventilation rates.
K. The development scheme, including the commensurate public realm, will be delivered in stages commensurate with market demand and take up.

4.4 Quantification of Exposures

4.4.1 Direct Contact with Key Chemicals in Soil

Contact with the contaminated soil is possible while the development is being constructed and for intrusive workers maintaining services once construction is complete. Construction workers fall into two categories – those like plumbers/drainers who will be in direct contact with the soil throughout the construction and other workers who supervise works or who work above the slab constructing the actual building and who are unlikely to be in direct contact with soil for most of the project although they may be in contact with soil during the initial major earthworks. Exposure assumptions relevant to these two types of construction workers are presented in **Table 12**.

Once some buildings in the development are completed and are occupied and when the whole development is completed, there will be limited opportunity for direct contact with soil, however, some contact may occur during recreational use of the limited outdoor areas where surface soil remains (limited to a few small patches of grass). The people who work in the retail businesses around the development may come into direct contact with soil during lunch breaks.

For the purpose of this assessment it has been assumed that the maximum soil concentrations listed in **Table 9** are representative of the concentrations in all soil at the ground surface or in excavations. A second set of calculations has been undertaken using the 95% upper confidence limit of the mean (95%UCL) to give further information about the average risks at the site. The US EPA's program ProUCL was used to determine the 95% UCL values listed in **Table 9**.

Table 9 Summary of Soil Data (mg/kg)

Key Chemicals Identified	Maximum Concentration in Soil (mg/kg)	95% UCL Concentration in Soil (mg/kg)
TPH C10-14 aliphatic	330	79
TPH C10-14 aromatic	330	79
TPH C15+ aliphatic	2 100	601
TPH C15+ aromatic	3 100	601
Benzo[a]pyrene	200	8
Benzo[a]anthracene	260	12
Benzo[b&k]fluoranthene	340	15
Benzo[ghi]perylene	62	3.7
Chrysene	300	12
Dibenzo[ah]anthracene	19	2.5
Indeno[123-cd]pyrene	60	3.3
Naphthalene	15	1.1
2-naphthylamine	0.8	0.8

Note:
For TPH C10-14 – the maximum concentration of TPH C10-14 measured at the site has been assumed to be present 50% aliphatic and 50% aromatic
For TPH C15+ - the maximum concentration of TPH C15+ measured at the site has been assumed to be present as 50% aliphatic and 50% aromatic with the aromatic fraction corrected for the amount of PAHs found in the sample.

4.4.2 Inhalation of Dust

The potential concentration of PAHs in dust that might be in air as a result of wind erosion and other typical site activities has been estimated using a Particulate Emission Factor (PEF).

A PEF is a ratio of the concentration in soil (mg/kg) to the concentration in air (mg/m^3). It estimates the amount of respirable dust (i.e. PM_{10}) that could be blown up from the excavations and other bare soil surfaces into air that people might breathe. The concentration of PAHs on particles in air is estimated using the surface soil concentration (refer to **Table 9**). The amount of dust in the air and the concentrations of PAHs on the soil particles are then combined to estimate how much people may be exposed to if they breathe in these soil particles. The PEF has been estimated using equations for outdoor workers provided in the US EPA Soil Screening Guidance (US EPA 1996), Supplemental Guidance (US EPA 2002) and US EPA RSLs (2013), conservatively assuming that there is no ground cover to mitigate dust emissions. This approach is considered suitable for the assessment of dust exposures by the intrusive workers. This is also considered appropriate for the assessment of potential exposures by recreational users, residents or retail/commercial workers for dust arising from the small areas of garden bed once the construction across the whole area has been completed. This is a conservative assessment as these areas will be covered by a layer of clean fill and turfed rather than being bare dirt. Calculation of the PEF and associated PAH concentrations in air are presented in **Appendix D**.

An alternative approach has been used to determine exposures to dust during the initial earthworks for each building as the levels of dust in the air may be higher during this time. The PEF calculations determine the levels of dust in air from wind erosion from bare ground while the alternative approach assumes that levels of dust in air reach 10% of the maximum dust levels acceptable under OHS regulations due to the disturbance of ground during regrading of the site. This alternative approach assumes the dust level in air is 1 mg/m^3 and uses that in combination with the 95%UCL concentrations to determine exposures to the construction workers. Calculations are presented in **Appendix D**.

This development will be constructed in stages. It is therefore possible that recreational users, residents or retail/commercial workers may be exposed to higher levels of dust during the initial earthworks for the construction of buildings if that occurs while some of the other buildings have been completed and are occupied. The alternative approach discussed above for the construction workers has also been used to assess inhalation exposures of these receptor groups. It is assumed that these receptor groups are outdoors for 2 hours where this exposure might occur. Calculations are presented in **Appendix D**.

4.4.3 Inhalation of Volatile Chemicals

Inhalation of volatile chemicals derived from the soil source is likely to occur from the following scenarios:

- Volatilisation from soil into the retail, commercial and residential buildings;
- Volatilisation from soil into outdoor areas; and
- Volatilisation from soil into trenches during intrusive works (during construction and post construction).

The assessment of inhalation exposures requires the estimation of an exposure concentration, or air concentration indoors and outdoors that is associated with the presence of volatile contamination in the subsurface. This has been undertaken on the basis of a vapour model where indoor and outdoor air concentrations are estimated on the basis of the source concentrations reported beneath the site.

The following vapour migration models and assumptions have been adopted for the purpose of estimating air concentrations within the buildings and in any excavations:

Air Concentrations in Buildings and Outdoors

Air concentrations have been estimated using the Johnson & Ettinger Vapour Model (US EPA, 2004b) for buildings constructed on a slab (where vapours enter the building via both diffusion and advection) and the outdoor model presented by ASTM (2002), refer to **Appendix C** for details on the models and equations.

Modelling of vapour migration into the buildings (slab-on-grade) and outdoors has adopted the following assumptions:

- The slab is assumed to be 0.10 m thick (relevant minimum in the Building Code of Australia);
- The internal ceiling height is assumed to be 2.4 m (relevant minimum in the Building Code of Australia);
- The air exchange rate within the building has been taken to be 2.0 per hour for commercial buildings and 0.6 per hour for residential buildings (minimum required);
- A room on the ground floor of the new buildings will be 10 x 10 m (e.g. smallest room likely to be occupied);

- Retail/commercial or car park areas of the development are assumed to be on the ground floor directly above the slab;
- Residential areas of the development are assumed to be on the first floor or higher in the buildings;
- The buildings are multi storey slab on grade building so advection is considered to be of significance, and the default value presented by US EPA (2004b) has been adopted;
- Fraction of organic carbon in the soil is assumed to be very low (0.3%) indicating a sandy nature to the fill/soil – a conservative assumption; and
- The wind speed in outdoor areas has been taken to be the average long term 9am and 3pm average reported for the Sydney Observatory Hill station by the Bureau of Meteorology.

Table 10 presents a summary of the parameters used in modelling vapours indoors and outdoors.

It is noted that for the purpose of quantifying phase partitioning from soil to vapour phase in the subsurface a correction factor of 10 fold has been adopted for naphthalene and TPH C10-C14 consistent with that identified and adopted in the derivation of the soil HSLs (Friebel & Nadebaum 2011).

The concentration in first floor residential apartments has been estimated to be 10 times[4] less than that estimated in the ground floor areas.

Table 10 Modelling Parameter Assumptions

Parameter	Value Used
Width of room in building (m)	10
Length of room in building (m)	10
Height of room in building (m)	2.4
Air exchanges per hour inside building	2 or 0.6
Wind speed outdoors at the site (m/s)	3.8
Depth to soil contamination (m bgl)	0.2
HSL correction for phase partitioning from soil to vapour phase for naphthalene and TPH	10

Air Concentrations in Excavations

Vapour concentrations in an excavation have been modelled using the outdoor model as described in ASTM (2002) and **Appendix C**. The calculations are based on determining a volatilisation factor from the soil surface and mixing what evaporates from the soil surface in the air inside the trench.

[4] This factor has been adopted on the basis that the basement, ground floor and subsequent floors are not well connected with large openings. The attenuation factor relates the concentration in the ground floor (1/10th) to the estimated air concentration in the basement level directly below the ground floor. The 10 fold attenuation factor used in this assessment is derived from a number of sources including: Olson and Corsi (2001) where tracer experiments within a multi-storey home (with internal stairway access) indicates that the concentration within the first-floor is approximately 10 times lower than the concentration within the basement; Data provided by CEE (2004) indicates that the transfer of air between floors of a multi-floor building was 2% for the lower floors, 7% for the middle floors and 19% for the upper floors; and Fang J.B and Persily A.K. (1995) where data collected indicated that under a range of temperature and wind conditions the concentration difference between the basement and first floors was between a factor of 0 and 100.

Summary

Modelled vapour concentrations indoors, outdoors and within excavations (modelled from the maximum and 95%UCL soil concentrations identified in **Table 9**) are presented in **Tables 11** and **12** and detailed in **Appendix D**.

Table 11 Modelled Air Concentrations for Volatile Key Chemicals (mg/m³) – maximum concentrations

Key Chemical	Construction Worker – Intrusive	Construction Worker	Intrusive Worker	Residential/ Recreational Scenario	Retail/Car Par Scenario
TPH C10-14 aromatic	0.06	0.008	0.06	0.03	0.3
TPH C10-14 aliphatic	0.4	0.05	0.4	0.2	2.2
Naphthalene	0.0005	0.00007	0.0005	0.0004	0.004

Table 12 Modelled Air Concentrations for Volatile Key Chemicals (mg/m³) – 95% UCL concentrations

Key Chemical	Construction Worker – Intrusive	Construction Worker	Intrusive Worker	Residential/ Recreational Scenario	Retail/Car Par Scenario
TPH C10-14 aromatic	0.01	0.002	0.01	0.007	0.07
TPH C10-14 aliphatic	0.1	0.01	0.1	0.05	0.5
Naphthalene	0.00004	0.000005	0.00004	0.00003	0.0003

4.4.3 Exposure Parameters

Exposure assumptions relevant to the identified receptors are presented in **Tables 13** and **14**. A summary of the exposure parameters, equations and calculated risks are presented in **Appendix D**.

Table 13 Summary of Exposure Assumptions for Construction Scenarios

Exposure	Construction Worker - intrusive	Other Construction Worker
All exposures considered:		
Exposure Duration (non-carcinogenic)	10 years (life of project)	1 year (major earthworks at the site completed in first year)
Exposure Duration (carcinogenic)	70 years	70 years
Body Weight	78 kg	78 kg
Averaging Time (non-carcinogenic)	Exposure duration x 365 days (or expressed in hours)	Exposure duration x 365 days (or expressed in hours)
Averaging Time (carcinogenic)	25550 days (613200 hours)	25550 days (613200 hours)
Inhalation of contaminated dust and vapours:		
Exposure Time	8 hrs per day	8 hrs per day
Exposure Frequency	120 days per year (every second day spent working inside a trench)	240 days per year
Fraction from Source	100%	100%
Air Concentration	Modelled dust concentrations using US EPA PEF approach and modelled vapour concentrations in trench	Modelled dust concentrations using alternative approach calculation for partially completed construction for outdoor areas
Incidental ingestion of soil		
Ingestion Rate	100 mg per day (MDEP 2002)	330 mg per day (Construction Worker US EPA)
Exposure Frequency	240 days	240 days
Fraction from Source	100%	100%
Soil Concentration	Maximum and 95%UCL concentrations listed in **Table 9**	Maximum and 95%UCL concentrations listed in **Table 9**

Exposure	Construction Worker - intrusive	Other Construction Worker
Dermal contact with soil		
Skin Surface Area	2200 cm^2 (US EPA EFH) (only hands uncovered at the site while undertaking intrusive works)	3300 cm^2 (US EPA EFH – standard construction worker scenario)
Soil Adherence Factor	0.27 mg/cm^2 (US EPA EFH)	0.27 mg/cm^2 (US EPA EFH)
Exposure Frequency	240 days	240 days
Soil Concentration	Maximum and 95%UCL concentrations listed in **Table 9**	Maximum and 95%UCL concentrations listed in **Table 9**

Table 14 Summary of Exposure Assumptions for Exposure Scenarios after Construction is Part or Fully Complete

Exposure	Residential Scenario	Retail Scenario	Recreational Scenario	Intrusive Worker Post Construction
All exposures considered:				
Exposure Duration	30 years	30 years	6 years (child used as only ones likely to come into contact with soil given style of development and is worst case)	5 years
Body Weight	70 kg (NEPM 1999 amended 2013)	70 kg (NEPM 1999 amended 2013)	15 kg (child used as only ones likely to come into contact with soil given style of development and is worst case)	78 kg (average adult body weight relevant as per enHealth 2012)
Averaging Time (non-carcinogenic)	Exposure duration x 365 days (or expressed in hours)	Exposure duration x 365 days (or expressed in hours)	Exposure duration x 365 days (or expressed in hours)	Exposure duration x 365 days (or expressed in hours)
Averaging Time (carcinogenic)	25550 days (613200 hours)	25550 days (613200 hours)	25550 days (613200 hours)	25550 days (613200 hours)
Inhalation of contaminated dust and vapours:				
Exposure Time	20 hrs per day	8 hrs per day indoors 1 hr per day outdoors for dust inhalation	2 hrs per day	8 hrs per day
Exposure Frequency	365 days per year	240 days per year	265 days per year based on the number of dry days per year (<1mm rain)	10 days per year
Fraction from Source	100%	100%	100%	100%
Air Concentration	Modelled concentrations using J&E Model for volatiles	Modelled concentrations using J&E Model for volatiles Modelled concentrations using US EPA PEF approach and modelled concentrations for volatiles at surface for fully completed development. Alternative approach calculation for dust during partially completed construction.	Modelled concentrations using US EPA PEF approach and modelled concentrations for volatiles at surface for fully completed development. Alternative approach calculation for dust during partially completed construction.	Modelled concentrations using US EPA PEF approach and modelled concentrations for volatiles in trench
Incidental ingestion of soil				
Ingestion Rate	NA	25 mg per day (enHealth AEFG 2012)	100 mg per day for child (enHealth AEFG 2012)	100 mg per day (MDEP 2002)
Exposure Frequency	NA	240 days per year	Direct contact with soil at site on 10% of average no of dry days per year (i.e. 26 days)	10 days
Fraction from Source	NA	100%	100%	100%
Soil Concentration	NA	Maximum and 95%UCL concentrations listed in **Table 9**	Maximum and 95%UCL concentrations listed in **Table 9**	Maximum and 95%UCL concentrations listed in **Table 9**

Exposure	Residential Scenario	Retail Scenario	Recreational Scenario	Intrusive Worker Post Construction
Dermal contact with soil				
Skin Surface Area	NA	2 200 cm^2 (adult male hands only – enHealth AEFG)	2 700 cm^2 (enHealth AEFG)	3 300 cm^2 (US EPA EFH)
Soil Adherence Factor	NA	0.51 mg/cm^2 (enHealth AEFG)	0.51 mg/cm^2 (enHealth AEFG)	0.27 mg/cm^2 (US EPA EFH)
Exposure Frequency	NA	As for ingestion	As for ingestion	10 days
Soil Concentration	NA	Maximum and 95%UCL concentrations listed in **Table 9**	Maximum and 95%UCL concentrations listed in **Table 9**	Maximum and 95%UCL concentrations listed in **Table 9**

4.5 Uncertainties

The quantification of exposure has adopted a number of conservative assumptions, particularly that the maximum concentration present anywhere across The Haymarket site is present at each location across the site for the purposes of the exposure calculations.

The values adopted for the purpose of quantifying exposure are point values that are derived from a wide range of physiological or behavioural values that are better defined using a distribution. It is overly complex to present the assessment based on distributions hence the point values identified provide an approximation of RME. The overall approach, however, is expected to result in an overestimate of actual exposure.

Section 5 Risk Characterisation

5.1 Approach

Risk characterisation is the final step in a quantitative risk assessment. It involves the incorporation of the exposure and toxicity assessment to provide a quantitative evaluation of risk. Risk is characterised separately for threshold and non-threshold carcinogenic effects as outlined in the following:

5.1.1 Assessment of Threshold Effects

The quantification of potential exposure and risks to human health associated with the presence of chemicals where a threshold dose-response approach is appropriate has been undertaken by comparing the estimated intake (or exposure concentration) with the threshold values adopted that represent a tolerable intake (or concentration), with consideration for background intakes. The calculated ratio is termed a Risk Index (RI), which is the sum of all ratios (termed Risk Quotients [RQ]) over all relevant pathways of exposure. These are calculated using the following equations:

$$\text{Hazard or Risk Quotient [RQ] (oral or dermal)} = \frac{\text{Daily Chemical Intake}}{(ADI, TDI, RfD - \text{Background})}$$

$$\text{Hazard or Risk Quotient [RQ] (inhalation)} = \frac{\text{Exposure Concentration in Air}}{(TC, RfC - \text{Background}) \text{ or } TWA}$$

$$\text{Hazard or Risk Index } (RI) = \sum_{\text{All pathways}} HQ$$

The interpretation of an acceptable RI needs to recognise an inherent degree of conservatism that is built into the establishment of appropriate guideline (threshold) values (using many uncertainty factors) and the exposure assessment (as noted in **Section 4**). Hence, in reviewing and interpreting the calculated RI the following is noted:

- A RI less than or equal to a value of 1 (where intake or exposure is less than or equal to the threshold) represents no cause for concern (as per risk assessment industry practice, supported by protocols outlined in NEPM (1999 amended 2013) and US EPA guidance); and
- A RI greater than 1 requires further consideration within the context of the assessment undertaken, particularly with respect to the level of conservatism in the assumptions adopted for the quantification of exposure and the level of uncertainty within the toxicity (threshold) values adopted.

5.1.2 Non-Threshold Carcinogenic Effects

Non-threshold carcinogenic risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential non-threshold carcinogen. The numerical estimate of excess lifetime cancer risk is calculated as follows for oral/dermal and inhalation exposures:

Carcinogenic Risk (oral or dermal) = Daily Chemical Intake • Cancer Slope Factor

Carcinogenic Risk (inhalation) = Exposure Concentration in Air • Inhalation Unit Risk

The total non-threshold carcinogenic risk is the sum of the risk for each chemical for each pathway.

The recently amended NEPM (1999 amended 2013) provides guidance on what risk may be considered acceptable for non-threshold contaminants. It is based on a review of policy and common practice by US EPA, WHO, enHealth and various states of Australia.

The NEPM (1999 amended 2013) recommends the adoption of $1x10^{-5}$ as the acceptable level for incremental lifetime cancer risk estimates for exposure to single or multiple carcinogens.

On this basis a total Target Risk value of >1 x 10^{-5} has been adopted as indicating conditions that would warrant further assessment. Risks values ≤1 x 10^{-5} are considered to be representative of acceptable risks.

5.2 Calculated Risks

Tables 15 and **16** present a summary of the non-threshold risks and threshold RQs for each pathway assessed and the total risk/RI calculated for the exposure scenarios previously described using either the maximum or the 95% UCL concentration found in soil at The Haymarket site. The values presented in **Tables 15** and **16** (and all other risk calculations) are rounded to 1 or 2 significant figures reflecting the level of certainty inherent in risk calculations. Detailed calculations are presented in **Appendix D**.

Table 15 Summary of Risk – Maximum Concentrations

Exposure Scenario	Non-threshold Risk	Threshold Risk
CONSTRUCTION		
Intrusive Construction Worker (e.g. plumber)		
Ingestion	$8x10^{-6}$	0.08
Dermal	$3x10^{-6}$	0.09
Dust and Vapour Inhalation	$1x10^{-8}$	0.1
Total	*$1x10^{-5}$*	*0.3*
Other Construction Workers		
Ingestion	$3x10^{-6}$	0.3
Dermal	$5x10^{-7}$	0.1
Dust and Vapour Inhalation	$3x10^{-9}$	0.03
Total	*$2x10^{-6}$*	*0.4*
STAGED CONSTRUCTION – PART OCCUPIED		
Recreational Child		
Ingestion	$2x10^{-5}$	0.04
Dermal	$1x10^{-5}$	0.1
Dust Inhalation	$2x10^{-6}$	0.0004
Residential Child		
Vapour Inhalation	NA	0.5
Total for Recreational/Residential Child	*$3x10^{-5}$*	*0.6*
Retail Worker or Car Park Attendant		
Vapour Inhalation	NA	1.2
Dust Inhalation	$4x10^{-7}$	0.0004
Ingestion	$7x10^{-6}$	0.02
Dermal	$2x10^{-5}$	0.2
Total	*$3x10^{-5}$*	*1.4*
COMPLETED DEVELOPMENT		
Recreational Child		
Ingestion	$2x10^{-5}$	0.04
Dermal	$1x10^{-5}$	0.1
Dust Inhalation	$2x10^{-8}$	0.008
Residential Child		
Vapour Inhalation	NA	0.5
Total for Recreational/Residential Child	*$3x10^{-5}$*	*0.6*

Retail Worker or Car Park Attendant		
Vapour Inhalation Dust Inhalation Ingestion Dermal	NA 9x10^{-9} 7x10^{-6} 2x10^{-5}	1.2 0.004 0.02 0.2
Total	*3x10^{-5}*	*1.4*
Intrusive Worker Post Completion		
Ingestion Dermal Dust and Vapour Inhalation	2x10^{-7} 9x10^{-8} 5x10^{-10}	0.003 0.006 0.009
Total	*3x10^{-7}*	*0.02*
Acceptable Risk	**≤1x10^{-5}**	**≤1**

Table 16 Summary of Risk – 95% UCL Concentrations

Exposure Scenario	Non-threshold Risk	Threshold Risk
CONSTRUCTION		
Intrusive Construction Worker (e.g. plumber)		
Ingestion Dermal Dust and Vapour Inhalation	6x10^{-7} 2x10^{-7} 6x10^{-10}	0.01 0.01 0.01
Total	*8x10^{-7}*	*0.03*
Other Construction Workers		
Ingestion Dermal Dust and Vapour Inhalation	2x10^{-7} 4x10^{-8} 1x10^{-6}	0.04 0.02 0.002
Total	*1x10^{-6}*	*0.06*
STAGED CONSTRUCTION – PART OCCUPIED		
Recreational Child		
Ingestion Dermal Dust Inhalation	8x10^{-7} 7x10^{-7} 2x10^{-6}	0.006 0.02 0.0004
Residential Child		
Vapour Inhalation	NA	0.05
Total for Recreational/Residential Child	*4x10^{-6}*	*0.08*
Retail Worker or Car Park Attendant		
Vapour Inhalation Dust Inhalation Ingestion Dermal	NA 4x10^{-7} 5x10^{-7} 2x10^{-6}	0.1 0.0004 0.003 0.03
Total	*3x10^{-6}*	*0.1*
COMPLETED DEVELOPMENT		
Recreational Child		
Ingestion Dermal Dust Inhalation	8x10^{-7} 7x10^{-7} 2x10^{-10}	0.006 0.02 0.0009
Residential Child		
Vapour Inhalation	NA	0.05
Total for Recreational/Residential Child	*2x10^{-7}*	*0.08*
Retail Worker or Car Park Attendant		
Vapour Inhalation Dust Inhalation Ingestion Dermal	NA 4x10^{-10} 5x10^{-7} 2x10^{-6}	0.1 0.000000003 0.003 0.03
Total	*3x10^{-6}*	*0.1*
Intrusive Worker Post Completion		
Ingestion Dermal Dust and Vapour Inhalation	1x10^{-8} 8x10^{-9} 2x10^{-11}	0.0005 0.0008 0.001
Total	*2x10^{-8}*	*0.002*
Acceptable Risk	**≤1x10^{-5}**	**≤1**

CONSTRUCTION

Review of **Tables 15** and **16** indicates the following in relation to the potential for exposure to the contamination present at The Haymarket throughout construction:

- Risks to construction workers who undertake intrusive works at the site for the life of the project are acceptable considering both the maximum and the 95% UCL (a conservative estimate of the average concentration at the site) soil concentration.
- Risks to other construction workers who undertake earthworks at the site for the first year of the project and are then involved in constructing the buildings are low and acceptable considering both the maximum and the 95% UCL (a conservative estimate of the average concentration at the site) soil concentration.
- Risks to workers at the site who are involved in accessing/constructing/repairing the large stormwater culverts that exist at the site or that will be constructed at the site are low and acceptable because the contaminant concentrations in groundwater do not exceed drinking water guidelines which are based on significant consumption. No further detailed calculations have been undertaken for this pathway.

STAGED CONSTRUCTION – PART OCCUPIED

Review of **Tables 15** and **16** indicates the following in relation to the potential for exposure to the contamination present at The Haymarket during stages of construction when some buildings are complete and occupied while others are still under construction:

- Risks to all types of construction workers are acceptable as discussed above.
- Risks to children using the area for recreation and living in the apartments at the site are above acceptable levels if the maximum concentration at the site was present across the site but low and acceptable using the 95% UCL concentration. Risks to adults for the same exposure pathway will be lower than those for children. Site specific trigger levels have been developed to address the risk found at the maximum concentration (discussed below).
- Risks to people who work in the retail area on the ground floor or in the car parks as an attendant or car wash employee are above acceptable levels and need to be addressed during construction. Site specific trigger levels have been developed and are discussed below.
- Risks to visitors to the Precinct or office workers in the multi-storey buildings will be lower than the scenarios assessed so will also be low and acceptable.

COMPLETED DEVELOPMENT

Review of **Tables 15** and **16** indicates the following in relation to the potential for exposure to the contamination present at The Haymarket once construction is completed:

- Risks to children using the area for recreation and living in the apartments at the site are above acceptable levels if the maximum concentration at the site was present across the site but low and acceptable using the 95% UCL concentration. Risks to adults for the same exposure pathway will be lower than those for children. Site specific trigger levels have been developed to address the risk found at the maximum concentration (discussed below).

- Risks to people who work in the retail area on the ground floor or in the car parks as an attendant or car wash employee are above acceptable levels and need to be addressed during construction. Site specific trigger levels have been developed and are discussed below.
- Risks to intrusive workers at the site once the development is completed will be low and acceptable.
- Risks to visitors to the Precinct or office workers in the multi-storey buildings will be lower than the scenarios assessed so will also be low and acceptable.

5.3 Site Specific Trigger Levels and Reuse of Soils

The exposure scenario for the retail worker calculated for the development includes inhalation of volatile chemicals that may be left below the building and direct contact with soil during lunch breaks spent in the open space areas of The Haymarket development scheme. The exposure scenario for the recreational and residential child includes inhalation of volatile chemicals that may be left below a building and direct contact with soil in open spaces while living at the site. When the maximum concentrations are used in the calculations for these exposure scenarios, the threshold and/or non-threshold risks are estimated to be above the acceptable levels and need to be addressed during the construction of the development. When the 95%UCL concentrations are used in the calculations, the risks estimated for both of these scenarios are acceptable.

Site specific trigger levels are calculated to set maximum values that can remain in soil across the whole site or can be applied more specifically, in areas of the site where people using the site can come into direct contact with soil. These trigger levels then guide remediation at the site to ensure the site is suitable for the proposed land use. These trigger levels are calculated using the same calculations undertaken to determine risk but in reverse.

The SSTLs have been calculated to bring the risks back within acceptable levels. SSTLs have been calculated using both the retail worker scenario and the recreational/residential child scenario. SSTLs have been determined separately for application to open spaces at the site and to the rest of the site for benzo[a]pyrene and naphthalene to ensure the criteria are appropriate.

The recreational/residential child scenario has been used for the open space SSTL for benzo[a]pyrene assuming ingestion and dermal exposure to soil for the child on 160 days per year (60% non-wet days). The benzo[a]pyrene value for the rest of the site is based on considering the retail worker and child scenarios, with the potential for odours or discolouration of soil and the spread of measured concentrations across the site.

The open space SSTL for naphthalene is based on the NEPM (1999 amended 2013).

Calculations are included in **Appendix D**.

Table 17 Site Specific Trigger Levels

Key Chemicals	Site-Specific Trigger Levels (mg/kg)	
	Open Spaces	**Rest of Site (based on protection of residents, commercial workers, construction workers, intrusive works)**
Benzo[a]pyrene TEFs	20	50
TPH C10-C14	360 (based on 50/50 split aromatic /aliphatic)	360 (based on 50/50 split aromatic /aliphatic)
TPH C15+	2 300 (based on 50/50 split aromatic /aliphatic)	2 300 (based on 50/50 split aromatic /aliphatic)
Naphthalene	Not Limiting - *maximum value found at site – 15 mg/kg)*	7
2-Naphthylamine	Maximum value found at the site currently – 0.8	0.8

Soil remaining at the site or to be reused around the site should comply with the SSTLs.

Should they occur, unexpected finds at the site should be managed in accordance with the RAP (Coffey 2013).

5.4 Acid Sulfate Soils

Given the presence of alluvial and residual clays beneath the fill underlying parts of The Haymarket site, the presence of acid sulfate soils (ASS) or potential acid sulfate soils (PASS) is likely within natural material requiring excavation. If such material is excavated it should be managed in accordance with the acid sulfate soils management plan for the site.

5.5 Asbestos Impacted Soil

Asbestos (both in the form of bonded asbestos and asbestos fibre) was identified in some of the soil samples at the site and is commonly found in fill material like that found at this site. Asbestos is hazardous to human health. Asbestos impacted soil finds at the site will be dealt with in accordance procedure outlined in **Section 12.4** of the RAP (Coffey 2013).

The asbestos management plan as outlined in the RAP (Coffey 2013) is based on the use of the NEPM (1999 amended 2013) guidance for the management of any asbestos impacted soil. It includes assessing areas within building footprints and in open spaces for the presence of asbestos and using the health investigation levels from the NEPM to determine if further management is required.

5.6 Sensitivity - Dermal Exposure to PAHs

There is some uncertainty in the assessment of dermal contact with PAHs as benzo[a]pyrene is a point of contact carcinogen. Organisations like US EPA and WHO have flagged for about a decade that dermal contact with PAHs probably should be assessed separately to oral exposure but have not developed the toxicity reference value to allow this to occur. Health Canada has published information on the carcinogenic effects of dermal contact with benzo[a]pyrene which could be used in such assessments. The Health Canada assessment has been published in Knafla et al. 2006. This slope factor has not yet been incorporated into any guidance from these organisations.

The most recent revision of the National Environmental Protection Measure (Assessment of Site Contamination) **Appendix A2** of **Schedule B7** shows that the Knafla et al. 2006 approach was considered in the revision but was not adopted given the various conservative assumptions already included in the calculations. Using the Knafla approach increases the risk estimates further for the recreational child. However, the conservative assumptions (similar to those used in the NEPM HIL calculation) that have been used in these calculations are likely to mean the risks are overestimated in this situation as was indicated in the calculation of the health based investigation level for benzo[a]pyrene in the amended NEPM. Conservative assumptions regarding exposure relevant in this HHERA include:

- The maximum concentration anywhere at the site is assumed to be present across the whole site including in the garden areas
- Children are assumed to get their hands, arms and legs covered in dirt on those days when they play in the small garden/open space areas and that they do not wash to remove the dirt until they next have a shower or bath
- That the small garden/open space areas where they play do not have any grass cover at all
- The small garden/open space areas cover approximately 1% of the area of The Haymarket
- That the children live and play in the area throughout their childhood

These assumptions mean that there is likely to be an order of magnitude conservatism in the calculations.

The risk posed by direct contact exposure included in the retail/commercial worker would also be increased if the Knafla slope factor was used. Given that the risks for this exposure scenario are estimated to be above acceptable levels when calculated using the maximum concentration found at the site and will need to be addressed in some way during construction, this matter will be covered by the SSTLs developed in **Section 5.3**.

The other exposure scenarios which may have direct dermal contact with the soil at the site are the construction and intrusive worker ones. These scenarios assume that the workers hands come in direct contact with soil every day they work at the site (every working day of the year) and that they do not wash their hands until the next time they shower. Using the Knafla slope factor does increase the potential risks posed by exposure to the most contaminated soils to levels above the acceptable value. Consequently, even though there is conservatism built into the scenario assessed and the highest concentrations at the site will be addressed by remediation to the SSTLs, it would be appropriate to consider the use of gloves as part of the site PPE particularly for the intrusive construction worker who might be at the site throughout the life of the project.

5.7 Uncertainties

Uncertainty in any assessment refers to a lack of knowledge (that could be better refined through the collection of additional data or conducting additional studies) and is an important aspect of the risk assessment process. An assessment of uncertainty is a qualitative process relating to the selection and rejection of specific data, estimates or scenarios within the risk assessment. In general, to compensate for uncertainty, conservative assumptions are often made that result in an overestimate rather than an underestimate of risk.

In general, the uncertainties and limitations of the risk assessment can be classified into the following categories, where uncertainties relevant to each have been addressed within the report (as noted):

- Sampling and analysis (addressed in **Section 2.7**);
- Toxicological assessment (addressed in **Section 3.3**); and
- Exposure assessment (addressed in **Section 4.4**).

A number of approaches and assumptions have been adopted that are expected to result in a conservative estimation of risk, that include are:

- Use of the maximum soil concentrations from a single location as the concentration assumed to exist at all locations across the site given the spread of data across the site; and
- Use of conservative exposure assumptions like no grass cover assumed for recreational play in the garden areas and dirt on the skin not being washed off until the end of the day.

Section 6 Ecological Risk Assessment

6.1 Soil Contamination

The US EPA (US EPA 2005c,d,e and 2007a,b,c,d), the Canadian Council of Ministers of the Environment (CCME 2008a and b) and **Schedule B1** of the recently amended NEPM (1999 amended 2013) have ecological soil screening levels that are applicable to growing plants. The soil concentrations reported at the site have been reviewed against these criteria as outlined in the **Table 18**.

Table 18 Review of Soil Concentrations Against Ecological Criteria

Key Chemical	Soil Screening Level (mg/kg)	Maximum Concentration at the Site (mg/kg)	Mean Concentration at the Site (mg/kg)	Above Screening Value (Y/N)
Arsenic	18 U	21	--	N
Cadmium	32 U	0.5	--	N
Chromium	64 C	260	14	N
Copper	70 U	560	46	N
Lead	120 U	2 700	110	N
Mercury	6.6 C	4.9	--	N
Nickel	38 U	26	--	N
Zinc	160 U	2 200	150	N
Low Molecular Weight PAHs	29 U (sum)	828	15	N
High Molecular Weight PAHs	18 U (sum)	2351	39	Y
Naphthalene	170 N	15	--	N
Benzo[a]pyrene	0.7 N	200	3.1	Y
TPH C6-10	180 N	21	--	N
TPH C10-16	120 N	660	50	N
TPH C16+	3 100 N	6 200	360	N
Benzene	50 N	0.1	LOR 0.5 or 0.1	N
Toluene	85 N	0.1		N
Ethylbenzene	70 N	0.4	LOR 0.5 or 0.1	N
Xylenes	105 C	1.4		N

Notes:

-- Insufficient detections to calculate an arithmetic mean or maximum concentration already effectively equal to or below soil screening level

Low molecular weight PAHs include acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene and phenanthrene

High molecular weight PAHs include the carcinogenic PAHs and fluoranthene and pyrene.

U = US EPA Ecological Soil Screening Levels

C = CCME Terrestrial Guidelines

N = NEPM Schedule B (1) (1999 amended 2013)

The maximum concentrations for the PAHs and some of the metals are above soil screening levels for the protection of plants and soil organisms. The mean values for the site for the heavier PAHs and for benzo[a]pyrene are the only results that are still slightly above the guideline values. Most of The Haymarket will be covered by buildings or paving with only about 1% of the 4 ha currently allocated to garden/turfed areas. Two of the three areas currently allocated to gardens or grassed areas already have existing vegetation which does not appear to be affected by soil contamination.

Also the maximum soil results for the site are not in these areas where vegetation currently exists or is proposed.

For those areas with existing vegetation – near the proposed student accommodation and near the Novotel Rockford Hotel – it is likely that the existing vegetation will be retained as much as possible which will mean more contaminated soil from other areas of the site is unlikely to be moved to these areas.

However, if soil needs to be moved into areas where it is proposed to have gardens or turfed areas, material from areas known to have low contamination should be targeted to ensure the plants won't be adversely affected. Alternatively, selection of species (and the use of mature plants) that are more tolerant to elevated concentrations of PAHs and some metals may be considered in these areas.

6.2 Groundwater Contamination

Table 19 provides the screening of the groundwater contaminant concentrations at the site against ecosystem protection water quality guidelines (ANZECC/ARMCANZ 2000). A number of contaminants were found above these guidelines.

Table 19 Review of Groundwater Concentrations Against Ecological Criteria

Contaminants	Maximum concentration (well/round) (mg/L)	Ecological Screening Level (mg/L)	Key CoPCs (Y/N)?
Benzene	<0.0005	0.5[A]	N
Toluene	0.013 (BH12 2011)	0.18[A]	N
Ethylbenzene	0.0005 (BH12 2011)	0.005[A]	N
Xylenes	0.004 (BH12 2011)	0.075[A]	N
Acenapthene	0.00002 (MW25 2013)	0.00001[AS]	Y
Anthracene	0.00001 (MW25 2013)	0.00001[A]	N
Benz[a]anthracene	0.00001 (MW25 2013)	0.0001[AS]	N
Benzo[a]pyrene	0.00001 (MW30 2013)	0.0001[A]	N
Benzo[b&k]fluoranthene	0.00002 (MW30 2013)	0.0001[AS]	N
Pyrene	0.00008 (MW30 2013)	0.0006[AS]	N
TPH C6-C9	<0.02		N
TPH C10-C14	<0.05		N
TPH C15+	<0.1		N
Arsenic	0.008 (MW25 2013)	0.0023[A]	Y
Cadmium	0.0003 (MW30 2013)	0.0007[A]	N
Chromium	0.007 (BH1 2011)	0.0044[A]	Y
Copper	0.021 (BH1 2011)	0.0013[A]	Y
Lead	0.009 (BH1 2011)	0.0044[A]	Y
Nickel	0.003 (BH1,12 and 13 2011)	0.07[A]	N
Zinc	0.53 (BH1 2011)	0.015[A]	Y

Notes:
[A] = ANZECC/ARMCANZ 2000 Ecosystem Protection Guidelines
[s] = surrogate (phenanthrene used for pyrene, benzo[a]pyrene used for other 2 carcinogenic ones, anthracene used for acenapthene)

Acenapthene was found in MW25 just above the adopted water quality guideline (the value listed for anthracene in the water quality guidelines) but it is still within the error of measurement, especially at this ultra trace limit of reporting. During the supplementary site investigation where this level of acenapthene was measured in an unfiltered groundwater sample, further analysis of the groundwater samples was undertaken on filtered samples. For the sample taken at MW25 where this measurement was taken, no PAHs at all were detected in the filtered sample. This indicates that the PAHs measured in the groundwater are likely to be attached to suspended particles in the groundwater and once these particles are removed no dissolved phase PAHs can be detected. This is in line with the chemical characteristics of these compounds given their low water solubility and high affinity for organic carbon and other material that makes up the suspended particles in the groundwater. It also means that the acenapthene contamination found at MW25 cannot travel freely with the groundwater as it flows towards Cockle Bay. The suspended particles get caught up as the groundwater flows through the fill which holds the contamination close to where it was found.

Arsenic, chromium, copper, lead and zinc were also found at levels above water quality guidelines in some groundwater samples at the site. The highest levels for most of these elements were found in the 2011 round of sampling. Groundwater at the site is not particularly affected by tidal influences, however, groundwater closer to Cockle Bay is more tidally influenced. This means that as the groundwater moves towards the Bay it will be diluted by the incoming and outgoing tides each day. This is likely to result in groundwater complying with the water quality guidelines as it is discharged to the Bay.

Zinc was found to be particularly elevated in 2011 with the highest result being 0.53 mg/L at BH1 compared with a water quality guideline of 0.015 mg/L. The results in 2012 and 2013 for zinc in the wells MW25 and 30 were 0.01 to 0.02 mg/L. The mean value for the dataset is 0.12 mg/L and the median value is 0.016 mg/L. The elevated values in 2011 do not appear to be linked to elevated soil concentrations which seem focused around BH129 which is at the other end of the site to BH1. Overall the results across the dataset are close to the water quality guideline and are in line with background concentrations of zinc normally found in waters in urban areas. The ASLP and TCLP data for sites within The Haymarket show no detectable levels of zinc leaching from the soils tested which included one sample from BH129.

Copper was not detected or detected below the water quality guideline in 2012 and 2013. In 2011 the results for BH12 and BH13 were within 2 fold of the water quality guideline. However for BH1, the result was 0.021 mg/L compared with the water quality guideline of 0.0013 mg/L. The mean value for the dataset is 0.004 mg/L and the median value is 0.001 mg/L. On average the results for copper in groundwater at the site are within background levels in urban areas.

For chromium and lead the results in 2012 and 2013 were below water quality guidelines while the results for 2011 were slightly above. The highest results were within 2 fold of the water quality guidelines. Given that these elements are naturally present in the soils these slight elevations are considered within background.

Arsenic is commonly found in groundwater around Sydney. The highest level found at the site was 0.008 mg/L compared to the water quality guideline of 0.002 mg/L. MW25 (in 2013) and BH13 were found to contain this level of arsenic. The other locations tested showed no detections for arsenic or detections at the limit of reporting which was 0.002 or 0.001 mg/L. The mean value for the dataset is

0.003 mg/L and the median value is 0.002 mg/L. On average the results for arsenic in groundwater at the site are within background levels in urban areas.

Given the likely dilution due to the tide as this groundwater approaches Cockle Bay and the longer term average values, it is likely that the concentration of inorganics discharging to the Bay complies with the water quality guidelines.

Section 7 Conclusions

The HHERA presented in this report has addressed the presence of contamination identified in soil and groundwater at The Haymarket. The assessment is based on the currently proposed development scheme for the site. Conservative assumptions have been used in the risk estimates to allow some flexibility in the risk considerations should the proposed design change slightly.

Based on the available data and consideration of the proposed development scheme and uncertainties identified, the following conclusions have been reached:

CONSTRUCTION

Review of **Tables 15** and **16** indicates the following in relation to the potential for exposure to the contamination present at The Haymarket throughout construction:

- Risks to construction workers who undertake intrusive works at the site for the life of the project are acceptable considering both the maximum and the 95% UCL (a conservative estimate of the average concentration at the site) soil concentration.
- Risks to other construction workers who undertake earthworks at the site for the first year of the project and are then involved in constructing the buildings are low and acceptable considering both the maximum and the 95% UCL (a conservative estimate of the average concentration at the site) soil concentration.
- Risks to workers at the site who are involved in accessing/constructing/repairing the large stormwater culverts that exist at the site or that will be constructed at the site are low and acceptable because the contaminant concentrations in groundwater do not exceed drinking water guidelines which are based on significant consumption. No further detailed calculations have been undertaken for this pathway.

STAGED CONSTRUCTION – PART OCCUPIED

Review of **Tables 15** and **16** indicates the following in relation to the potential for exposure to the contamination present at The Haymarket during stages of construction when some buildings are complete and occupied while others are still under construction:

- Risks to all types of construction workers are low and acceptable as discussed above.
- Risks to children using the area for recreation and living in the apartments at the site are above acceptable levels if the maximum concentration at the site was present across the site but low and acceptable using the 95% UCL concentration. Risks to adults for the same exposure pathway will be lower than those for children. Site specific trigger levels have been developed to address the risk found at the maximum concentration (discussed below).
- Risks to people who work in the retail area on the ground floor or in the car parks as an attendant or car wash employee are above acceptable levels and need to be addressed during construction. Site specific trigger levels have been developed and are discussed below.
- Risks to visitors to the Precinct or office workers in the multi-storey buildings will be lower than the scenarios assessed so will also be low and acceptable.

COMPLETED DEVELOPMENT

Review of **Tables 15** and **16** indicates the following in relation to the potential for exposure to the contamination present at The Haymarket once construction is completed:

- Risks to children using the area for recreation and living in the apartments at the site are above acceptable levels if the maximum concentration at the site was present across the site but low and acceptable using the 95% UCL concentration. Risks to adults for the same exposure pathway will be lower than those for children. Site specific trigger levels have been developed to address the risk found at the maximum concentration (discussed below).
- Risks to people who work in the retail area on the ground floor or in the car parks as an attendant or car wash employee are above acceptable levels and need to be addressed during construction. Site specific trigger levels have been developed and are discussed below.
- Risks to intrusive workers at the site once the development is completed will be low and acceptable.
- Risks to visitors to the Precinct or office workers in the multi-storey buildings will be lower than the scenarios assessed so will also be low and acceptable.

Site specific trigger levels have been calculated based on determining concentrations that would give estimates of risk that are acceptable for the most affected scenarios – that for retail/commercial workers and for the residential/recreational child. If these contaminants are kept below these concentrations in soil across the site then the risks posed by the contamination in the fill at the site will be acceptable for all the different exposure scenarios addressed by this HHERA.

Table 20 Site Specific Trigger Levels

Key Chemicals	Site-Specific Trigger Levels (mg/kg)	
	Open Spaces	Rest of Site (based on protection of residents, commercial workers, construction workers, intrusive works)
Benzo[a]pyrene TEFs	20	50
TPH C10-C14	360 (based on 50/50 split aromatic/ aliphatic)	360 (based on 50/50 split aromatic/ aliphatic)
TPH C15+	2 300 (based on 50/50 split aromatic/ aliphatic)	2 300 (based on 50/50 split aromatic/ aliphatic)
Naphthalene	Not Limiting - *maximum value found at site 15 mg/kg*	7
2-Naphthylamine	Maximum value found at the site currently – 0.8	0.8

Details regarding how these SSTLs will be applied at the site are provided in the RAP (Coffey 2013).

The uncontrolled historical filling at the site mean that finds of asbestos impacted soil (soil containing bonded asbestos or asbestos fibres or both) are possible at the site and should be handled in accordance with the asbestos management plant in **Section 12.4** of the RAP (Coffey 2013). Other unexpected materials found at the site will be handled using the unexpected finds protocol outlined in **Section 12.2** of the RAP (Coffey 2013).

The maximum concentrations for the PAHs and some of the metals are above soil screening levels for the protection of plants and soil organisms. The mean values for most chemicals apart from the heavier PAHs and benzo[a]pyrene are below the guideline values. The areas where the highest concentrations of heavier PAHs and benzo[a]pyrene were found are not areas where gardens are proposed to be located. It is proposed to locate at least some of the gardens in areas that are already vegetated and those plants do not currently show any signs of impact from contamination. These highest concentrations of the heavier PAHs and benzo[a]pyrene will be addressed by the application of the SSTLs presented above based on the protection of human health.

Maximum levels of the contaminants in groundwater are low but are above water quality guidelines for some samples while the mean and median values are quite close or below the water quality guidelines. The site is approximately 500 m from the nearest waterway – Cockle Bay – and so it is likely that the groundwater will be sufficiently diluted by the tide by the time it reaches Cockle Bay. The contaminants found in the groundwater are also common to urban waterways.

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- *Schedule B(7) and Appendices, Derivation of Health-Based Investigation Levels*

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Figures

0 250
REDUCTION RATIO 1:5000 @ A4

Figure 1 : Site Location. The Haymarket

SYDNEY INTERNATIONAL CONVENTION AND ENTERTAINMENT CENTRE DARLING HARBOUR

Rygate & Company Pty Limited
P.W. Rygate & West
ABN 61 001 204 897

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e surveyors@rygate.com.au
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RYGATE SURVEYORS

REF: 75813 **DATE: 3/6/2013**

Key

- SICEEP Site
- PPP - State Significant DA Boundary
- PDA - Stage 1 State Significant DA Boundary
- Hotel Complex State Significant DA Boundary

Figure 2 – SICEEP Site Layout

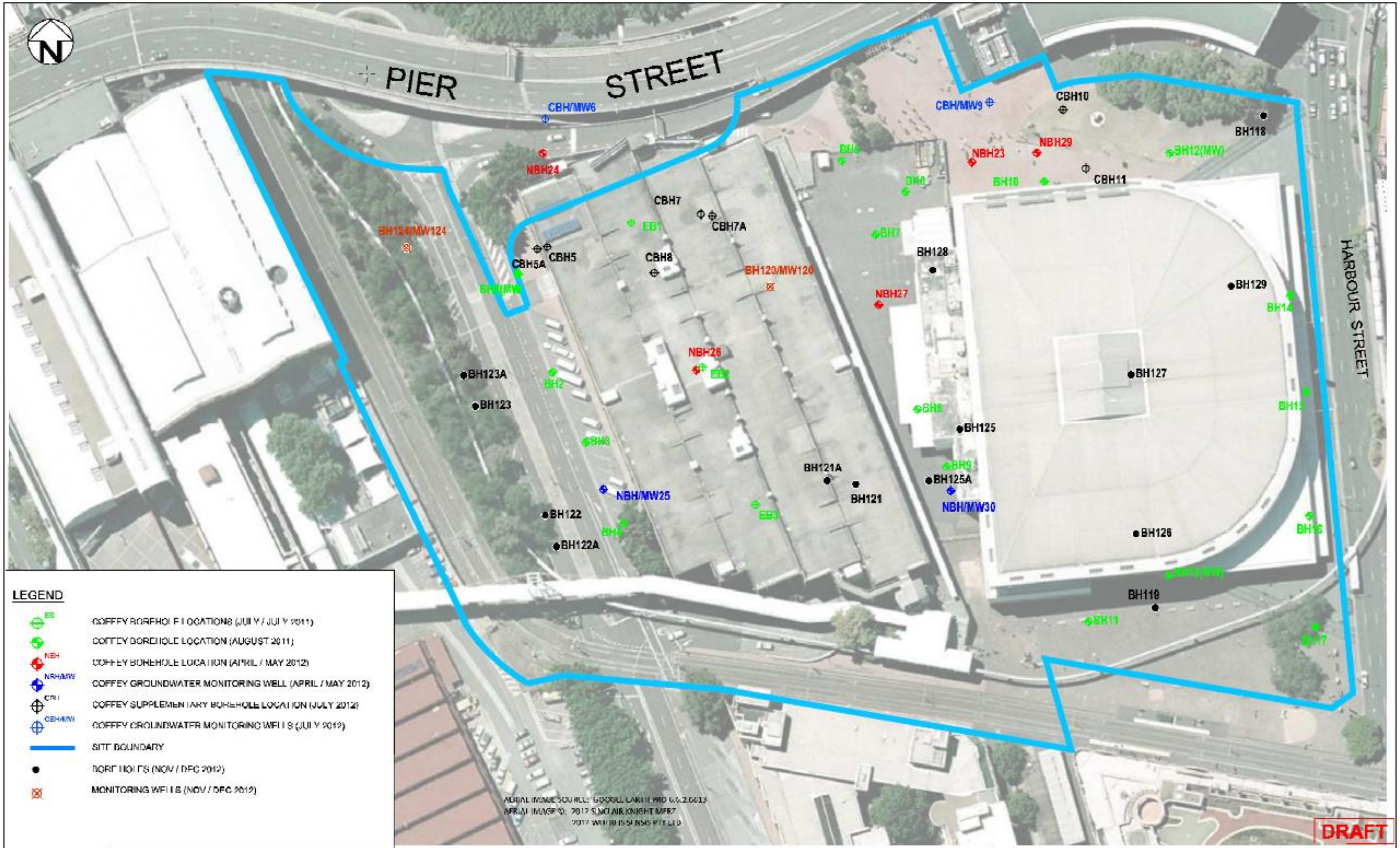

Figure 3 – Site Layout and Location of Soil and Groundwater Sampling

0 50
REDUCTION RATIO 1: 1000 @ A3

Rygate & Company Pty Limited
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REF: 75813 DATE: 3/6/2013

Appendix A Soil Monitoring

Table 1
Soil Analytical Results Summary
Sydney International Convention and Entertainment Centre

Group	ChemName	Units	EQL	Assessment Criteria	BH1 1.0	BH1 3.0	BH2 0.6m	BH2 1.5m	BH2 2.5m	BH2 2-2.2m	BH3 0.5m	BH3 1.0m	QC1 (duplicate of BH3_2.0)	BH3 2.5m	BH3 5.5m	BH4 0.5m	BH4 1.0m	BH4 1.5m	BH4 2.0m	BH4 5.5m	BH5_1.5-1.6
	Date				7/06/2011	7/06/2011	3/06/2011	3/06/2011	3/06/2011	3/06/2011	2/06/2011	2/06/2011	2/06/2011	2/06/2011	2/06/2011	6/06/2011	6/06/2011	6/06/2011	6/06/2011	6/06/2011	14/06/2011
	Laboratory Batch				SE100700-1	SE100700-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100639-1	SE100735-1
Asbestos	Asbestos				ND	ND	ND	ND	-	-	-	ND	-	ND	-	-	ND	ND	-	-	ND
TRH	TPH C6 - C9	mg/kg	20	65 [1]	<20	<20	<20	-	<20	<20	<20	<20	<20	-	<20	<20	-	-	<20	<20	<20
	TPH C10 - C14	mg/kg	20		<20	<20	<20	-	<20	<20	<20	<20	<20	-	<20	<20	-	-	<20	<20	<20
	TPH C15 - C28	mg/kg	50		<50	<50	<50	-	140	130	<50	<50	<50	-	<50	<50	-	-	380	<50	<50
	TPH C29-C36	mg/kg	50		<50	<50	<50	-	88	92	<50	<50	<50	-	<50	<50	-	-	110	<50	<50
	TPH+C10 - C36	mg/kg		1000 [1]	<120	<120	<120	-	228	222	<120	<120	<120	-	<120	<120	-	-	490	<120	<120
BTEX	Benzene	mg/kg	0.1	1 [1]	<0.1	<0.1	<0.1	-	<0.1	<1	<0.1	<1	<0.1	-	<0.1	<0.1	-	-	<1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1	3.1 [1]	<0.1	<0.1	<0.1	-	<0.1	<1	<0.1	<1	<0.1	-	<0.1	<0.1	-	-	<1	<0.1	<0.1
	Toluene	mg/kg	0.1	1.4 [1]	<0.1	<0.1	<0.1	-	<0.1	<1	<0.1	<1	<0.1	-	<0.1	<0.1	-	-	<1	<0.1	<0.1
	Xylene (m & p)	mg/kg	1		<1	<1	<1	-	<1	<2	<1	<2	<1	-	<1	<1	-	-	<2	<1	<1
	Xylene (o)	mg/kg	0.5		<0.5	<0.5	<0.5	-	<0.5	<1	<0.5	<1	<0.5	-	<0.5	<0.5	-	-	<1	<0.5	<0.5
	Xylene Total	mg/kg	0.3	14 [1]	<0.3	<0.3	<0.3	-	<0.3	<3	<0.3	<3	<0.3	-	<0.3	<0.3	-	-	<3	<0.3	<0.3
Metals	Arsenic	mg/kg	3	500 [2]	3	9	4	-	23	28	4	4	9	-	<3	12	-	-	14	<3	4
	Cadmium	mg/kg	0.3	100 [2]	0.3	<0.3	<0.3	-	0.4	0.4	<0.3	<0.3	<0.3	-	<0.3	<0.3	-	-	<0.3	<0.3	<0.3
	Chromium (III+VI)	mg/kg	0.3	600000 [2]	9	16	7.4	-	16	11	7.5	14	12	-	6	10	-	-	12	12	9.8
	Copper	mg/kg	0.5	5000 [2]	13	21	9.9	-	51	56	51	58	57	-	4.9	63	-	-	42	1.2	26
	Lead	mg/kg	1	1500 [2]	15	25	15	-	93	98	15	27	120	-	6	47	-	-	110	7	57
	Nickel	mg/kg	0.5	3000 [2]	7.7	3.6	11	-	11	7	6.6	22	10	-	0.9	5.6	-	-	10	1.2	13
	Zinc	mg/kg	0.5	35000 [2]	30	25	38	-	160	110	32	50	85	-	1.9	91	-	-	110	2.5	96
	Mercury	mg/kg	0.05	75 [2]	<0.05	0.05	<0.05	-	0.55	0.37	<0.05	0.48	0.47	-	<0.05	0.15	-	-	0.64	<0.05	0.24
PAH	Benzo(a) pyrene	mg/kg	0.05	5 [2]	<0.05	<0.05	<0.05	-	-	0.86	-	0.1	0.25	-	-	0.35	-	-	-	-	0.24
	PAHs (Sum of total)	mg/kg	1.75	100 [2]	<1.75	<1.75	<1.75	-	-	10	-	<1.75	3.7	-	-	3.8	-	-	-	-	2.2
VOC	**Total VOC**	mg/kg			-	-	-	-	-	<LOR	<LOR	<LOR	-	-	-	-	-	-	<LOR	-	-
SVOC	**Total SVOC**	mg/kg			-	<LOR	-	-	-	-	<LOR	<LOR	-	-	-	-	-	-	<LOR	-	-

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coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Table 1
Soil Analytical Results Summary
Sydney International Convention and Entertainment Centre

Group	ChemName	Units	EQL	Assessment Criteria	BH5_14.5m	BH5_2.5-2.6	BH5_4-4.1	BH5_8.5m	BH6 2.0	BH6 2.5	BH6 4.0	BH6 6.0	BH6 9.5	BH8_0.5-0.6	BH9_0.5-0.6	BH10 1.1-1.3	BH10 2.0	BH10 3.0	BH10 4.0	BH10 8.0	BH11 0.1m
	Date				15/06/2011	14/06/2011	14/06/2011	15/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011	14/06/2011	15/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	1/06/2011
	Laboratory Batch				SE100735-1	SE100735-1	SE100735-1	SE100735-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100735-1	SE100735-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100639-1
Asbestos	Asbestos				-	-	ND	-	ND	ND	-	ND	-	ND	ND	ND	-	ND	-	-	ND
TRH	TPH C6 - C9	mg/kg	20	65 [1]	-	-	<20	-	<20	-	-	<20	-	<20	<20	<20	<20	<20	<20	-	-
	TPH C10 - C14	mg/kg	20		-	-	<20	-	<20	-	-	<20	-	<20	<20	22	<20	<20	<20	-	-
	TPH C15 - C28	mg/kg	50		-	-	<50	-	<50	-	-	<50	-	89	54	1100	590	<50	120	-	-
	TPH C29-C36	mg/kg	50		-	-	<50	-	<50	-	-	<50	-	76	53	510	220	<50	52	-	-
	TPH+C10 - C36	mg/kg		1000 [1]	-	-	<120	-	<120	-	-	<120	-	165	107	1632	810	<120	172	-	-
BTEX	Benzene	mg/kg	0.1	1 [1]	-	-	<0.1	-	<1	-	-	<0.1	-	<0.1	<0.1	<1	<0.1	<0.1	<0.1	-	-
	Ethylbenzene	mg/kg	0.1	3.1 [1]	-	-	<0.1	-	<1	-	-	<0.1	-	<0.1	<0.1	<1	<0.1	<0.1	<0.1	-	-
	Toluene	mg/kg	0.1	1.4 [1]	-	-	<0.1	-	<1	-	-	<0.1	-	<0.1	<0.1	<1	<0.1	<0.1	<0.1	-	-
	Xylene (m & p)	mg/kg	1		-	-	<1	-	<2	-	-	<1	-	<1	<1	<2	<1	<1	<1	-	-
	Xylene (o)	mg/kg	0.5		-	-	<0.5	-	<1	-	-	<0.5	-	<0.5	<0.5	<1	<0.5	<0.5	<0.5	-	-
	Xylene Total	mg/kg	0.3	14 [1]	-	-	<0.3	-	<3	-	-	<0.3	-	<0.3	<0.3	<3	<0.3	<0.3	<0.3	-	-
Metals	Arsenic	mg/kg	3	500 [2]	-	-	6	-	8	-	3	25	-	5	4	4	-	8	4	-	-
	Cadmium	mg/kg	0.3	100 [2]	-	-	<0.3	-	<0.3	-	<0.3	0.6	-	0.8	0.3	<0.3	-	<0.3	<0.3	-	-
	Chromium (III+VI)	mg/kg	0.3	600000 [2]	-	-	11	-	6.4	-	13	13	-	12	12	11	-	13	13	-	-
	Copper	mg/kg	0.5	5000 [2]	-	-	14	-	9.3	-	16	1.2	-	39	30	44	-	4.9	35	-	-
	Lead	mg/kg	1	1500 [2]	-	-	37	-	15	-	12	12	-	130	66	260	-	19	150	-	-
	Nickel	mg/kg	0.5	3000 [2]	-	-	5.7	-	1.2	-	13	1.3	-	7.2	19	7.7	-	1.2	4.7	-	-
	Zinc	mg/kg	0.5	35000 [2]	-	-	25	-	12	-	22	7.9	-	190	93	72	-	18	110	-	-
	Mercury	mg/kg	0.05	75 [2]	-	-	0.23	-	0.41	-	<0.05	<0.05	-	0.27	0.12	0.13	-	<0.05	0.22	-	-
PAH	Benzo(a) pyrene	mg/kg	0.05	5 [2]	-	-	<0.05	-	<0.05	-	<0.05	<0.05	-	1.5	0.92	20	-	<0.05	2.1	-	-
	PAHs (Sum of total)	mg/kg	1.75	100 [2]	-	-	<1.75	-	<1.75	-	<1.75	<1.75	-	16	7.1	280	-	<1.75	32	-	-
VOC	**Total VOC**	mg/kg			-	<LOR	-	-	<LOR	-	-	-	-	-	-	<LOR	-	-	-	-	-
SVOC	**Total SVOC**	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Table 1
Soil Analytical Results Summary
Sydney International Convention and Entertainment Centre

Group	ChemName	Units	EQL	Assessment Criteria	BH11 0.5m	BH11 1.0m	BH12 0.5	BH12 1.0	BH12 1.5	BH12 2.0	BH12 3.0	BH12 4.5	BH13 1.0	BH13 1.5	BH13 2.5	BH13 4.0	BH13 5.5	BH14_2.5	BH14_5.5	BH15_(1.0-1.1m)	BH15_(2.5-2.6m)
				Date	1/06/2011	1/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011	9/06/2011	17/06/2011	17/06/2011	21/06/2011	21/06/2011
				Laboratory Batch	SE100639-1	SE100639-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100700-1	SE100711-1	SE100711-1	SE100739-1	SE100739-1
Asbestos	Asbestos				-	ND	ND	-	ND	-	-	-	ND	D	D	-	-	ND	-	ND	ND
TRH	TPH C6 - C9	mg/kg	20	65 [1]	<20	<20	-	<20	<20	<20	-	-	-	<20	-	<20	-	<20	<20	<20	<20
	TPH C10 - C14	mg/kg	20		28	23	-	<20	<20	<20	-	-	-	<20	-	<20	-	<20	<20	<20	<20
	TPH C15 - C28	mg/kg	50		1200	430	-	190	130	<50	-	-	-	<50	-	<50	-	<50	<50	<50	<50
	TPH C29-C36	mg/kg	50		620	260	-	150	100	<50	-	-	-	<50	-	<50	-	<50	<50	<50	<50
	TPH+C10 - C36	mg/kg		1000 [1]	1848	713	-	340	230	<120	-	-	-	<120	-	<120	-	<120	<120	<120	<120
BTEX	Benzene	mg/kg	0.1	1 [1]	<1	<0.1	-	<0.1	<1	<0.1	-	-	-	<0.1	-	<1	-	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1	3.1 [1]	<1	<0.1	-	<0.1	<1	<0.1	-	-	-	<0.1	-	<1	-	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1	1.4 [1]	<1	<0.1	-	<0.1	<1	<0.1	-	-	-	<0.1	-	<1	-	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	1		<2	<1	-	<1	<2	<1	-	-	-	<1	-	<2	-	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5		<1	<0.5	-	<0.5	<1	<0.5	-	-	-	<0.5	-	<1	-	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	0.3	14 [1]	<3	<0.3	-	<0.3	<3	<0.3	-	-	-	<0.3	-	<3	-	<0.3	<0.3	<0.3	<0.3
Metals	Arsenic	mg/kg	3	500 [2]	5	<3	5	<3	6	5	8	-	-	10	-	180	-	7	6	6	11
	Cadmium	mg/kg	0.3	100 [2]	0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	-	-	0.8	-	<0.3	-	0.5	0.5	<0.3	0.5
	Chromium (III+VI)	mg/kg	0.3	600000 [2]	16	20	13	13	14	11	16	-	-	9.3	-	17	-	18	14	12	31
	Copper	mg/kg	0.5	5000 [2]	34	18	13	39	36	3.8	5.1	-	-	70	-	11	-	120	9.4	61	79
	Lead	mg/kg	1	1500 [2]	74	21	34	31	240	24	13	-	-	140	-	49	-	170	19	110	300
	Nickel	mg/kg	0.5	3000 [2]	4.6	5.1	9.3	13	7.8	1	1.7	-	-	6.2	-	11	-	14	6.8	3.7	14
	Zinc	mg/kg	0.5	35000 [2]	77	160	83	64	92	380	520	-	-	730	-	18	-	340	130	100	100
	Mercury	mg/kg	0.05	75 [2]	0.12	0.09	0.1	0.11	0.19	<0.05	<0.05	-	-	0.45	-	0.21	-	1	0.06	0.74	2.2
PAH	Benzo(a) pyrene	mg/kg	0.05	5 [2]	-	7	0.63	3.2	1.9	<0.05	<0.05	-	-	0.88	-	<0.05	-	0.29	-	0.06	<0.05
	PAHs (Sum of total)	mg/kg	1.75	100 [2]	-	110	5.6	29	17	<1.75	<1.75	-	-	6.5	-	<1.75	-	4.2	-	<1.75	<1.75
VOC	**Total VOC**	mg/kg			<LOR	-	-	-	<LOR	-	-	-	-	-	-	<LOR	-	-	-	-	-
SVOC	**Total SVOC**	mg/kg			<LOR	-	-	-	<LOR	-	-	-	-	-	-	-	-	-	-	-	-

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Soil Analytical Results Summary
Sydney International Convention and Entertainment Centre

Group	ChemName	Units	EQL	Assessment Criteria	BH15_(4.0-4.1m)	BH15_(7.5-7.6m)	BH17_1-1.1	BH17_2-2.1	BH17_5-5.1	BH17_8-8.1	EB1/1.0-1.1	EB1/1.4-1.5	EB1/2.0-2.1	EB1/3.0-3.1	EB2/0.5-0.6	EB2/2.0-2.1	EB3/0.5	EB3/1.0-1.1	EB3/1.6-1.7	EB3/2.0-2.1	EB3/3.0-3.1
				Date	21/06/2011	21/06/2011	16/06/2011	16/06/2011	16/06/2011	16/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2011
				Laboratory Batch	SE100739-1	SE100739-1	SE100735-1	SE100735-1	SE100735-1	SE100735-1	SE100692-1	SE100692-1	SE100692-1	SE100692-1	SE100692-1	SE100692-1	SE100692-1	SE100692-1	SE100692-1	SE100692-1	SE100692-1
Asbestos	Asbestos				-	-	ND	ND	-	-	ND	ND	ND	-	ND	-	ND	ND	ND	ND	-
TRH	TPH C6 - C9	mg/kg	20	65 [1]	-	-	<20	<20	<20	<20	-	<20	<20	<20	<20	<20	-	<20	<20	<20	<20
	TPH C10 - C14	mg/kg	20		-	-	<20	<20	<20	<20	-	130	<20	<20	<20	<20	-	<20	<20	<20	<20
	TPH C15 - C28	mg/kg	50		-	-	<50	<50	<50	<50	-	4300	290	310	170	<50	-	320	<50	<50	<50
	TPH C29-C36	mg/kg	50		-	-	<50	<50	<50	<50	-	1900	150	140	130	<50	-	190	<50	<50	<50
	TPH+C10 - C36	mg/kg		1000 [1]	-	-	<120	<120	<120	<120	-	4620	440	450	300	<120	-	510	<120	<120	<120
BTEX	Benzene	mg/kg	0.1	1 [1]	-	-	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1	3.1 [1]	-	-	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1	1.4 [1]	-	-	<0.1	<0.1	<0.1	<0.1	-	-	-	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	1		-	-	<1	<1	<1	<1	-	-	-	<1	<1	<1	-	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5		-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	0.3	14 [1]	-	-	<0.3	<0.3	<0.3	<0.3	-	-	-	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3
Metals	Arsenic	mg/kg	3	500 [2]	-	-	6	7	<3	16	-	13	6	8	9	7	-	13	6	5	-
	Cadmium	mg/kg	0.3	100 [2]	-	-	0.6	0.6	<0.3	0.5	-	0.5	<0.3	<0.3	0.3	<0.3	-	<0.3	<0.3	<0.3	-
	Chromium (III+VI)	mg/kg	0.3	600000 [2]	-	-	14	11	9.5	13	-	29	15	13	9.7	13	-	18	9.5	15	-
	Copper	mg/kg	0.5	5000 [2]	-	-	72	46	7.3	8.6	-	98	30	15	320	18	-	110	7.3	12	-
	Lead	mg/kg	1	1500 [2]	-	-	240	140	15	13	-	540	75	31	190	32	-	310	23	31	-
	Nickel	mg/kg	0.5	3000 [2]	-	-	6.7	2.7	3.5	2.5	-	26	6.5	1.9	13	3.5	-	11	1.3	4.6	-
	Zinc	mg/kg	0.5	35000 [2]	-	-	340	110	19	27	-	460	89	22	270	32	-	190	12	17	-
	Mercury	mg/kg	0.05	75 [2]	-	-	4.9	0.44	0.07	<0.05	-	1.2	0.22	0.05	0.64	1	-	0.68	<0.05	0.07	-
PAH	Benzo(a) pyrene	mg/kg	0.05	5 [2]	-	-	<0.05	<0.05	-	-	-	74	4.3	<0.05	3.2	0.35	-	3.9	0.15	0.25	<0.05
	PAHs (Sum of total)	mg/kg	1.75	100 [2]	-	-	<1.75	<1.75	-	-	-	1400	70	3	35	4.7	-	58	<1.75	3.8	<1.75
VOC	**Total VOC**	mg/kg			-	-	-	-	-	-	-	<LOR	<LOR	-	-	-	-	-	-	-	-
SVOC	**Total SVOC**	mg/kg			-	-	-	-	-	-	-	<LOR	<LOR	-	-	-	-	-	-	-	-

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Parameter	Units	LOR	Sample Number: SE100692.001 Sample Matrix: Soil Sample Date: 10 Jun 2011 Sample Name: EB1/1.0-1.1	SE100692.002 Soil 10 Jun 2011 EB1/1.4-1.5	SE100692.003 Soil 10 Jun 2011 EB1/2.0-2.1	SE100692.004 Soil 10 Jun 2011 EB1/3.0-3.1	SE100692.005 Soil 10 Jun 2011 EB2/0.5-0.6
VOC's in Soil Method: AN433/AN434							
Fumigants							
2,2-dichloropropane	mg/kg	0.1	-	<0.1	<0.1	-	-
1,2-dichloropropane	mg/kg	0.1	-	<0.1	<0.1	-	-
cis-1,3-dichloropropene	mg/kg	0.1	-	<0.1	<0.1	-	-
trans-1,3-dichloropropene	mg/kg	0.1	-	<0.1	<0.1	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	<0.1	<0.1	-	-
Halogenated Aliphatics							
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	<1	<1	-	-
Chloromethane	mg/kg	1	-	<1	<1	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	<0.1	<0.1	-	-
Bromomethane	mg/kg	1	-	<1	<1	-	-
Chloroethane	mg/kg	1	-	<1	<1	-	-
Trichlorofluoromethane	mg/kg	1	-	<1	<1	-	-
Iodomethane	mg/kg	5	-	<5	<5	-	-
1,1-dichloroethene	mg/kg	0.1	-	<0.1	<0.1	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	<0.5	<0.5	-	-
Allyl chloride	mg/kg	0.1	-	<0.1	<0.1	-	-
trans-1,2-dichloroethene	mg/kg	0.1	-	<0.1	<0.1	-	-
1,1-dichloroethane	mg/kg	0.1	-	<0.1	<0.1	-	-
cis-1,2-dichloroethene	mg/kg	0.1	-	<0.1	<0.1	-	-
Bromochloromethane	mg/kg	0.1	-	<0.1	<0.1	-	-
1,2-dichloroethane	mg/kg	0.1	-	<0.1	<0.1	-	-
1,1,1-trichloroethane	mg/kg	0.1	-	<0.1	<0.1	-	-
1,1-dichloropropene	mg/kg	0.1	-	<0.1	<0.1	-	-
Carbon tetrachloride	mg/kg	0.1	-	<0.1	<0.1	-	-
Dibromomethane	mg/kg	0.1	-	<0.1	<0.1	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	<0.1	<0.1	-	-
1,1,2-trichloroethane	mg/kg	0.1	-	<0.1	<0.1	-	-
1,3-dichloropropane	mg/kg	0.1	-	<0.1	<0.1	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	<0.1	<0.1	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	<0.1	<0.1	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	<1	<1	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	<0.1	<0.1	-	-
1,2,3-trichloropropane	mg/kg	0.1	-	<0.1	<0.1	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	<1	<1	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	<0.1	<0.1	-	-
Hexachlorobutadiene	mg/kg	0.1	-	<0.1	<0.1	-	-
Halogenated Aromatics							
Chlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
Bromobenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
2-chlorotoluene	mg/kg	0.1	-	<0.1	<0.1	-	-
4-chlorotoluene	mg/kg	0.1	-	<0.1	<0.1	-	-
1,3-dichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
1,4-dichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
1,2-dichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1	-	<0.1	<0.1	-	-
Toluene	mg/kg	0.1	-	<0.1	<0.1	-	-
Ethylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
m/p-xylene	mg/kg	0.2	-	<0.2	<0.2	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	<0.1	<0.1	-	-
o-xylene	mg/kg	0.1	-	<0.1	<0.1	-	-
Isopropylbenzene (Cumene)	mg/kg	0.1	-	<0.1	<0.1	-	-
n-propylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	-

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Sample Matrix			Soil	Soil	Soil	Soil	Soil
Sample Date			10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011
Sample Name			EB1/1.0-1.1	EB1/1.4-1.5	EB1/2.0-2.1	EB1/3.0-3.1	EB2/0.5-0.6

VOC's in Soil Method: AN433/AN434 (continued)

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
1,3,5-trimethylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
tert-butylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
sec-butylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	-
p-isopropyltoluene	mg/kg	0.1	-	<0.1	<0.1	-	-
n-butylbenzene	mg/kg	0.1	-	<0.1	<0.1	-	-

Nitrogenous Compounds

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Acrylonitrile	mg/kg	0.1	-	<0.1	<0.1	-	-

Oxygenated Compounds

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Acetone (2-propanone)	mg/kg	10	-	<10	<10	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.5	-	<0.5	<0.5	-	-
Vinyl acetate	mg/kg	10	-	<10	<10	-	-
MEK (2-butanone)	mg/kg	10	-	<10	<10	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	<1	<1	-	-
2-hexanone (MBK)	mg/kg	5	-	<5	<5	-	-

Polycyclic VOCs

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Naphthalene	mg/kg	0.1	-	**3.7**	**0.4**	-	-

Sulphonated Compounds

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Carbon disulfide	mg/kg	0.5	-	<0.5	<0.5	-	-

Surrogates

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Dibromofluoromethane (Surrogate)	%	-	-	**89**	**91**	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	**100**	**101**	-	-
d8-toluene (Surrogate)	%	-	-	**102**	**103**	-	-
Bromofluorobenzene (Surrogate)	%	-	-	**83**	**85**	-	-

Totals

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Total Xylenes*	mg/kg	0.3	-	<0.3	<0.3	-	-
Total BTEX*	mg/kg	-	-	**0**	**0**	-	-
Total VOC*	mg/kg	24	-	-	-	-	-

Trihalomethanes

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Chloroform	mg/kg	0.1	-	<0.1	<0.1	-	-
Bromodichloromethane	mg/kg	0.1	-	<0.1	<0.1	-	-
Chlorodibromomethane	mg/kg	0.1	-	<0.1	<0.1	-	-
Bromoform	mg/kg	0.1	-	<0.1	<0.1	-	-

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
TRH C6-C9	mg/kg	20	-	<20	<20	<20	<20
Benzene	mg/kg	0.1	-	-	-	<0.1	<0.1
Toluene	mg/kg	0.1	-	-	-	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	-	-	-	<0.1	<0.1
m/p-xylene	mg/kg	1	-	-	-	<1	<1
o-xylene	mg/kg	0.5	-	-	-	<0.5	<0.5
Total Xylenes	mg/kg	0.3	-	-	-	<0.3	<0.3
Total BTEX*	mg/kg	2.7	-	-	-	<2.7	<2.7

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Sample Matrix			Soil	Soil	Soil	Soil	Soil
Sample Date			10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011
Sample Name			EB1/1.0-1.1	EB1/1.4-1.5	EB1/2.0-2.1	EB1/3.0-3.1	EB2/0.5-0.6

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434 (continued)

Surrogates

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Trifluorotoluene (Surrogate)	%	-	-	98	119	127	117
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
TRH C10-C14	mg/kg	20	-	130	<20	<20	<20
TRH C15-C28	mg/kg	50	-	4300	290	310	170
TRH C29-C36	mg/kg	50	-	1900	150	140	130

Surrogates

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
TRH (Surrogate)	%	-	-	-	-	-	-

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Naphthalene	mg/kg	0.1	-	9.8	0.6	0.6	0.3
Acenaphthylene	mg/kg	0.1	-	1.1	<0.1	<0.1	0.4
Acenaphthene	mg/kg	0.1	-	35	1.6	2.4	0.2
Fluorene	mg/kg	0.1	-	50	2.2	<0.1	0.4
Phenanthrene	mg/kg	0.1	-	370	15	<0.1	3.2
Anthracene	mg/kg	0.1	-	69	3.2	<0.1	1.0
Fluoranthene	mg/kg	0.1	-	220	13	<0.1	5.2
Pyrene	mg/kg	0.1	-	220	12	<0.1	5.4
Benzo(a)anthracene	mg/kg	0.1	-	160	8.7	<0.1	4.0
Chrysene	mg/kg	0.1	-	98	4.5	<0.1	1.9
Benzo(b)fluoranthene	mg/kg	0.1	-	110	6.6	<0.1	4.3
Benzo(k)fluoranthene	mg/kg	0.1	-	34	1.3	<0.1	1.2
Benzo(a)pyrene	mg/kg	0.05	-	74	4.3	<0.05	3.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	-	32	2.2	<0.1	1.9
Dibenzo(a&h)anthracene	mg/kg	0.1	-	12	0.8	<0.1	0.5
Benzo(ghi)perylene	mg/kg	0.1	-	38	2.3	<0.1	1.9
Total PAH	mg/kg	1.75	-	1400	70	3.0	35

Surrogates

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
d5-nitrobenzene (Surrogate)	%	-	-	160	121	0	126
2-fluorobiphenyl (Surrogate)	%	-	-	168	112	0	116
d14-p-terphenyl (Surrogate)	%	-	-	249	122	0	123

Full 8270 SVOC in Soil Method: AN420

PAHs

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
Acenaphthene	mg/kg	0.5	-	54	4.2	-	-
Acenaphthylene	mg/kg	0.5	-	1.0	<0.5	-	-
Anthracene	mg/kg	0.5	-	110	8.8	-	-
Benzo(a)anthracene	mg/kg	0.5	-	260	14	-	-
Benzo(b&k)fluoranthene	mg/kg	1	-	340	18	-	-
Benzo(b)fluoranthene	mg/kg	0.5	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.5	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.5	-	62	7.2	-	-
Benzo(a)pyrene	mg/kg	0.5	-	200	11	-	-
Chrysene	mg/kg	0.5	-	300	16	-	-
Dibenzo(ah)anthracene	mg/kg	0.5	-	19	1.6	-	-
Fluoranthene	mg/kg	0.5	-	570	30	-	-
Fluorene	mg/kg	0.5	-	68	5.5	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.5	-	60	5.9	-	-
1-methylnaphthalene	mg/kg	0.5	-	25	2.0	-	-
2-methylnaphthalene	mg/kg	0.5	-	26	2.1	-	-
Naphthalene	mg/kg	0.5	-	15	1.8	-	-

Parameter	Units	LOR	Sample Number: SE100692.001 Sample Matrix: Soil Sample Date: 10 Jun 2011 Sample Name: EB1/1.0-1.1	SE100692.002 Soil 10 Jun 2011 EB1/1.4-1.5	SE100692.003 Soil 10 Jun 2011 EB1/2.0-2.1	SE100692.004 Soil 10 Jun 2011 EB1/3.0-3.1	SE100692.005 Soil 10 Jun 2011 EB2/0.5-0.6

Full 8270 SVOC in Soil Method: AN420 (continued)

Phenanthrene	mg/kg	0.5	-	**580**	**31**	-	-
Pyrene	mg/kg	0.5	-	**540**	**29**	-	-
2-acetylamino fluorene	mg/kg	2	-	<2	<2	-	-
7,12-dimethyl-benz(a)anthracene	mg/kg	0.5	-	<0.5	<0.5	-	-
3-methylcholanthrene	mg/kg	1	-	<1	<1	-	-

OCs

Aldrin	mg/kg	0.5	-	<0.5	<0.5	-	-
Alpha-BHC	mg/kg	0.5	-	<0.5	<0.5	-	-
Beta-BHC	mg/kg	0.5	-	<0.5	<0.5	-	-
Delta-BHC	mg/kg	0.5	-	<0.5	<0.5	-	-
Gamma-BHC (Lindane)	mg/kg	0.5	-	<0.5	<0.5	-	-
p,p-DDD	mg/kg	0.5	-	<0.5	<0.5	-	-
p,p-DDE	mg/kg	0.5	-	<0.5	<0.5	-	-
p,p-DDT	mg/kg	0.5	-	<0.5	<0.5	-	-
Dieldrin	mg/kg	0.5	-	<0.5	<0.5	-	-
Alpha-endosulfan	mg/kg	0.5	-	<0.5	<0.5	-	-
Beta-endosulfan	mg/kg	0.5	-	<0.5	<0.5	-	-
Endosulfan sulphate	mg/kg	0.5	-	<0.5	<0.5	-	-
Endrin	mg/kg	0.5	-	<0.5	<0.5	-	-
Heptachlor	mg/kg	0.5	-	<0.5	<0.5	-	-
Heptachlor epoxide	mg/kg	0.5	-	<0.5	<0.5	-	-
Isodrin	mg/kg	0.5	-	<0.5	<0.5	-	-
Methoxychlor	mg/kg	0.5	-	<0.5	<0.5	-	-
Mirex	mg/kg	0.5	-	<0.5	<0.5	-	-
Alpha-chlordane	mg/kg	0.5	-	<0.5	<0.5	-	-
Gamma-chlordane	mg/kg	0.5	-	<0.5	<0.5	-	-
Endrin ketone	mg/kg	0.5	-	<0.5	<0.5	-	-

OPs

Azinphos-methyl (Guthion)	mg/kg	1	-	<1	<1	-	-
Bromophos ethyl	mg/kg	1	-	<1	<1	-	-
Carbophenothion	mg/kg	1	-	<1	<1	-	-
Chlorfenvinphos-cis (Chlofenvinphos-cis)	mg/kg	5	-	<5	<5	-	-
Chlorfenvinphos-trans (Chlofenvinphos-trans)	mg/kg	1	-	<1	<1	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	1	-	<1	<1	-	-
Chlorpyrifos-methyl	mg/kg	1	-	<1	<1	-	-
Co-Ral (Coumaphos)	mg/kg	1	-	<1	<1	-	-
Diazinon (Dimpylate)	mg/kg	1	-	<1	<1	-	-
Dichlorvos	mg/kg	1	-	<1	<1	-	-
Demeton-S-methyl	mg/kg	1	-	<1	<1	-	-
Dimethoate	mg/kg	1	-	<1	<1	-	-
Disulfoton (Di-syston)	mg/kg	1	-	<1	<1	-	-
EPN*	mg/kg	1	-	<1	<1	-	-
Ethion	mg/kg	1	-	<1	<1	-	-
Ethoprophos (ethoprop or prophos)	mg/kg	1	-	<1	<1	-	-
Famphur (Famophos)	mg/kg	1	-	<1	<1	-	-
Fenamiphos (Phenamiphos)	mg/kg	1	-	<1	<1	-	-
Fenchlorophos (Ronnel)	mg/kg	1	-	<1	<1	-	-
Fenitrothion	mg/kg	1	-	<1	<1	-	-
Fenthion	mg/kg	1	-	<1	<1	-	-
Malathion (Maldison)	mg/kg	1	-	<1	<1	-	-
Methidathion	mg/kg	1	-	<1	<1	-	-
Mevinphos-cis/trans	mg/kg	2	-	<2	<2	-	-
o,o,o-triethyl phosphorothioate	mg/kg	1	-	<1	<1	-	-
Parathion ethyl (Parathion)	mg/kg	1	-	<1	<1	-	-
Parathion methyl	mg/kg	1	-	<1	<1	-	-
Phorate	mg/kg	1	-	<1	<1	-	-
Pirimiphos-ethyl	mg/kg	1	-	<1	<1	-	-

Parameter	Units	LOR	SE100692.001 Soil 10 Jun 2011 EB1/1.0-1.1	SE100692.002 Soil 10 Jun 2011 EB1/1.4-1.5	SE100692.003 Soil 10 Jun 2011 EB1/2.0-2.1	SE100692.004 Soil 10 Jun 2011 EB1/3.0-3.1	SE100692.005 Soil 10 Jun 2011 EB2/0.5-0.6
Full 8270 SVOC in Soil Method: AN420 (continued)							
Pirimiphos-methyl	mg/kg	1	-	<1	<1	-	-
Profenofos	mg/kg	1	-	<1	<1	-	-
Prothiophos (Tokuthion)*	mg/kg	1	-	<1	<1	-	-
Sulfotepp	mg/kg	1	-	<1	<1	-	-
Tetrachlorvinphos (Stirophos)*	mg/kg	1	-	<1	<1	-	-
PCB UPAC(7) Congeners							
PCB Congener C28	mg/kg	0.5	-	<0.5	<0.5	-	-
PCB Congener C52	mg/kg	0.5	-	<0.5	<0.5	-	-
PCB Congener C101	mg/kg	0.5	-	<0.5	<0.5	-	-
PCB Congener C118	mg/kg	0.5	-	<0.5	<0.5	-	-
PCB Congener C138	mg/kg	0.5	-	<0.5	<0.5	-	-
PCB Congener C153	mg/kg	0.5	-	<0.5	<0.5	-	-
PCB Congener C180	mg/kg	0.5	-	<0.5	<0.5	-	-
SVCH (Cl Benzenes, Hydrocarbons & VOCs)							
Hexachlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	-
1,2-dichlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	-
1,3-dichlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	-
1,4-dichlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	-
Hexachlorobutadiene	mg/kg	0.5	-	<0.5	<0.5	-	-
Hexachlorocyclopentadiene	mg/kg	1	-	<1	<1	-	-
Hexachloroethane	mg/kg	0.5	-	<0.5	<0.5	-	-
Hexachloroproprene	mg/kg	0.5	-	<0.5	<0.5	-	-
Pentachlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	-
Pentachloroethane	mg/kg	0.5	-	<0.5	<0.5	-	-
1,2,3,5 and 1,2,4,5 -tetrachlorobenzene	mg/kg	1	-	<1	<1	-	-
1,2,3,4-tetrachlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	-
1/2-Chloronaphthalene	mg/kg	1	-	<1	<1	-	-
1,2,4-trichlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	-

Parameter	Units	LOR	SE100692.001	SE100692.002	SE100692.003	SE100692.004	SE100692.005
		Sample Matrix	Soil	Soil	Soil	Soil	Soil
		Sample Date	10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011
		Sample Name	EB1/1.0-1.1	EB1/1.4-1.5	EB1/2.0-2.1	EB1/3.0-3.1	EB2/0.5-0.6
Full 8270 SVOC in Soil Method: AN420 (continued)							
Phthalates							
Bis(2-ethylhexyl)phthalate	mg/kg	5	-	<5	<5	-	-
Bis(2-ethylhexyl)adipate	mg/kg	0.5	-	<0.5	<0.5	-	-
Butyl benzyl phthalate	mg/kg	0.5	-	<0.5	<0.5	-	-
Di-n-butyl phthalate	mg/kg	0.5	-	<0.5	<0.5	-	-
Diethyl phthalate	mg/kg	0.5	-	<0.5	<0.5	-	-
Dimethyl phthalate	mg/kg	0.5	-	<0.5	<0.5	-	-
Dioctyl phthalate	mg/kg	0.5	-	<0.5	<0.5	-	-
Carbamates							
Carbofuran	mg/kg	0.5	-	<0.5	<0.5	-	-
Carbaryl	mg/kg	0.5	-	<0.5	<0.5	-	-
Herbicides (normal)							
Trifluralin	mg/kg	0.5	-	<0.5	<0.5	-	-
Nitrosamines							
N-nitroso-di-n-butylamine (NDBA)	mg/kg	0.5	-	<0.5	<0.5	-	-
N-nitroso-diethylamine (NDEA)	mg/kg	1	-	<1	<1	-	-
N-nitroso-di-n-propylamine (NDPA)	mg/kg	0.5	-	<0.5	<0.5	-	-
N-nitroso-morpholine (NMOR)	mg/kg	0.5	-	<0.5	<0.5	-	-
N-nitroso-piperidine (NPIP)	mg/kg	0.5	-	<0.5	<0.5	-	-
N-nitroso-pyrrolidine (NPYR)	mg/kg	1	-	<1	<1	-	-
4-amino biphenyl	mg/kg	1	-	<1	<1	-	-
Nitroaromatics and Ketones							
Acetophenone	mg/kg	0.5	-	<0.5	<0.5	-	-
1,3-dinitrobenzene	mg/kg	1	-	<1	<1	-	-
2,4-dinitrotoluene	mg/kg	0.5	-	<0.5	<0.5	-	-
2,6-dinitrotoluene	mg/kg	0.5	-	<0.5	<0.5	-	-
Isophorone	mg/kg	0.5	-	<0.5	<0.5	-	-
Nitrobenzene	mg/kg	0.5	-	<0.5	<0.5	-	-
p-(dimethylamino) azobenzene	mg/kg	1	-	<1	<1	-	-
Phenacetin	mg/kg	1	-	<1	<1	-	-
Pentachloronitrobenzene (quintozene)	mg/kg	0.5	-	<0.5	<0.5	-	-
Anilines and Amines							
Aniline	mg/kg	3	-	<3	<3	-	-
4-chloroaniline	mg/kg	1	-	<1	<1	-	-
2-nitroaniline	mg/kg	1	-	<1	<1	-	-
3-nitroaniline	mg/kg	1	-	<1	<1	-	-
4-nitroaniline	mg/kg	1	-	<1	<1	-	-
Diphenylamine	mg/kg	0.5	-	<0.5	<0.5	-	-
o-toluidine	mg/kg	1	-	<1	<1	-	-
5-nitro-o-toluidine	mg/kg	1	-	<1	<1	-	-
1-naphthylamine	mg/kg	1	-	<1	<1	-	-
2-naphthylamine	mg/kg	1	-	<1	<1	-	-
Haloethers							
Bis(2-chloroethoxy) methane	mg/kg	0.5	-	<0.5	<0.5	-	-
Bis(2-chloroethyl) ether	mg/kg	0.5	-	<0.5	<0.5	-	-
Bis(2-chloroisopropyl) ether	mg/kg	0.5	-	<0.5	<0.5	-	-
4-chlorophenyl phenyl ether	mg/kg	0.5	-	<0.5	<0.5	-	-
4-bromophenyl phenyl ether	mg/kg	0.5	-	<0.5	<0.5	-	-

Parameter	Units	LOR	SE100692.001 Soil 10 Jun 2011 EB1/1.0-1.1	SE100692.002 Soil 10 Jun 2011 EB1/1.4-1.5	SE100692.003 Soil 10 Jun 2011 EB1/2.0-2.1	SE100692.004 Soil 10 Jun 2011 EB1/3.0-3.1	SE100692.005 Soil 10 Jun 2011 EB2/0.5-0.6

Full 8270 SVOC in Soil Method: AN420 (continued)

Other SVOCs

Methyl methanesulfonate	mg/kg	1	-	<1	<1	-	-
Ethyl methanesulfonate	mg/kg	1	-	<1	<1	-	-
Dibenzofuran	mg/kg	0.5	-	31	2.5	-	-
Benzyl alcohol	mg/kg	1	-	<1	<1	-	-
Safrole	mg/kg	0.5	-	<0.5	<0.5	-	-
Isosafrole Isomer 1	mg/kg	1	-	<1	<1	-	-
Isosafrole Isomer 2	mg/kg	1	-	<1	<1	-	-
1,4-naphthoquinone	mg/kg	0.5	-	<0.5	<0.5	-	-
Thionazin	mg/kg	1	-	<1	<1	-	-

Speciated Routine Phenols

3/4-methyl phenol (m/p-cresol)	mg/kg	1	-	<2↑	<1	-	-
2-methyl phenol (o-cresol)	mg/kg	0.5	-	<0.5	<0.5	-	-
2,6-dichlorophenol	mg/kg	0.5	-	<0.5	<0.5	-	-
2,3,4,6 and 2,3,5,6-tetrachlorophenol	mg/kg	1	-	<1	<1	-	-
2,4,5-trichlorophenol	mg/kg	0.5	-	<0.5	<0.5	-	-
4-chloro-3-methylphenol	mg/kg	1	-	<1	<1	-	-
2-chlorophenol	mg/kg	0.5	-	<0.5	<0.5	-	-
2,4-dichlorophenol	mg/kg	0.5	-	<0.5	<0.5	-	-
2,4-dimethyl phenol	mg/kg	0.5	-	<0.8↑	<0.5	-	-
2-nitrophenol	mg/kg	0.5	-	<0.5	<0.5	-	-
Phenol	mg/kg	0.5	-	<0.6↑	<0.5	-	-
2,4,6-trichlorophenol	mg/kg	0.5	-	1.0	<0.5	-	-
Pentachlorophenol	mg/kg	0.5	-	<0.5	<0.5	-	-
4-nitrophenol	mg/kg	0.5	-	<0.5	<0.5	-	-

Surrogates

d5-phenol (Surrogate)	%	-	-	103	110	-	-
d5-nitrobenzene (Surrogate)	%	-	-	94	103	-	-
2-fluorobiphenyl (Surrogate)	%	-	-	94	102	-	-
2,4,6-tribromophenol (Surrogate)	%	-	-	94	118	-	-
d14-p-terphenyl (Surrogate)	%	-	-	114	104	-	-

Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320

Arsenic, As	mg/kg	3	-	13	6	8	9
Cadmium, Cd	mg/kg	0.3	-	0.5	<0.3	<0.3	0.3
Chromium, Cr	mg/kg	0.3	-	29	15	13	9.7
Copper, Cu	mg/kg	0.5	-	98	30	15	320
Lead, Pb	mg/kg	1	-	540	75	31	190
Nickel, Ni	mg/kg	0.5	-	26	6.5	1.9	13
Zinc, Zn	mg/kg	0.5	-	460	89	22	270

Mercury in Soil Method: AN312

Mercury	mg/kg	0.05	-	1.2	0.22	0.05	0.64

Fibre Identification in soil Method: AN602

FibreID

Asbestos Detected	No unit	-	No	No	No	-	No

Parameter	Units	LOR	Sample Number: SE100692.001 / Sample Matrix: Soil / Sample Date: 10 Jun 2011 / Sample Name: EB1/1.0-1.1	SE100692.002 / Soil / 10 Jun 2011 / EB1/1.4-1.5	SE100692.003 / Soil / 10 Jun 2011 / EB1/2.0-2.1	SE100692.004 / Soil / 10 Jun 2011 / EB1/3.0-3.1	SE100692.005 / Soil / 10 Jun 2011 / EB2/0.5-0.6
Moisture Content Method: AN234							
% Moisture	%	0.5	-	20	17	18	13
Volatile Petroleum Hydrocarbons in Water Method: AN433/AN434							
TRH C6-C9	mg/L	0.04	-	-	-	-	-
Benzene	µg/L	0.5	-	-	-	-	-
Toluene	µg/L	0.5	-	-	-	-	-
Ethylbenzene	µg/L	0.5	-	-	-	-	-
m/p-xylene	µg/L	1	-	-	-	-	-
o-xylene	µg/L	0.5	-	-	-	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	2	-	-	-	-	-
Total BTEX*	µg/L	3	-	-	-	-	-
Total Xylenes*	µg/L	1.5	-	-	-	-	-
Surrogates							
Trifluorotoluene (Surrogate)	%	-	-	-	-	-	-
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-

Parameter	Units	LOR	Sample Number: SE100692.006 / Sample Matrix: Soil / Sample Date: 10 Jun 2011 / Sample Name: EB2/2.0-2.1	SE100692.007 / Soil / 10 Jun 2011 / EB3/0.5-0.6	SE100692.008 / Soil / 10 Jun 2011 / EB3/1.0-1.1	SE100692.009 / Soil / 10 Jun 2011 / EB3/1.6-1.7	SE100692.010 / Soil / 10 Jun 2011 / EB3/2.0-2.1
VOC's in Soil Method: AN433/AN434							
Fumigants							
2,2-dichloropropane	mg/kg	0.1	-	-	-	-	-
1,2-dichloropropane	mg/kg	0.1	-	-	-	-	-
cis-1,3-dichloropropene	mg/kg	0.1	-	-	-	-	-
trans-1,3-dichloropropene	mg/kg	0.1	-	-	-	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	-	-	-	-
Halogenated Aliphatics							
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	-	-	-	-
Chloromethane	mg/kg	1	-	-	-	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	-	-	-	-
Bromomethane	mg/kg	1	-	-	-	-	-
Chloroethane	mg/kg	1	-	-	-	-	-
Trichlorofluoromethane	mg/kg	1	-	-	-	-	-
Iodomethane	mg/kg	5	-	-	-	-	-
1,1-dichloroethene	mg/kg	0.1	-	-	-	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	-	-	-	-
Allyl chloride	mg/kg	0.1	-	-	-	-	-
trans-1,2-dichloroethene	mg/kg	0.1	-	-	-	-	-
1,1-dichloroethane	mg/kg	0.1	-	-	-	-	-
cis-1,2-dichloroethene	mg/kg	0.1	-	-	-	-	-
Bromochloromethane	mg/kg	0.1	-	-	-	-	-
1,2-dichloroethane	mg/kg	0.1	-	-	-	-	-
1,1,1-trichloroethane	mg/kg	0.1	-	-	-	-	-
1,1-dichloropropene	mg/kg	0.1	-	-	-	-	-
Carbon tetrachloride	mg/kg	0.1	-	-	-	-	-
Dibromomethane	mg/kg	0.1	-	-	-	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	-	-	-	-
1,1,2-trichloroethane	mg/kg	0.1	-	-	-	-	-
1,3-dichloropropane	mg/kg	0.1	-	-	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	-	-	-	-

Parameter	Units	LOR	Sample Number SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
		Sample Matrix	Soil	Soil	Soil	Soil	Soil
		Sample Date	10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011
		Sample Name	EB2/2.0-2.1	EB3/0.5-0.6	EB3/1.0-1.1	EB3/1.6-1.7	EB3/2.0-2.1

VOC's in Soil Method: AN433/AN434 (continued)

1,1,1,2-tetrachloroethane	mg/kg	0.1	-	-	-	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	-	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	-	-	-	-
1,2,3-trichloropropane	mg/kg	0.1	-	-	-	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	-	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	-	-	-	-	-

Halogenated Aromatics

Chlorobenzene	mg/kg	0.1	-	-	-	-	-
Bromobenzene	mg/kg	0.1	-	-	-	-	-
2-chlorotoluene	mg/kg	0.1	-	-	-	-	-
4-chlorotoluene	mg/kg	0.1	-	-	-	-	-
1,3-dichlorobenzene	mg/kg	0.1	-	-	-	-	-
1,4-dichlorobenzene	mg/kg	0.1	-	-	-	-	-
1,2-dichlorobenzene	mg/kg	0.1	-	-	-	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	-	-	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	-	-	-	-

Monocyclic Aromatic Hydrocarbons

Benzene	mg/kg	0.1	-	-	-	-	-
Toluene	mg/kg	0.1	-	-	-	-	-
Ethylbenzene	mg/kg	0.1	-	-	-	-	-
m/p-xylene	mg/kg	0.2	-	-	-	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	-	-	-	-
o-xylene	mg/kg	0.1	-	-	-	-	-
Isopropylbenzene (Cumene)	mg/kg	0.1	-	-	-	-	-
n-propylbenzene	mg/kg	0.1	-	-	-	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	-	-	-	-
tert-butylbenzene	mg/kg	0.1	-	-	-	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	-	-	-	-
sec-butylbenzene	mg/kg	0.1	-	-	-	-	-
p-isopropyltoluene	mg/kg	0.1	-	-	-	-	-
n-butylbenzene	mg/kg	0.1	-	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE100692.006 Soil 10 Jun 2011 EB2/2.0-2.1	SE100692.007 Soil 10 Jun 2011 EB3/0.5-0.6	SE100692.008 Soil 10 Jun 2011 EB3/1.0-1.1	SE100692.009 Soil 10 Jun 2011 EB3/1.6-1.7	SE100692.010 Soil 10 Jun 2011 EB3/2.0-2.1
VOC's in Soil Method: AN433/AN434 (continued)								
Nitrogenous Compounds								
Acrylonitrile	mg/kg	0.1		-	-	-	-	-
Oxygenated Compounds								
Acetone (2-propanone)	mg/kg	10		-	-	-	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.5		-	-	-	-	-
Vinyl acetate	mg/kg	10		-	-	-	-	-
MEK (2-butanone)	mg/kg	10		-	-	-	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1		-	-	-	-	-
2-hexanone (MBK)	mg/kg	5		-	-	-	-	-
Polycyclic VOCs								
Naphthalene	mg/kg	0.1		-	-	-	-	-
Sulphonated Compounds								
Carbon disulfide	mg/kg	0.5		-	-	-	-	-
Surrogates								
Dibromofluoromethane (Surrogate)	%	-		-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-		-	-	-	-	-
d8-toluene (Surrogate)	%	-		-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-		-	-	-	-	-
Totals								
Total Xylenes*	mg/kg	0.3		-	-	-	-	-
Total BTEX*	mg/kg	-		-	-	-	-	-
Total VOC*	mg/kg	24		-	-	-	-	-
Trihalomethanes								
Chloroform	mg/kg	0.1		-	-	-	-	-
Bromodichloromethane	mg/kg	0.1		-	-	-	-	-
Chlorodibromomethane	mg/kg	0.1		-	-	-	-	-
Bromoform	mg/kg	0.1		-	-	-	-	-
Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434								
TRH C6-C9	mg/kg	20		<20	-	<20	<20	<20
Benzene	mg/kg	0.1		<0.1	-	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1		<0.1	-	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1		<0.1	-	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	1		<1	-	<1	<1	<1
o-xylene	mg/kg	0.5		<0.5	-	<0.5	<0.5	<0.5
Total Xylenes	mg/kg	0.3		<0.3	-	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	2.7		<2.7	-	<2.7	<2.7	<2.7
Surrogates								
Trifluorotoluene (Surrogate)	%	-		**126**	-	**123**	**120**	**109**
Dibromofluoromethane (Surrogate)	%	-		-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-		-	-	-	-	-
d8-toluene (Surrogate)	%	-		-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-		-	-	-	-	-

ANALYTICAL REPORT

SE100692 R0

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Sample Number			SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Sample Matrix			Soil	Soil	Soil	Soil	Soil
Sample Date			10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011
Sample Name			EB2/2.0-2.1	EB3/0.5-0.6	EB3/1.0-1.1	EB3/1.6-1.7	EB3/2.0-2.1

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
TRH C10-C14	mg/kg	20	<20	-	<20	<20	<20
TRH C15-C28	mg/kg	50	<50	-	**320**	<50	<50
TRH C29-C36	mg/kg	50	<50	-	**190**	<50	<50

Surrogates

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
TRH (Surrogate)	%	-	-	-	-	-	-

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Naphthalene	mg/kg	0.1	<0.1	-	**0.7**	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	-	**1.5**	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	-	**0.4**	<0.1	<0.1
Fluorene	mg/kg	0.1	**0.1**	-	**1.5**	<0.1	<0.1
Phenanthrene	mg/kg	0.1	**0.6**	-	**7.9**	**0.3**	**0.6**
Anthracene	mg/kg	0.1	**0.3**	-	**2.3**	<0.1	**0.2**
Fluoranthene	mg/kg	0.1	**0.8**	-	**9.1**	**0.4**	**0.7**
Pyrene	mg/kg	0.1	**0.8**	-	**8.8**	**0.3**	**0.7**
Benzo(a)anthracene	mg/kg	0.1	**0.4**	-	**6.4**	**0.3**	**0.4**
Chrysene	mg/kg	0.1	**0.3**	-	**3.2**	**0.1**	**0.2**
Benzo(b)fluoranthene	mg/kg	0.1	**0.4**	-	**5.5**	**0.2**	**0.4**
Benzo(k)fluoranthene	mg/kg	0.1	**0.1**	-	**1.5**	<0.1	**0.1**
Benzo(a)pyrene	mg/kg	0.05	**0.35**	-	**3.9**	**0.15**	**0.25**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**0.2**	-	**2.2**	<0.1	**0.1**
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	-	**0.6**	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	**0.2**	-	**2.1**	<0.1	**0.2**
Total PAH	mg/kg	1.75	**4.7**	-	**58**	<1.8↑	**3.8**

Surrogates

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
d5-nitrobenzene (Surrogate)	%	-	**123**	-	**115**	**121**	**114**
2-fluorobiphenyl (Surrogate)	%	-	**106**	-	**117**	**106**	**100**
d14-p-terphenyl (Surrogate)	%	-	**118**	-	**126**	**120**	**119**

Full 8270 SVOC in Soil Method: AN420

PAHs

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Acenaphthene	mg/kg	0.5	-	-	-	-	-
Acenaphthylene	mg/kg	0.5	-	-	-	-	-
Anthracene	mg/kg	0.5	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.5	-	-	-	-	-
Benzo(b&k)fluoranthene	mg/kg	1	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.5	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.5	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.5	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.5	-	-	-	-	-
Chrysene	mg/kg	0.5	-	-	-	-	-
Dibenzo(ah)anthracene	mg/kg	0.5	-	-	-	-	-
Fluoranthene	mg/kg	0.5	-	-	-	-	-
Fluorene	mg/kg	0.5	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.5	-	-	-	-	-
1-methylnaphthalene	mg/kg	0.5	-	-	-	-	-
2-methylnaphthalene	mg/kg	0.5	-	-	-	-	-
Naphthalene	mg/kg	0.5	-	-	-	-	-
Phenanthrene	mg/kg	0.5	-	-	-	-	-
Pyrene	mg/kg	0.5	-	-	-	-	-
2-acetylamino fluorene	mg/kg	2	-	-	-	-	-
7,12-dimethyl-benz(a)anthracene	mg/kg	0.5	-	-	-	-	-
3-methylcholanthrene	mg/kg	1	-	-	-	-	-

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Sample Matrix			Soil	Soil	Soil	Soil	Soil
Sample Date			10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011
Sample Name			EB2/2.0-2.1	EB3/0.5-0.6	EB3/1.0-1.1	EB3/1.6-1.7	EB3/2.0-2.1

Full 8270 SVOC in Soil   Method: AN420 (continued)

OCs

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Aldrin	mg/kg	0.5	-	-	-	-	-
Alpha-BHC	mg/kg	0.5	-	-	-	-	-
Beta-BHC	mg/kg	0.5	-	-	-	-	-
Delta-BHC	mg/kg	0.5	-	-	-	-	-
Gamma-BHC (Lindane)	mg/kg	0.5	-	-	-	-	-
p,p-DDD	mg/kg	0.5	-	-	-	-	-
p,p-DDE	mg/kg	0.5	-	-	-	-	-
p,p-DDT	mg/kg	0.5	-	-	-	-	-
Dieldrin	mg/kg	0.5	-	-	-	-	-
Alpha-endosulfan	mg/kg	0.5	-	-	-	-	-
Beta-endosulfan	mg/kg	0.5	-	-	-	-	-
Endosulfan sulphate	mg/kg	0.5	-	-	-	-	-
Endrin	mg/kg	0.5	-	-	-	-	-
Heptachlor	mg/kg	0.5	-	-	-	-	-
Heptachlor epoxide	mg/kg	0.5	-	-	-	-	-
Isodrin	mg/kg	0.5	-	-	-	-	-
Methoxychlor	mg/kg	0.5	-	-	-	-	-
Mirex	mg/kg	0.5	-	-	-	-	-
Alpha-chlordane	mg/kg	0.5	-	-	-	-	-
Gamma-chlordane	mg/kg	0.5	-	-	-	-	-
Endrin ketone	mg/kg	0.5	-	-	-	-	-

OPs

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Azinphos-methyl (Guthion)	mg/kg	1	-	-	-	-	-
Bromophos ethyl	mg/kg	1	-	-	-	-	-
Carbophenothion	mg/kg	1	-	-	-	-	-
Chlorfenvinphos-cis (Chlofenvinphos-cis)	mg/kg	5	-	-	-	-	-
Chlorfenvinphos-trans (Chlofenvinphos-trans)	mg/kg	1	-	-	-	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	1	-	-	-	-	-
Chlorpyrifos-methyl	mg/kg	1	-	-	-	-	-
Co-Ral (Coumaphos)	mg/kg	1	-	-	-	-	-
Diazinon (Dimpylate)	mg/kg	1	-	-	-	-	-
Dichlorvos	mg/kg	1	-	-	-	-	-
Demeton-S-methyl	mg/kg	1	-	-	-	-	-
Dimethoate	mg/kg	1	-	-	-	-	-
Disulfoton (Di-syston)	mg/kg	1	-	-	-	-	-
EPN*	mg/kg	1	-	-	-	-	-
Ethion	mg/kg	1	-	-	-	-	-
Ethoprophos (ethoprop or prophos)	mg/kg	1	-	-	-	-	-
Famphur (Famophos)	mg/kg	1	-	-	-	-	-
Fenamiphos (Phenamiphos)	mg/kg	1	-	-	-	-	-
Fenchlorophos (Ronnel)	mg/kg	1	-	-	-	-	-
Fenitrothion	mg/kg	1	-	-	-	-	-
Fenthion	mg/kg	1	-	-	-	-	-
Malathion (Maldison)	mg/kg	1	-	-	-	-	-
Methidathion	mg/kg	1	-	-	-	-	-
Mevinphos-cis/trans	mg/kg	2	-	-	-	-	-
o,o,o-triethyl phosphorothioate	mg/kg	1	-	-	-	-	-
Parathion ethyl (Parathion)	mg/kg	1	-	-	-	-	-
Parathion methyl	mg/kg	1	-	-	-	-	-
Phorate	mg/kg	1	-	-	-	-	-
Pirimiphos-ethyl	mg/kg	1	-	-	-	-	-
Pirimiphos-methyl	mg/kg	1	-	-	-	-	-
Profenofos	mg/kg	1	-	-	-	-	-
Prothiophos (Tokuthion)*	mg/kg	1	-	-	-	-	-
Sulfotepp	mg/kg	1	-	-	-	-	-
Tetrachlorvinphos (Stirophos)*	mg/kg	1	-	-	-	-	-

Parameter	Units	LOR	SE100692.006 Soil 10 Jun 2011 EB2/2.0-2.1	SE100692.007 Soil 10 Jun 2011 EB3/0.5-0.6	SE100692.008 Soil 10 Jun 2011 EB3/1.0-1.1	SE100692.009 Soil 10 Jun 2011 EB3/1.6-1.7	SE100692.010 Soil 10 Jun 2011 EB3/2.0-2.1

Full 8270 SVOC in Soil Method: AN420 (continued)

PCB UPAC(7) Congeners

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
PCB Congener C28	mg/kg	0.5	-	-	-	-	-
PCB Congener C52	mg/kg	0.5	-	-	-	-	-
PCB Congener C101	mg/kg	0.5	-	-	-	-	-
PCB Congener C118	mg/kg	0.5	-	-	-	-	-
PCB Congener C138	mg/kg	0.5	-	-	-	-	-
PCB Congener C153	mg/kg	0.5	-	-	-	-	-
PCB Congener C180	mg/kg	0.5	-	-	-	-	-

SVCH (Cl Benzenes, Hydrocarbons & VOCs)

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Hexachlorobenzene	mg/kg	0.5	-	-	-	-	-
1,2-dichlorobenzene	mg/kg	0.5	-	-	-	-	-
1,3-dichlorobenzene	mg/kg	0.5	-	-	-	-	-
1,4-dichlorobenzene	mg/kg	0.5	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.5	-	-	-	-	-
Hexachlorocyclopentadiene	mg/kg	1	-	-	-	-	-
Hexachloroethane	mg/kg	0.5	-	-	-	-	-
Hexachloroproprene	mg/kg	0.5	-	-	-	-	-
Pentachlorobenzene	mg/kg	0.5	-	-	-	-	-
Pentachloroethane	mg/kg	0.5	-	-	-	-	-
1,2,3,5 and 1,2,4,5 -tetrachlorobenzene	mg/kg	1	-	-	-	-	-
1,2,3,4-tetrachlorobenzene	mg/kg	0.5	-	-	-	-	-
1/2-Chloronaphthalene	mg/kg	1	-	-	-	-	-
1,2,4-trichlorobenzene	mg/kg	0.5	-	-	-	-	-

Phthalates

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Bis(2-ethylhexyl)phthalate	mg/kg	5	-	-	-	-	-
Bis(2-ethylhexyl)adipate	mg/kg	0.5	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.5	-	-	-	-	-
Di-n-butyl phthalate	mg/kg	0.5	-	-	-	-	-
Diethyl phthalate	mg/kg	0.5	-	-	-	-	-
Dimethyl phthalate	mg/kg	0.5	-	-	-	-	-
Dioctyl phthalate	mg/kg	0.5	-	-	-	-	-

Carbamates

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Carbofuran	mg/kg	0.5	-	-	-	-	-
Carbaryl	mg/kg	0.5	-	-	-	-	-

Herbicides (normal)

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Trifluralin	mg/kg	0.5	-	-	-	-	-

Nitrosamines

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
N-nitroso-di-n-butylamine (NDBA)	mg/kg	0.5	-	-	-	-	-
N-nitroso-diethylamine (NDEA)	mg/kg	1	-	-	-	-	-
N-nitroso-di-n-propylamine (NDPA)	mg/kg	0.5	-	-	-	-	-
N-nitroso-morpholine (NMOR)	mg/kg	0.5	-	-	-	-	-
N-nitroso-piperidine (NPIP)	mg/kg	0.5	-	-	-	-	-
N-nitroso-pyrrolidine (NPYR)	mg/kg	1	-	-	-	-	-
4-amino biphenyl	mg/kg	1	-	-	-	-	-

Nitroaromatics and Ketones

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Acetophenone	mg/kg	0.5	-	-	-	-	-
1,3-dinitrobenzene	mg/kg	1	-	-	-	-	-
2,4-dinitrotoluene	mg/kg	0.5	-	-	-	-	-
2,6-dinitrotoluene	mg/kg	0.5	-	-	-	-	-
Isophorone	mg/kg	0.5	-	-	-	-	-
Nitrobenzene	mg/kg	0.5	-	-	-	-	-
p-(dimethylamino) azobenzene	mg/kg	1	-	-	-	-	-

Parameter	Units	LOR	SE100692.006	SE100692.007	SE100692.008	SE100692.009	SE100692.010
Sample Matrix			Soil	Soil	Soil	Soil	Soil
Sample Date			10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011
Sample Name			EB2/2.0-2.1	EB3/0.5-0.6	EB3/1.0-1.1	EB3/1.6-1.7	EB3/2.0-2.1
Full 8270 SVOC in Soil Method: AN420 (continued)							
Phenacetin	mg/kg	1	-	-	-	-	-
Pentachloronitrobenzene (quintozene)	mg/kg	0.5	-	-	-	-	-
Anilines and Amines							
Aniline	mg/kg	3	-	-	-	-	-
4-chloroaniline	mg/kg	1	-	-	-	-	-
2-nitroaniline	mg/kg	1	-	-	-	-	-
3-nitroaniline	mg/kg	1	-	-	-	-	-
4-nitroaniline	mg/kg	1	-	-	-	-	-
Diphenylamine	mg/kg	0.5	-	-	-	-	-
o-toluidine	mg/kg	1	-	-	-	-	-
5-nitro-o-toluidine	mg/kg	1	-	-	-	-	-
1-naphthylamine	mg/kg	1	-	-	-	-	-
2-naphthylamine	mg/kg	1	-	-	-	-	-
Haloethers							
Bis(2-chloroethoxy) methane	mg/kg	0.5	-	-	-	-	-
Bis(2-chloroethyl) ether	mg/kg	0.5	-	-	-	-	-
Bis(2-chloroisopropyl) ether	mg/kg	0.5	-	-	-	-	-
4-chlorophenyl phenyl ether	mg/kg	0.5	-	-	-	-	-
4-bromophenyl phenyl ether	mg/kg	0.5	-	-	-	-	-
Other SVOCs							
Methyl methanesulfonate	mg/kg	1	-	-	-	-	-
Ethyl methanesulfonate	mg/kg	1	-	-	-	-	-
Dibenzofuran	mg/kg	0.5	-	-	-	-	-
Benzyl alcohol	mg/kg	1	-	-	-	-	-
Safrole	mg/kg	0.5	-	-	-	-	-
Isosafrole Isomer 1	mg/kg	1	-	-	-	-	-
Isosafrole Isomer 2	mg/kg	1	-	-	-	-	-
1,4-naphthoquinone	mg/kg	0.5	-	-	-	-	-
Thionazin	mg/kg	1	-	-	-	-	-
Speciated Routine Phenols							
3/4-methyl phenol (m/p-cresol)	mg/kg	1	-	-	-	-	-
2-methyl phenol (o-cresol)	mg/kg	0.5	-	-	-	-	-
2,6-dichlorophenol	mg/kg	0.5	-	-	-	-	-
2,3,4,6 and 2,3,5,6-tetrachlorophenol	mg/kg	1	-	-	-	-	-
2,4,5-trichlorophenol	mg/kg	0.5	-	-	-	-	-
4-chloro-3-methylphenol	mg/kg	1	-	-	-	-	-
2-chlorophenol	mg/kg	0.5	-	-	-	-	-
2,4-dichlorophenol	mg/kg	0.5	-	-	-	-	-
2,4-dimethyl phenol	mg/kg	0.5	-	-	-	-	-
2-nitrophenol	mg/kg	0.5	-	-	-	-	-
Phenol	mg/kg	0.5	-	-	-	-	-
2,4,6-trichlorophenol	mg/kg	0.5	-	-	-	-	-
Pentachlorophenol	mg/kg	0.5	-	-	-	-	-
4-nitrophenol	mg/kg	0.5	-	-	-	-	-

Parameter	Units	LOR	SE100692.006 Soil 10 Jun 2011 EB2/2.0-2.1	SE100692.007 Soil 10 Jun 2011 EB3/0.5-0.6	SE100692.008 Soil 10 Jun 2011 EB3/1.0-1.1	SE100692.009 Soil 10 Jun 2011 EB3/1.6-1.7	SE100692.010 Soil 10 Jun 2011 EB3/2.0-2.1
Full 8270 SVOC in Soil Method: AN420 (continued)							
Surrogates							
d5-phenol (Surrogate)	%	-	-	-	-	-	-
d5-nitrobenzene (Surrogate)	%	-	-	-	-	-	-
2-fluorobiphenyl (Surrogate)	%	-	-	-	-	-	-
2,4,6-tribromophenol (Surrogate)	%	-	-	-	-	-	-
d14-p-terphenyl (Surrogate)	%	-	-	-	-	-	-
Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320							
Arsenic, As	mg/kg	3	7	-	13	6	5
Cadmium, Cd	mg/kg	0.3	<0.3	-	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	13	-	18	9.5	15
Copper, Cu	mg/kg	0.5	18	-	110	7.3	12
Lead, Pb	mg/kg	1	32	-	310	23	31
Nickel, Ni	mg/kg	0.5	3.5	-	11	1.3	4.6
Zinc, Zn	mg/kg	0.5	32	-	190	12	17
Mercury in Soil Method: AN312							
Mercury	mg/kg	0.05	1.0	-	0.68	<0.05	0.07
Fibre Identification in soil Method: AN602							
FibreID							
Asbestos Detected	No unit	-	-	No	No	No	No
Moisture Content Method: AN234							
% Moisture	%	0.5	17	-	10	15	9.1
Volatile Petroleum Hydrocarbons in Water Method: AN433/AN434							
TRH C6-C9	mg/L	0.04	-	-	-	-	-
Benzene	µg/L	0.5	-	-	-	-	-
Toluene	µg/L	0.5	-	-	-	-	-
Ethylbenzene	µg/L	0.5	-	-	-	-	-
m/p-xylene	µg/L	1	-	-	-	-	-
o-xylene	µg/L	0.5	-	-	-	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	2	-	-	-	-	-
Total BTEX*	µg/L	3	-	-	-	-	-
Total Xylenes*	µg/L	1.5	-	-	-	-	-
Surrogates							
Trifluorotoluene (Surrogate)	%	-	-	-	-	-	-
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Sample Number			SE100692.011	SE100692.012	SE100692.013	SE100692.014
Sample Matrix			Soil	Soil	Soil	Water
Sample Date			10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011
Sample Name			EB3/3.0-3.1	QC1	QC2	TB

VOC's in Soil Method: AN433/AN434

Fumigants

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
2,2-dichloropropane	mg/kg	0.1	-	-	-	-
1,2-dichloropropane	mg/kg	0.1	-	-	-	-
cis-1,3-dichloropropene	mg/kg	0.1	-	-	-	-
trans-1,3-dichloropropene	mg/kg	0.1	-	-	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	-	-	-

Halogenated Aliphatics

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	-	-	-
Chloromethane	mg/kg	1	-	-	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	-	-	-
Bromomethane	mg/kg	1	-	-	-	-
Chloroethane	mg/kg	1	-	-	-	-
Trichlorofluoromethane	mg/kg	1	-	-	-	-
Iodomethane	mg/kg	5	-	-	-	-
1,1-dichloroethene	mg/kg	0.1	-	-	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	-	-	-
Allyl chloride	mg/kg	0.1	-	-	-	-
trans-1,2-dichloroethene	mg/kg	0.1	-	-	-	-
1,1-dichloroethane	mg/kg	0.1	-	-	-	-
cis-1,2-dichloroethene	mg/kg	0.1	-	-	-	-
Bromochloromethane	mg/kg	0.1	-	-	-	-
1,2-dichloroethane	mg/kg	0.1	-	-	-	-
1,1,1-trichloroethane	mg/kg	0.1	-	-	-	-
1,1-dichloropropene	mg/kg	0.1	-	-	-	-
Carbon tetrachloride	mg/kg	0.1	-	-	-	-
Dibromomethane	mg/kg	0.1	-	-	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	-	-	-
1,1,2-trichloroethane	mg/kg	0.1	-	-	-	-
1,3-dichloropropane	mg/kg	0.1	-	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	-	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	-	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	-	-	-
1,2,3-trichloropropane	mg/kg	0.1	-	-	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	-	-	-	-

Halogenated Aromatics

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Chlorobenzene	mg/kg	0.1	-	-	-	-
Bromobenzene	mg/kg	0.1	-	-	-	-
2-chlorotoluene	mg/kg	0.1	-	-	-	-
4-chlorotoluene	mg/kg	0.1	-	-	-	-
1,3-dichlorobenzene	mg/kg	0.1	-	-	-	-
1,4-dichlorobenzene	mg/kg	0.1	-	-	-	-
1,2-dichlorobenzene	mg/kg	0.1	-	-	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	-	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	-	-	-

Monocyclic Aromatic Hydrocarbons

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Benzene	mg/kg	0.1	-	-	-	-
Toluene	mg/kg	0.1	-	-	-	-
Ethylbenzene	mg/kg	0.1	-	-	-	-
m/p-xylene	mg/kg	0.2	-	-	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	-	-	-
o-xylene	mg/kg	0.1	-	-	-	-
Isopropylbenzene (Cumene)	mg/kg	0.1	-	-	-	-
n-propylbenzene	mg/kg	0.1	-	-	-	-

Parameter	Units	LOR	SE100692.011 Soil 10 Jun 2011 EB3/3.0-3.1	SE100692.012 Soil 10 Jun 2011 QC1	SE100692.013 Soil 10 Jun 2011 QC2	SE100692.014 Water 10 Jun 2011 TB

VOC's in Soil Method: AN433/AN434 (continued)

1,3,5-trimethylbenzene	mg/kg	0.1	-	-	-	-
tert-butylbenzene	mg/kg	0.1	-	-	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	-	-	-
sec-butylbenzene	mg/kg	0.1	-	-	-	-
p-isopropyltoluene	mg/kg	0.1	-	-	-	-
n-butylbenzene	mg/kg	0.1	-	-	-	-

Nitrogenous Compounds

Acrylonitrile	mg/kg	0.1	-	-	-	-

Oxygenated Compounds

Acetone (2-propanone)	mg/kg	10	-	-	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.5	-	-	-	-
Vinyl acetate	mg/kg	10	-	-	-	-
MEK (2-butanone)	mg/kg	10	-	-	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	-	-	-
2-hexanone (MBK)	mg/kg	5	-	-	-	-

Polycyclic VOCs

Naphthalene	mg/kg	0.1	-	-	-	-

Sulphonated Compounds

Carbon disulfide	mg/kg	0.5	-	-	-	-

Surrogates

Dibromofluoromethane (Surrogate)	%	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-

Totals

Total Xylenes*	mg/kg	0.3	-	-	-	-
Total BTEX*	mg/kg	-	-	-	-	-
Total VOC*	mg/kg	24	-	-	-	-

Trihalomethanes

Chloroform	mg/kg	0.1	-	-	-	-
Bromodichloromethane	mg/kg	0.1	-	-	-	-
Chlorodibromomethane	mg/kg	0.1	-	-	-	-
Bromoform	mg/kg	0.1	-	-	-	-

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434

TRH C6-C9	mg/kg	20	<20	<20	<20	-
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	-
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	-
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	-
m/p-xylene	mg/kg	1	<1	<1	<1	-
o-xylene	mg/kg	0.5	<0.5	<0.5	<0.5	-
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	-
Total BTEX*	mg/kg	2.7	<2.7	<2.7	<2.7	-

		Sample Number	SE100692.011	SE100692.012	SE100692.013	SE100692.014
		Sample Matrix	Soil	Soil	Soil	Water
		Sample Date	10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011
		Sample Name	EB3/3.0-3.1	QC1	QC2	TB
Parameter	Units	LOR				

Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434 (continued)

Surrogates

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Trifluorotoluene (Surrogate)	%	-	119	109	120	-
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
TRH C10-C14	mg/kg	20	<20	150	<20	-
TRH C15-C28	mg/kg	50	<50	7000	440	-
TRH C29-C36	mg/kg	50	<50	3100	350	-

Surrogates

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
TRH (Surrogate)	%	-	-	-	-	-

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Naphthalene	mg/kg	0.1	<0.1	10	0.7	-
Acenaphthylene	mg/kg	0.1	<0.1	1.9	2.1	-
Acenaphthene	mg/kg	0.1	<0.1	47	0.5	-
Fluorene	mg/kg	0.1	<0.1	68	1.8	-
Phenanthrene	mg/kg	0.1	<0.1	480	13	-
Anthracene	mg/kg	0.1	<0.1	91	3.5	-
Fluoranthene	mg/kg	0.1	<0.1	280	15	-
Pyrene	mg/kg	0.1	<0.1	380	14	-
Benzo(a)anthracene	mg/kg	0.1	<0.1	200	11	-
Chrysene	mg/kg	0.1	<0.1	130	4.7	-
Benzo(b)fluoranthene	mg/kg	0.1	<0.1	120	8.8	-
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	45	2.0	-
Benzo(a)pyrene	mg/kg	0.05	<0.05	87	5.8	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	37	3.1	-
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	14	0.9	-
Benzo(ghi)perylene	mg/kg	0.1	<0.1	43	2.9	-
Total PAH	mg/kg	1.75	<1.8↑	2000	90	-

Surrogates

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
d5-nitrobenzene (Surrogate)	%	-	120	143	128	-
2-fluorobiphenyl (Surrogate)	%	-	97	147	116	-
d14-p-terphenyl (Surrogate)	%	-	124	166	124	-

Full 8270 SVOC in Soil Method: AN420

PAHs

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Acenaphthene	mg/kg	0.5	-	-	-	-
Acenaphthylene	mg/kg	0.5	-	-	-	-
Anthracene	mg/kg	0.5	-	-	-	-
Benzo(a)anthracene	mg/kg	0.5	-	-	-	-
Benzo(b&k)fluoranthene	mg/kg	1	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.5	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.5	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.5	-	-	-	-
Benzo(a)pyrene	mg/kg	0.5	-	-	-	-
Chrysene	mg/kg	0.5	-	-	-	-
Dibenzo(ah)anthracene	mg/kg	0.5	-	-	-	-
Fluoranthene	mg/kg	0.5	-	-	-	-
Fluorene	mg/kg	0.5	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.5	-	-	-	-
1-methylnaphthalene	mg/kg	0.5	-	-	-	-
2-methylnaphthalene	mg/kg	0.5	-	-	-	-
Naphthalene	mg/kg	0.5	-	-	-	-

Parameter	Units	LOR	SE100692.011 Soil 10 Jun 2011 EB3/3.0-3.1	SE100692.012 Soil 10 Jun 2011 QC1	SE100692.013 Soil 10 Jun 2011 QC2	SE100692.014 Water 10 Jun 2011 TB
Full 8270 SVOC in Soil Method: AN420 (continued)						
Phenanthrene	mg/kg	0.5	-	-	-	-
Pyrene	mg/kg	0.5	-	-	-	-
2-acetylamino fluorene	mg/kg	2	-	-	-	-
7,12-dimethyl-benz(a)anthracene	mg/kg	0.5	-	-	-	-
3-methylcholanthrene	mg/kg	1	-	-	-	-
OCs						
Aldrin	mg/kg	0.5	-	-	-	-
Alpha-BHC	mg/kg	0.5	-	-	-	-
Beta-BHC	mg/kg	0.5	-	-	-	-
Delta-BHC	mg/kg	0.5	-	-	-	-
Gamma-BHC (Lindane)	mg/kg	0.5	-	-	-	-
p,p-DDD	mg/kg	0.5	-	-	-	-
p,p-DDE	mg/kg	0.5	-	-	-	-
p,p-DDT	mg/kg	0.5	-	-	-	-
Dieldrin	mg/kg	0.5	-	-	-	-
Alpha-endosulfan	mg/kg	0.5	-	-	-	-
Beta-endosulfan	mg/kg	0.5	-	-	-	-
Endosulfan sulphate	mg/kg	0.5	-	-	-	-
Endrin	mg/kg	0.5	-	-	-	-
Heptachlor	mg/kg	0.5	-	-	-	-
Heptachlor epoxide	mg/kg	0.5	-	-	-	-
Isodrin	mg/kg	0.5	-	-	-	-
Methoxychlor	mg/kg	0.5	-	-	-	-
Mirex	mg/kg	0.5	-	-	-	-
Alpha-chlordane	mg/kg	0.5	-	-	-	-
Gamma-chlordane	mg/kg	0.5	-	-	-	-
Endrin ketone	mg/kg	0.5	-	-	-	-
OPs						
Azinphos-methyl (Guthion)	mg/kg	1	-	-	-	-
Bromophos ethyl	mg/kg	1	-	-	-	-
Carbophenothion	mg/kg	1	-	-	-	-
Chlorfenvinphos-cis (Chlofenvinphos-cis)	mg/kg	5	-	-	-	-
Chlorfenvinphos-trans (Chlofenvinphos-trans)	mg/kg	1	-	-	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	1	-	-	-	-
Chlorpyrifos-methyl	mg/kg	1	-	-	-	-
Co-Ral (Coumaphos)	mg/kg	1	-	-	-	-
Diazinon (Dimpylate)	mg/kg	1	-	-	-	-
Dichlorvos	mg/kg	1	-	-	-	-
Demeton-S-methyl	mg/kg	1	-	-	-	-
Dimethoate	mg/kg	1	-	-	-	-
Disulfoton (Di-syston)	mg/kg	1	-	-	-	-
EPN*	mg/kg	1	-	-	-	-
Ethion	mg/kg	1	-	-	-	-
Ethoprophos (ethoprop or prophos)	mg/kg	1	-	-	-	-
Famphur (Famophos)	mg/kg	1	-	-	-	-
Fenamiphos (Phenamiphos)	mg/kg	1	-	-	-	-
Fenchlorophos (Ronnel)	mg/kg	1	-	-	-	-
Fenitrothion	mg/kg	1	-	-	-	-
Fenthion	mg/kg	1	-	-	-	-
Malathion (Maldison)	mg/kg	1	-	-	-	-
Methidathion	mg/kg	1	-	-	-	-
Mevinphos-cis/trans	mg/kg	2	-	-	-	-
o,o,o-triethyl phosphorothioate	mg/kg	1	-	-	-	-
Parathion ethyl (Parathion)	mg/kg	1	-	-	-	-
Parathion methyl	mg/kg	1	-	-	-	-
Phorate	mg/kg	1	-	-	-	-
Pirimiphos-ethyl	mg/kg	1	-	-	-	-

Parameter	Units	LOR	Sample Number: SE100692.011 Sample Matrix: Soil Sample Date: 10 Jun 2011 Sample Name: EB3/3.0-3.1	SE100692.012 Soil 10 Jun 2011 QC1	SE100692.013 Soil 10 Jun 2011 QC2	SE100692.014 Water 10 Jun 2011 TB
Full 8270 SVOC in Soil Method: AN420 (continued)						
Pirimiphos-methyl	mg/kg	1	-	-	-	-
Profenofos	mg/kg	1	-	-	-	-
Prothiophos (Tokuthion)*	mg/kg	1	-	-	-	-
Sulfotepp	mg/kg	1	-	-	-	-
Tetrachlorvinphos (Stirophos)*	mg/kg	1	-	-	-	-
PCB UPAC(7) Congeners						
PCB Congener C28	mg/kg	0.5	-	-	-	-
PCB Congener C52	mg/kg	0.5	-	-	-	-
PCB Congener C101	mg/kg	0.5	-	-	-	-
PCB Congener C118	mg/kg	0.5	-	-	-	-
PCB Congener C138	mg/kg	0.5	-	-	-	-
PCB Congener C153	mg/kg	0.5	-	-	-	-
PCB Congener C180	mg/kg	0.5	-	-	-	-
SVCH (Cl Benzenes, Hydrocarbons & VOCs)						
Hexachlorobenzene	mg/kg	0.5	-	-	-	-
1,2-dichlorobenzene	mg/kg	0.5	-	-	-	-
1,3-dichlorobenzene	mg/kg	0.5	-	-	-	-
1,4-dichlorobenzene	mg/kg	0.5	-	-	-	-
Hexachlorobutadiene	mg/kg	0.5	-	-	-	-
Hexachlorocyclopentadiene	mg/kg	1	-	-	-	-
Hexachloroethane	mg/kg	0.5	-	-	-	-
Hexachloroproprene	mg/kg	0.5	-	-	-	-
Pentachlorobenzene	mg/kg	0.5	-	-	-	-
Pentachloroethane	mg/kg	0.5	-	-	-	-
1,2,3,5 and 1,2,4,5 -tetrachlorobenzene	mg/kg	1	-	-	-	-
1,2,3,4-tetrachlorobenzene	mg/kg	0.5	-	-	-	-
1/2-Chloronaphthalene	mg/kg	1	-	-	-	-
1,2,4-trichlorobenzene	mg/kg	0.5	-	-	-	-

Parameter	Units	LOR	SE100692.011 Soil 10 Jun 2011 EB3/3.0-3.1	SE100692.012 Soil 10 Jun 2011 QC1	SE100692.013 Soil 10 Jun 2011 QC2	SE100692.014 Water 10 Jun 2011 TB
Full 8270 SVOC in Soil Method: AN420 (continued)						
Phthalates						
Bis(2-ethylhexyl)phthalate	mg/kg	5	-	-	-	-
Bis(2-ethylhexyl)adipate	mg/kg	0.5	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.5	-	-	-	-
Di-n-butyl phthalate	mg/kg	0.5	-	-	-	-
Diethyl phthalate	mg/kg	0.5	-	-	-	-
Dimethyl phthalate	mg/kg	0.5	-	-	-	-
Dioctyl phthalate	mg/kg	0.5	-	-	-	-
Carbamates						
Carbofuran	mg/kg	0.5	-	-	-	-
Carbaryl	mg/kg	0.5	-	-	-	-
Herbicides (normal)						
Trifluralin	mg/kg	0.5	-	-	-	-
Nitrosamines						
N-nitroso-di-n-butylamine (NDBA)	mg/kg	0.5	-	-	-	-
N-nitroso-diethylamine (NDEA)	mg/kg	1	-	-	-	-
N-nitroso-di-n-propylamine (NDPA)	mg/kg	0.5	-	-	-	-
N-nitroso-morpholine (NMOR)	mg/kg	0.5	-	-	-	-
N-nitroso-piperidine (NPIP)	mg/kg	0.5	-	-	-	-
N-nitroso-pyrrolidine (NPYR)	mg/kg	1	-	-	-	-
4-amino biphenyl	mg/kg	1	-	-	-	-
Nitroaromatics and Ketones						
Acetophenone	mg/kg	0.5	-	-	-	-
1,3-dinitrobenzene	mg/kg	1	-	-	-	-
2,4-dinitrotoluene	mg/kg	0.5	-	-	-	-
2,6-dinitrotoluene	mg/kg	0.5	-	-	-	-
Isophorone	mg/kg	0.5	-	-	-	-
Nitrobenzene	mg/kg	0.5	-	-	-	-
p-(dimethylamino) azobenzene	mg/kg	1	-	-	-	-
Phenacetin	mg/kg	1	-	-	-	-
Pentachloronitrobenzene (quintozene)	mg/kg	0.5	-	-	-	-
Anilines and Amines						
Aniline	mg/kg	3	-	-	-	-
4-chloroaniline	mg/kg	1	-	-	-	-
2-nitroaniline	mg/kg	1	-	-	-	-
3-nitroaniline	mg/kg	1	-	-	-	-
4-nitroaniline	mg/kg	1	-	-	-	-
Diphenylamine	mg/kg	0.5	-	-	-	-
o-toluidine	mg/kg	1	-	-	-	-
5-nitro-o-toluidine	mg/kg	1	-	-	-	-
1-naphthylamine	mg/kg	1	-	-	-	-
2-naphthylamine	mg/kg	1	-	-	-	-
Haloethers						
Bis(2-chloroethoxy) methane	mg/kg	0.5	-	-	-	-
Bis(2-chloroethyl) ether	mg/kg	0.5	-	-	-	-
Bis(2-chloroisopropyl) ether	mg/kg	0.5	-	-	-	-
4-chlorophenyl phenyl ether	mg/kg	0.5	-	-	-	-
4-bromophenyl phenyl ether	mg/kg	0.5	-	-	-	-

Parameter	Units	LOR	SE100692.011 Soil 10 Jun 2011 EB3/3.0-3.1	SE100692.012 Soil 10 Jun 2011 QC1	SE100692.013 Soil 10 Jun 2011 QC2	SE100692.014 Water 10 Jun 2011 TB

Full 8270 SVOC in Soil Method: AN420 (continued)

Other SVOCs

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Methyl methanesulfonate	mg/kg	1	-	-	-	-
Ethyl methanesulfonate	mg/kg	1	-	-	-	-
Dibenzofuran	mg/kg	0.5	-	-	-	-
Benzyl alcohol	mg/kg	1	-	-	-	-
Safrole	mg/kg	0.5	-	-	-	-
Isosafrole Isomer 1	mg/kg	1	-	-	-	-
Isosafrole Isomer 2	mg/kg	1	-	-	-	-
1,4-naphthoquinone	mg/kg	0.5	-	-	-	-
Thionazin	mg/kg	1	-	-	-	-

Speciated Routine Phenols

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
3/4-methyl phenol (m/p-cresol)	mg/kg	1	-	-	-	-
2-methyl phenol (o-cresol)	mg/kg	0.5	-	-	-	-
2,6-dichlorophenol	mg/kg	0.5	-	-	-	-
2,3,4,6 and 2,3,5,6-tetrachlorophenol	mg/kg	1	-	-	-	-
2,4,5-trichlorophenol	mg/kg	0.5	-	-	-	-
4-chloro-3-methylphenol	mg/kg	1	-	-	-	-
2-chlorophenol	mg/kg	0.5	-	-	-	-
2,4-dichlorophenol	mg/kg	0.5	-	-	-	-
2,4-dimethyl phenol	mg/kg	0.5	-	-	-	-
2-nitrophenol	mg/kg	0.5	-	-	-	-
Phenol	mg/kg	0.5	-	-	-	-
2,4,6-trichlorophenol	mg/kg	0.5	-	-	-	-
Pentachlorophenol	mg/kg	0.5	-	-	-	-
4-nitrophenol	mg/kg	0.5	-	-	-	-

Surrogates

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
d5-phenol (Surrogate)	%	-	-	-	-	-
d5-nitrobenzene (Surrogate)	%	-	-	-	-	-
2-fluorobiphenyl (Surrogate)	%	-	-	-	-	-
2,4,6-tribromophenol (Surrogate)	%	-	-	-	-	-
d14-p-terphenyl (Surrogate)	%	-	-	-	-	-

Metals in Soil by ICPOES from EPA 200.8 Digest (SYDNEY) Method: AN040/AN320

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Arsenic, As	mg/kg	3	-	12	7	-
Cadmium, Cd	mg/kg	0.3	-	0.5	<0.3	-
Chromium, Cr	mg/kg	0.3	-	33	22	-
Copper, Cu	mg/kg	0.5	-	100	110	-
Lead, Pb	mg/kg	1	-	300	360	-
Nickel, Ni	mg/kg	0.5	-	28	8.7	-
Zinc, Zn	mg/kg	0.5	-	540	230	-

Mercury in Soil Method: AN312

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Mercury	mg/kg	0.05	-	0.81	0.39	-

Fibre Identification in soil Method: AN602

FibreID

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Asbestos Detected	No unit	-	-	-	-	-

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Sample Matrix			Soil	Soil	Soil	Water
Sample Date			10 Jun 2011	10 Jun 2011	10 Jun 2011	10 Jun 2011
Sample Name			EB3/3.0-3.1	QC1	QC2	TB

Moisture Content Method: AN234

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
% Moisture	%	0.5	**18**	**20**	**11**	-

Volatile Petroleum Hydrocarbons in Water Method: AN433/AN434

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
TRH C6-C9	mg/L	0.04	-	-	-	<0.04
Benzene	µg/L	0.5	-	-	-	<0.5
Toluene	µg/L	0.5	-	-	-	**1.0**
Ethylbenzene	µg/L	0.5	-	-	-	<0.5
m/p-xylene	µg/L	1	-	-	-	<1
o-xylene	µg/L	0.5	-	-	-	<0.5
MtBE (Methyl-tert-butyl ether)	µg/L	2	-	-	-	<2
Total BTEX*	µg/L	3	-	-	-	<3
Total Xylenes*	µg/L	1.5	-	-	-	<2↑

Surrogates

Parameter	Units	LOR	SE100692.011	SE100692.012	SE100692.013	SE100692.014
Trifluorotoluene (Surrogate)	%	-	-	-	-	**80**
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Table 1: Soil Analytical Results
Stage 2 - Detailed Site Investigation
Sydney International Conference Exhibition and Entertainment Precinct

			pH	ASBESTOS			TPH					BTEX								Metals			
			pH (Field)	Asbestos	C6 - C9	C10 - C14	C15 - C28	C29 - C36	C10 - C36 (Sum of total)	Total BTEX	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	Mercury
			pH_Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0		20	20	50	50		0	0.1	0.1	0.1	0.2	0.1	0.3	3	0.3	0.3	0.5	1	0.5	0.5	0.05
NEPM 1999 HIL F																	500	100	600000	5000	1500	3000	35000	75
A 1994 Health and Ecological					65				1000		1	130	50			25								
eneral Solid Waste (No Leaching)					650				10000		10	288	600			1000	100	20			100	40		4
Sample ID	**Sample Date**	**Lab ID**																						
NBH22_1.5-1.95	24/04/2012	SE107686-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	8	0.3	18	17	25	1.7	4.2	<0.05
BH23_0.5-0.6	24/04/2012	SE107686-1	-	ND	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	3	0.3	5.1	51	220	12	310	0.89
BH23_1.5-1.95	24/04/2012	SE107686-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	5	0.3	7.9	580	92	7.3	110	1.3
BH23_3-3.45	24/04/2012	SE107686-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	8	<0.3	5.6	5.8	14	1.6	6	0.07
NBH24_0.3-0.5	24/04/2012	SE107686-1	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0-0.1	24/04/2012	SE107686-1	-	ND	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<3	<0.3	4.9	5.4	11	3.6	22	<0.05
NBH24_1.5-1.95	24/04/2012	SE107686-1	-	-	21	62	2400	1100	3562	2	<0.1	<0.1	0.4	1.1	0.3	1.4	<3	<0.3	7.6	8.5	16	6.2	33	<0.05
NBH24_3.0-3.45	24/04/2012	SE107686-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	16	<0.3	12	3.4	14	4.1	9.9	<0.05
BH25_0.4-0.5	18/04/2012	SE107335-1	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.5-0.6	18/04/2012	SE107335-1	-	ND	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	4	<0.3	7.3	23	13	5	33	0.07
BH25_1.5-1.7	18/04/2012	SE107335-1	-	-	<20	<20	190	55	255	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	12	0.4	9.9	41	93	16	100	0.26
BH25_4.5-4.9	18/04/2012	SE107335-1	-	-	<20	<20	<50	<50	<120	0	0.1	0.1	<0.1	<0.2	<0.1	<0.3	12	0.3	21	63	91	4.8	95	0.18
BH26_Surface	24/04/2012	SE107686-1	-	ND	<20	30	450	420	900	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	4	0.4	6.9	98	96	11	210	0.13
BH27_1.5-1.9	27/04/2012	SE107819-1	-	ND	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	6	0.3	6.9	2.3	9	<0.5	21	<0.05
BH27_3.0-3.4	27/04/2012	SE107819-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	5	<0.3	17	13	30	12	27	0.08
BH27_4.5-4.9	27/04/2012	SE107819-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<3	<0.3	16	8.6	15	3.7	3.7	<0.05
BH28_Surface	20/04/2012	SE107556-1	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_0.5-0.6	20/04/2012	SE107556-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<3	<0.3	5.7	21	18	32	29	0.08
BH28_1.5-1.9	20/04/2012	SE107556-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<3	<0.3	2.7	2	3	3.4	5.3	<0.05
BH28_3.0-3.4	20/04/2012	SE107556-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	8	<0.3	6.6	8.9	20	2.2	7.4	0.1
BH28_7.3-7.8	20/04/2012	SE107556-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<3	<0.3	6	2.8	7	0.8	2.2	<0.05
BH29_0.4-0.5	17/04/2012	SE107335-1	-	ND	<20	20	2500	1700	4220	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<3	0.3	22	80	24	38	71	0.3
BH29_0.9-1.0	17/04/2012	SE107335-1	-	-	<20	<20	840	380	1230	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	4	0.3	8.9	83	230	9.6	310	2.1
BH29_2.0-2.1	17/04/2012	SE107335-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	3	<0.3	4.7	5.5	6	<0.5	3.5	<0.05
BH30_0.5-0.6	27/04/2012	SE107819-1	-	ND	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<3	<0.3	11	35	51	31	89	0.28
BH30_1.5-1.9	27/04/2012	SE107819-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	4	<0.3	11	8.7	18	3.2	23	0.08
BH30_3.0-5.4	27/04/2012	SE107819-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<3	<0.3	9.7	4.7	27	2.1	32	0.08
BH30_4.5-4.9	27/04/2012	SE107819-1	8.1	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	9	<0.3	260	33	19	25	9.4	<0.05
DUP4A	20/04/2012	72127	-	-	<25	<50	<100	<100	<250	0	<0.2	<0.5	<1	<2	<1	<3	9	<0.5	12	8	15	2	4	<0.1
QC3	14/04/2012	SE107556-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<3	<0.3	3	3.1	11	0.7	20	<0.05
QC4	20/04/2012	SE107556-1	-	-	<20	<20	<50	<50	<120	0	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<3	<0.3	16	11	10	1.7	8.1	<0.05

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Table 1: Soil Analytical Results
Stage 2 - Detailed Site Investigation
Sydney International Conference Exhibition and Entertainment Precinct

			PAH																
			Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8
NEPM 1999 HIL F							5												100
A 1994 Health and Ecological																			
eneral Solid Waste (No Leaching)							0.8												200
Sample ID	**Sample Date**	**Lab ID**																	
NBH22_1.5-1.95	24/04/2012	SE107686-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
BH23_0.5-0.6	24/04/2012	SE107686-1	<0.1	<0.1	0.1	0.3	0.3	0.4	0.2	0.2	0.3	<0.1	0.5	<0.1	0.1	0.2	0.5	0.5	3.3
BH23_1.5-1.95	24/04/2012	SE107686-1	<0.1	<0.1	<0.1	0.2	0.1	0.2	0.1	<0.1	0.2	<0.1	0.2	<0.1	<0.1	<0.1	0.2	0.2	1.4
BH23_3-3.45	24/04/2012	SE107686-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
NBH24_0.3-0.5	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0-0.1	24/04/2012	SE107686-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
NBH24_1.5-1.95	24/04/2012	SE107686-1	13	<1	23	50	30	28	15	10	42	3.1	79	12	11	<1	120	110	550
NBH24_3.0-3.45	24/04/2012	SE107686-1	<0.1	<0.1	0.1	0.3	0.2	0.2	0.1	0.1	0.3	<0.1	0.4	<0.1	<0.1	<0.1	0.5	0.6	2.7
BH25_0.4-0.5	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.5-0.6	18/04/2012	SE107335-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
BH25_1.5-1.7	18/04/2012	SE107335-1	0.2	0.5	1.2	2.2	1.6	1.9	0.8	0.7	1.4	0.2	3.9	0.5	0.7	0.2	3.1	3.7	23
BH25_4.5-4.9	18/04/2012	SE107335-1	<0.1	0.1	0.3	0.6	0.5	0.6	0.3	0.3	0.4	<0.1	1	0.1	0.2	<0.1	0.8	1	6
BH26_Surface	24/04/2012	SE107686-1	3	1.4	3.8	4.8	4.4	5.9	3.2	2	3.6	<1	15	<1	2.3	1.2	8.2	14	73
BH27_1.5-1.9	27/04/2012	SE107819-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
BH27_3.0-3.4	27/04/2012	SE107819-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
BH27_4.5-4.9	27/04/2012	SE107819-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
BH28_Surface	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_0.5-0.6	20/04/2012	SE107556-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
BH28_1.5-1.9	20/04/2012	SE107556-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
BH28_3.0-3.4	20/04/2012	SE107556-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
BH28_7.3-7.8	20/04/2012	SE107556-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
BH29_0.4-0.5	17/04/2012	SE107335-1	0.2	0.1	0.7	0.8	0.5	0.7	0.5	0.4	0.8	<0.1	1.5	0.3	0.3	0.1	3.2	1.3	11
BH29_0.9-1.0	17/04/2012	SE107335-1	2.5	4.7	13	26	16	21	9.3	5.6	14	2.5	53	5.5	8.1	2.6	69	51	300
BH29_2.0-2.1	17/04/2012	SE107335-1	<0.1	<0.1	0.2	0.2	0.1	0.2	<0.1	0.1	0.2	<0.1	0.5	<0.1	<0.1	<0.1	0.6	0.5	2.3
BH30_0.5-0.6	27/04/2012	SE107819-1	0.2	0.1	0.7	1.2	1	1.1	0.6	0.6	0.9	<0.1	2.6	0.3	0.5	<0.1	2	2.4	14
BH30_1.5-1.9	27/04/2012	SE107819-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
BH30_3.0-5.4	27/04/2012	SE107819-1	<0.1	<0.1	0.3	0.5	0.6	<0.1	<0.1	0.4	0.4	0.2	1.2	<0.1	0.4	<0.1	0.8	1.2	<0.8
BH30_4.5-4.9	27/04/2012	SE107819-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
DUP4A	20/04/2012	72127	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
QC3	14/04/2012	SE107556-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8
QC4	20/04/2012	SE107556-1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.8

Table 1: Soil Analytical Results
Stage 2 - Detailed Site Investigation
Sydney International Conference Exhibition and Entertainment Precinct

			PCB										OPP										
			Arochlor 1221	Aroclor 1016	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	PCBs (Sum of total)	Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Methidathion	Parathion
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1	0.2	0.2	0.2	0.5	0.5	0.5	0.2	0.2	0.2	0.5	0.2
NEPM 1999 HIL F												50											
A 1994 Health and Ecological																							
eneral Solid Waste (No Leaching)															4								
Sample ID	**Sample Date**	**Lab ID**																					
NBH22_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_0.5-0.6	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_3-3.45	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0.3-0.5	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0-0.1	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_3.0-3.45	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.4-0.5	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.5-0.6	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_1.5-1.7	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_4.5-4.9	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH26_Surface	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_1.5-1.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_3.0-3.4	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_4.5-4.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_Surface	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_0.5-0.6	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_1.5-1.9	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_3.0-3.4	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_7.3-7.8	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_0.4-0.5	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_0.9-1.0	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_2.0-2.1	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_0.5-0.6	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_1.5-1.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_3.0-5.4	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_4.5-4.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP4A	20/04/2012	72127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC3	14/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC4	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1: Soil Analytical Results
Stage 2 - Detailed Site Investigation
Sydney International Conference Exhibition and Entertainment Precinct

			OCP																							
			2,4-DDT	4,4-DDE	a-BHC	Aldrin	b-BHC	gamma-Chlordane	cis-Chlordane	d-BHC	DDD	DDT	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	o,p-DDD	o,p'-DDE
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 1999 HIL F																					50					
A 1994 Health and Ecological																										
eneral Solid Waste (No Leaching)																										
Sample ID	**Sample Date**	**Lab ID**																								
NBH22_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_0.5-0.6	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_3-3.45	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0.3-0.5	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0-0.1	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_3.0-3.45	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.4-0.5	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.5-0.6	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_1.5-1.7	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_4.5-4.9	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH26_Surface	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_1.5-1.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_3.0-3.4	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_4.5-4.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_Surface	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_0.5-0.6	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_1.5-1.9	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_3.0-3.4	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_7.3-7.8	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_0.4-0.5	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_0.9-1.0	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_2.0-2.1	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_0.5-0.6	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_1.5-1.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_3.0-5.4	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_4.5-4.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP4A	20/04/2012	72127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC3	14/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC4	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1: Soil Analytical Results
Stage 2 - Detailed Site Investigation
Sydney International Conference Exhibition and Entertainment Precinct

			OCP			VOC / SVOC																				
			trans-Nonachlor	Aldrin + Dieldrin	DDT+DDE+DDD	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,3-trichlorobenzene	1,2,3-trichloropropane	1,2,4-trichlorobenzene	1,2,4-trimethylbenzene	1,2-dibromo-3-chloropropane	1,2-dibromoethane	1,2-dichlorobenzene	1,2-dichloroethane	1,2-dichloropropane	1,3,5-trimethylbenzene	1,3-dichlorobenzene	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0.1			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 1999 HIL F				50	1000																					
A 1994 Health and Ecological																										
eneral Solid Waste (No Leaching)						200	600	26	24		14								86	10					150	
Sample ID	**Sample Date**	**Lab ID**																								
NBH22_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_0.5-0.6	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_3-3.45	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0.3-0.5	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0-0.1	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_3.0-3.45	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.4-0.5	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.5-0.6	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_1.5-1.7	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_4.5-4.9	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH26_Surface	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_1.5-1.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_3.0-3.4	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_4.5-4.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_Surface	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_0.5-0.6	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_1.5-1.9	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_3.0-3.4	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_7.3-7.8	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_0.4-0.5	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_0.9-1.0	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_2.0-2.1	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_0.5-0.6	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_1.5-1.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_3.0-5.4	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_4.5-4.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP4A	20/04/2012	72127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC3	14/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC4	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1: Soil Analytical Results
Stage 2 - Detailed Site Investigation
Sydney International Conference Exhibition and Entertainment Precinct

			VOC / SVOC																							
			Methyl Ethyl Ketone	2-chlorotoluene	2-hexanone (MBK)	2-Nitropropane	4-chlorotoluene	4-Methyl-2-pentanone	Acetone	Acrylonitrile	Allyl chloride	Bromobenzene	Bromochloromethane	Bromodichloromethane	Bromoform	Bromomethane	Carbon disulfide	Carbon tetrachloride	Chlorobenzene	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	cis-1,4-Dichloro-2-butene
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			10	0.1	5	10	0.1	1	10	0.1	0.1	0.1	0.1	0.1	0.1	1	0.5	0.1	0.1	0.1	1	0.1	1	0.1	0.1	1
NEPM 1999 HIL F																										
A 1994 Health and Ecological																										
eneral Solid Waste (No Leaching)			4000															10	2000			120				
Sample ID	**Sample Date**	**Lab ID**																								
NBH22_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_0.5-0.6	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_3-3.45	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0.3-0.5	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0-0.1	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_3.0-3.45	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.4-0.5	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.5-0.6	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_1.5-1.7	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_4.5-4.9	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH26_Surface	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_1.5-1.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_3.0-3.4	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_4.5-4.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_Surface	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_0.5-0.6	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_1.5-1.9	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_3.0-3.4	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_7.3-7.8	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_0.4-0.5	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_0.9-1.0	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_2.0-2.1	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_0.5-0.6	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_1.5-1.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_3.0-5.4	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_4.5-4.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP4A	20/04/2012	72127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC3	14/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC4	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1: Soil Analytical Results
Stage 2 - Detailed Site Investigation
Sydney International Conference Exhibition and Entertainment Precinct

			VOC / SVOC																					
			Dibromomethane	Dichlorodifluoromethane	Dichloromethane	Hexachlorobutadiene	Iodomethane	Isopropylbenzene	MTBE	Naphthalene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	Trichloroethene	tert-butylbenzene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	trans-1,4-Dichloro-2-butene	Trichlorofluoromethane	Vinyl acetate	Vinyl chloride
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0.1	1	0.5	0.1	5	0.1	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	1	10	0.1
NEPM 1999 HIL F																								
A 1994 Health and Ecological																								
eneral Solid Waste (No Leaching)					172										60	10		14						4
Sample ID	**Sample Date**	**Lab ID**																						
NBH22_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_0.5-0.6	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_3-3.45	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0.3-0.5	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_0-0.1	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_1.5-1.95	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NBH24_3.0-3.45	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.4-0.5	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.5-0.6	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_1.5-1.7	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_4.5-4.9	18/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH26_Surface	24/04/2012	SE107686-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_1.5-1.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_3.0-3.4	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH27_4.5-4.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_Surface	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_0.5-0.6	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_1.5-1.9	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_3.0-3.4	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH28_7.3-7.8	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_0.4-0.5	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_0.9-1.0	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH29_2.0-2.1	17/04/2012	SE107335-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_0.5-0.6	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_1.5-1.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_3.0-5.4	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH30_4.5-4.9	27/04/2012	SE107819-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP4A	20/04/2012	72127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC3	14/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC4	20/04/2012	SE107556-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1. Area A Soil Analytical Results
Sydney International Conference Exhibition and Entertainment Precinct

Field_ID						EB1 / 1.0-1.1	EB1 / 1	EB1 / 2.0-2.1	EB1 / 3.0-3.1	NBH24	NBH24	NBH24	NBH24	CBH5_(0.5-0.6m)	DUP4	CBH5_(1.0-1.1m)	CBH5_(2.0-2.1m)
LocCode						EB1	EB1	EB1	EB1	NBH24	NBH24	NBH24	NBH24	CBH5	CBH5	CBH5	CBH5
Sample_Depth_Range						1.0-1.1	1.4-1.5	2.0-2.1	3.0-3.1	0.3-0.5	0-0.1	1.5-1.95	3.0-3.45	0.5-0.6	0.5-0.6	1.0-1.1	2.0-2.1
Sampled_Date-Time						10/06/2011	#####	10/06/2011	10/06/2011	24/04/2012	24/04/2012	24/04/2012	24/04/2012	25/07/2012	25/07/2012	25/07/2012	25/07/2012
Matrix_Description						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte Group	**Analyte**	**Units**	**LOR**	**NEPM 1999 HIL F**	**NSW EPA 1994 Health and Ecological**												
Volatile	Benzene	mg/kg	0.5		1	-	-	-	<0.1	-	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5		50	-	-	-	<0.1	-	<0.1	0.4	<0.1	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5		130	-	-	-	<0.1	-	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5			-	-	-	<LOR	-	<LOR	2	<LOR	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1			<0.5	-	-	<1	-	<0.2	1.1	<0.2	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5			1.6	-	-	<0.5	-	<0.1	0.3	<0.1	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5		25	1.8	-	-	<0.3	-	<0.3	1.4	<0.3	<1.5	<1.5	<1.5	<1.5
PAH	Acenaphthene	mg/kg	0.5			2.7	-	-	-	-	<0.1	13	<0.1	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5			0.9	-	-	-	-	<0.1	<1	<0.1	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5			1.4	-	-	-	-	<0.1	23	0.1	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5			<0.5	-	-	-	-	<0.1	50	0.3	<0.5	<0.5	<0.5	1.1
	Benzo(a)pyrene	mg/kg	0.5	5		2.6	-	4.3	<0.05	-	<0.1	**30**	0.2	<0.5	<0.5	<0.5	0.9
	Benzo(b)&(k)fluoranthene	mg/kg	1			<0.5	-	-	-	-	<0.1	38	0.3	<1	<1	<1	1.4
	Benzo(g,h,i)perylene	mg/kg	0.5			0.7	-	-	-	-	<0.1	15	0.1	<0.5	<0.5	<0.5	0.6
	Chrysene	mg/kg	0.5			<0.5	-	-	-	-	<0.1	42	0.3	<0.5	<0.5	<0.5	0.8
	Dibenz(a,h)anthracene	mg/kg	0.5			1.5	-	-	-	-	<0.1	3.1	<0.1	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5			2.5	-	-	-	-	<0.1	79	0.4	<0.5	<0.5	<0.5	1.8
	Fluorene	mg/kg	0.5			16	-	-	-	-	<0.1	12	<0.1	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			-	-	-	-	-	<0.1	11	<0.1	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5			-	-	-	-	-	<0.1	<1	<0.1	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5			-	-	-	-	-	<0.1	120	0.5	<0.5	<0.5	<0.5	0.9
	Pyrene	mg/kg	0.5			-	-	-	-	-	<0.1	110	0.6	<0.5	<0.5	<0.5	1.7
	Total PAHs	mg/kg	1	100		-	**1400**	70	3	-	<0.8	**550**	2.7	<1	<1	<1	9.2
TPH	C6 - C9	mg/kg	10		65	-	<20	<20	<20	-	<20	21	<20	<10	<10	<10	<10
	C10 - C14	mg/kg	50			-	130	<20	<20	-	<20	62	<20	<50	<50	<50	<50
	C15 - C28	mg/kg	100			-	4300	290	310	-	<50	2400	<50	<100	<100	<100	<100
	C29 - C36	mg/kg	100			-	1900	150	140	-	<50	1100	<50	<100	<100	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100		1000	-	**4620**	440	450	-	<120	**3562**	<120	<100	<100	<100	<100
Asbestos						ND	ND	ND	-	ND	ND	-	-	ND	-	ND	-
VOC	VOC					-	<LOR	<LOR	-	-	-	-	-	-	-	-	-
SVOC	SVOC					-	<LOR	<LOR	-	-	-	-	-	-	-	-	-

[1]Labelled as BH7_(1.0-1.1m) in the laboratory report.
LOR: Limit of Reporting
ND: Not Detected
(grey shading) Concentration above criteria

Table 1. Area A Soil Analytical Results
Sydney International Conference Exhibition and Entertainment Precinct

Analyte Group	Analyte	Units	LOR	NEPM 1999 HIL F	NSW EPA 1994 Health and Ecological	CBH5A_(1.0-1.1m)	CBH5A_(2.0-2.1m)	CBH5A_(3.0-3.1m)	CBH5A_(3.5-3.6m)	CBH6_(0.5-0.6m)	CBH6_(1.0-1.1m)	CBH6_(1.5-1.6m)	CBH6_(2.0-2.1m)	CBH6_(2.5-2.6m)	CBH7_(0.5-0.6m)	CBH7_(1.0-1.1m)[1]	CBH7_(1.5-1.6m)
LocCode						CBH5A	CBH5A	CBH5A	CBH5A	CBH6	CBH6	CBH6	CBH6	CBH6	CBH7	CBH7	CBH7
Sample_Depth_Range						1.0-1.1	2.0-2.1	3.0-3.1	3.5-3.6	0.5-0.6	0.5-0.6	1.5-1.6	2.0-2.1	2.5-2.6	0.5-0.6	1.0-1.1	1.5-1.6
Sampled_Date-Time						27/07/2012	27/07/2012	27/07/2012	27/07/2012	25/07/2012	25/07/2012	25/07/2012	25/07/2012	25/07/2012	24/07/2012	24/07/2012	24/07/2012
Matrix_Description						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Volatile	Benzene	mg/kg	0.5		1	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5		50	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5		130	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5			<1.5	<1.5	<1.5	<1.5	<1.5	-	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1			<1	<1	<1	<1	<1	-	<1	<1	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5			<0.5	0	<0.5	<0.5	<0.5	-	<0.5	133	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5		25	<1.5	<1.5	<1.5	<1.5	<1.5	-	<1.5	133	<1.5	<1.5	0	<1.5
PAH	Acenaphthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
	Acenaphthylene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	133	<0.5	<0.5	0	2.6
	Benzo(a)anthracene	mg/kg	0.5			<0.5	0.8	<0.5	1	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	2.8
	Benzo(a)pyrene	mg/kg	0.5	5		<0.5	0.9	<0.5	0.9	<0.5	-	<0.5	50	<0.5	<0.5	<0.5	2.8
	Benzo(b)&(k)fluoranthene	mg/kg	1			<1	1.4	<1	1.4	<1	-	<1	<1	<1	<1	<1	4.3
	Benzo(g,h,i)perylene	mg/kg	0.5			<0.5	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.6
	Chrysene	mg/kg	0.5			<0.5	0.7	<0.5	0.9	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	2.6
	Dibenz(a,h)anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	50	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5			<0.5	0	<0.5	2.1	<0.5	-	<0.5	50	<0.5	<0.5	<0.5	7.4
	Fluorene	mg/kg	0.5			<0.5	0	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	0.9
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2
	Naphthalene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5			<0.5	<0.5	<0.5	1.1	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	6.5
	Pyrene	mg/kg	0.5			<0.5	1.7	<0.5	2	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	6
	Total PAHs	mg/kg	1	100		<1	7.6	<1	9.4	<1	-	<1	<1	<1	<1	<1	39
TPH	C6 - C9	mg/kg	10		65	<10	<10	<10	<10	<10	-	<10	<10	<10	<10	<10	<10
	C10 - C14	mg/kg	50			<50	<50	<50	<50	<50	-	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100			<100	<100	<100	<100	<100	-	<100	<100	<100	<100	<100	<100
	C29 - C36	mg/kg	100			<100	<100	<100	<100	<100	-	<100	<100	<100	<100	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100		1000	<100	<100	<100	<100	<100	-	<100	<100	<100	<100	<100	<100
Asbestos						ND	ND	-	-	-	ND	ND	-	-	ND	-	ND
VOC	VOC					-	-	-	-	-		-	-	-	-	-	-
SVOC	SVOC					-	-	-	-	-		-	-	-	-	-	-

[1]Labelled as BH7_(1.0-1.1m) in the laboratory report.
LOR: Limit of Reporting
ND: Not Detected
Concentration above criteria

Table 1. Area A Soil Analytical Results
Sydney International Conference Exhibition and Entertainment Precinct

Field_ID						DUP7	CBH7A_(1.0-1.1m)	CBH7A_(2.0-2.1m)	CBH7A_(2.9-3.0m)	CBH8_(0.15-0.6m)	CBH8_(1.5-1.6m)	CBH8_(2.0-2.1m)	CBH8_(2.5-2.6m)
LocCode						CBH7A	CBH7A	CBH7A	CBH7A	CBH8	CBH8	CBH8	CBH8
Sample_Depth_Range						2.9-3.0	1.0-1.1	2.0-2.1	2.9-3.0	0.15-0.6	1.5-1.6	2.0-2.1	2.5-2.6
Sampled_Date-Time						27/07/2012	27/07/2012	27/07/2012	27/07/2012	27/07/2012	24/07/2012	24/07/2012	24/07/2012
Matrix_Description						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Analyte Group	**Analyte**	**Units**	**LOR**	**NEPM 1999 HIL F**	**NSW EPA 1994 Health and Ecological**								
Volatile	Benzene	mg/kg	0.5		1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5		50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5		130	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5			<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1			<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5		25	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
PAH	Acenaphthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5	5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b)&(k)fluoranthene	mg/kg	1			<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(g,h,i)perylene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5			0.8	<0.5	0.7	0.9	0.7	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5			0.8	<0.5	0.6	0.9	0.7	<0.5	<0.5	<0.5
	Total PAHs	mg/kg	1	100		1.6	<1	1.3	2.3	1.4	<1	<1	<1
TPH	C6 - C9	mg/kg	10		65	<10	<10	<10	<10	<10	<10	<10	<10
	C10 - C14	mg/kg	50			<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100			<100	<100	<100	<100	<100	<100	<100	<100
	C29 - C36	mg/kg	100			<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100		1000	<100	<100	<100	<100	<100	<100	<100	<100
Asbestos						-	ND	ND	-	ND	-	-	-
VOC	VOC					-	-	-	-	-	-	-	-
SVOC	SVOC					-	-	-	-	-	-	-	-

[1]Labelled as BH7_(1.0-1.1m) in the laboratory report.
LOR: Limit of Reporting
ND: Not Detected
Concentration above criteria

Table 2. Area B Soil Analytical Results
Sydney International Conference Exhibition and Entertainment Precinct

Field ID						BH101.1-1.3	BH10 2	BH10 3.0	BH10 4.0	BH12 0.5	BH12 1.0	BH12 1.5	BH12 2.0	BH12 3.0	BH23 0.5-0.6	BH23 1.5-1.95	BH23 3-3.45	NBH29 0.4-0.5[1]
LocCode						BH10	BH10	BH10	BH10	BH12	BH12	BH12	BH12	BH12	BH23	BH23	BH23	NBH29[1]
Sample Depth						1.0-1.3	2.0	3.0	4.0	0.5	1.0	1.5	2.0	3.0	0.5-0.6	1.5-1.95	3-3.45	0.4-0.5
Sampled Date						10/06/2011	#####	10/06/2011	10/06/2011	10/06/2011	10/06/2011	10/06/2012	10/06/2011	10/06/2011	24/04/2012	24/04/2012	24/04/2012	17/04/2012
Matrix Description						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Anlayte Group	**Analyte**	**Units**	**LOR**	**NEPM 1999 HIL F**	**NSW EPA 1994 Health and Ecological**													
Volatile	Benzene	mg/kg	0.5		1	<1	<0.1	<0.1	<0.1	-	<0.1	<1	<0.1	-	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.5		50	<1	<0.1	<0.1	<0.1	-	<0.1	<1	<0.1	-	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.5		130	<1	<0.1	<0.1	<0.1	-	<0.1	<1	<0.1	-	<0.1	<0.1	<0.1	<0.1
	Total BTEX	mg/kg	1.5			<LOR	<LOR	<LOR	<LOR	-	-	-	-	-				<LOR
	Xylene (m & p)	mg/kg	1			<0.5	-	<1	<1	-	<1	<2	<1	-	<0.1	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.5			1.6	<0.5	<0.5	<0.5	-	<0.5	<1	<0.5	-	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	1.5		25	1.8	<0.6	<0.3	<0.3	-	<0.3	<3	<0.3	-	<0.3	<0.3	<0.3	<0.3
PAH	Acenaphthene	mg/kg	0.5			2.7	<0.7	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.2
	Acenaphthylene	mg/kg	0.5			0.9	<0.8	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.1
	Anthracene	mg/kg	0.5			1.4	<0.9	-	-	-	-	-	-	-	0.1	<0.1	<0.1	0.7
	Benzo(a)anthracene	mg/kg	0.5			<0.5	-	-	-	-	-	-	-	-	0.3	0.2	<0.1	0.8
	Benzo(a)pyrene	mg/kg	0.5	5		**2.6**	<0.11	<0.05	2.1	0.63	3.2	1.9	<0.05	<0.05	0.3	0.1	<0.1	0.5
	Benzo(b)&(k)fluoranthene	mg/kg	1			<0.5	-	-	-	-	-	-	-	-	0.4	0.2	<0.1	1.1
	Benzo(g,h,i)perylene	mg/kg	0.5			0.7	<0.13	-	-	-	-	-	-	-	0.2	0.1	<0.1	0.5
	Chrysene	mg/kg	0.5			<0.5	-	-	-	-	-	-	-	-	0.3	0.2	<0.1	0.8
	Dibenz(a,h)anthracene	mg/kg	0.5			1.5	<0.15	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1
	Fluoranthene	mg/kg	0.5			2.5	<0.16	-	-	-	-	-	-	-	0.5	0.2	<0.1	1.5
	Fluorene	mg/kg	0.5			16	<0.17	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.3
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	0.1	<0.1	<0.1	0.3
	Naphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	0.2	<0.1	<0.1	0.1
	Phenanthrene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	0.5	0.2	<0.1	3.2
	Pyrene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	0.5	0.2	<0.1	1.3
	Total PAHs	mg/kg	1	100		**280**	-	<1.75	32	5.6	29	17	<1.75	<1.75	3.3	1.4	<0.8	11
TPH	C6 - C9	mg/kg	10		65	<20	<20	<20	<20	-	<20	<20	<20	-	<20	<20	<20	<20
	C10 - C14	mg/kg	50			22	<20	<20	<20	-	<20	<20	<20	-	<20	<20	<20	<20
	C15 - C28	mg/kg	100			1100	590	<50	120	-	190	130	<50	-	<50	<50	<50	2500
	C29 - C36	mg/kg	100			510	220	<50	52	-	150	100	<50	-	<50	<50	<50	1700
	C10 - C36 (Sum of total)	mg/kg	100		1000	**1632**	810	<120	172	-	340	230	<120	-	<120	<120	<120	**4220**
Asbestos		mg/kg				ND	-	ND	-	ND	-	ND	ND	-	-	-	-	ND
VOC	VOC	mg/kg				<LOR	-	-	-	-	-	<LOR	-	-	-	-	-	-
SVOC	SVOC	mg/kg				-	-	-	-	-	-	<LOR	-	-	-	-	-	-

LOR: Limit of Reporting
ND: Not Detected
[1]Samples NBH29 were mislabelled BH29.
Concentration above criteria (shaded)

Table 2. Area B Soil Analytical Results
Sydney International Conference Exhibition and Entertainment Precinct

Field ID						NBH29 0.9-1.0[1]	NBH29 2.0-2.1[1]	CBH9_(0.5-0.6m)	CBH9_(1.0-1.1m)	CBH9_(1.5-1.6m)	CBH9_(2.5-2.6m)	CBH10_(0.5-0.6m)	CBH10_(1.0-1.1m)	CBH10_(1.5-1.6m)	CBH10_(2.0-2.1m)	DUP5	DUP5A
LocCode						NBH29[1]	NBH29[1]	CBH9	CBH9	CBH9	CBH9	CBH10	CBH10	CBH10	CBH10	CBH10	CBH10
Sample Depth						0.9-1.0	2.0-2.1	0.5-0.6	1.0-1.1	1.5-1.6	2.5-2.6	0.5-0.6	1.0-1.1	1.5-1.6	2.0-2.1	2.0-2.1	2.0-2.1
Sampled Date						17/04/2012	17/04/2012	26/07/2012	26/07/2012	26/07/2012	26/07/2012	26/07/2012	26/07/2012	26/07/2012	26/07/2012	26/07/2012	26/07/2012
Matrix Description						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Anlayte Group	**Analyte**	**Units**	**LOR**	**NEPM 1999 HIL F**	**NSW EPA 1994 Health and Ecological**												
Volatile	Benzene	mg/kg	0.5		1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2
	Ethylbenzene	mg/kg	0.5		50	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
	Toluene	mg/kg	0.5		130	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5			<LOR	<LOR	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<25
	Xylene (m & p)	mg/kg	1			<0.2	<0.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2
	Xylene (o)	mg/kg	0.5			0	<0.1	<0.5	<0.5	<0.5	<0.5	133	<0.5	<0.5	<0.5	<0.5	<1
	Xylene Total	mg/kg	1.5		25	<0.3	<0.3	<1.5	<1.5	<1.5	<1.5	133	<1.5	<1.5	0	<1.5	-
PAH	Acenaphthene	mg/kg	0.5			2.5	<0.1	<0.5	0.9	<0.5	<0.5	<0.5	5	<0.5	<0.5	<0.5	<0.1
	Acenaphthylene	mg/kg	0.5			4.7	<0.1	<0.5	<0.5	<0.5	<0.5	3.5	0.7	<0.5	<0.5	<0.5	<0.1
	Anthracene	mg/kg	0.5			13	0.2	<0.5	2.8	<0.5	<0.5	133	12	<0.5	0	<0.5	<0.1
	Benzo(a)anthracene	mg/kg	0.5			26	0.2	<0.5	5.8	1.1	<0.5	16	20	<0.5	<0.5	0.5	0.1
	Benzo(a)pyrene	mg/kg	0.5	5		**16**	0.1	<0.5	**6**	1.8	<0.5	**10**	**19**	<0.5	0	0.5	0.1
	Benzo(b)&(k)fluoranthene	mg/kg	1			26.6	0.3	<1	9.1	2.8	<1	17	28	<1	<1	<1	<0.2
	Benzo(g,h,i)perylene	mg/kg	0.5			9.3	<0.1	<0.5	3.7	1.5	<0.5	5.1	11	<0.5	<0.5	<0.5	<0.1
	Chrysene	mg/kg	0.5			14	0.2	<0.5	4	1.1	<0.5	9.2	13	<0.5	<0.5	<0.5	0.1
	Dibenz(a,h)anthracene	mg/kg	0.5			2.5	<0.1	<0.5	<0.5	<0.5	<0.5	50	<0.5	<0.5	<0.5	<0.5	<0.1
	Fluoranthene	mg/kg	0.5			0	0.5	<0.5	12	1.6	<0.5	50	50	0.6	<0.5	1.2	0.3
	Fluorene	mg/kg	0.5			0	<0.1	<0.5	0.8	<0.5	<0.5	1.9	5.1	<0.5	<0.5	<0.5	<0.1
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			8.1	<0.1	<0.5	2.7	1	<0.5	4.2	8.6	<0.5	<0.5	<0.5	<0.1
	Naphthalene	mg/kg	0.5			2.6	<0.1	<0.5	<0.5	<0.5	<0.5	0.6	3.8	<0.5	<0.5	<0.5	<0.1
	Phenanthrene	mg/kg	0.5			69	0.6	<0.5	8.9	0.6	<0.5	32	42	0.7	<0.5	1	0.3
	Pyrene	mg/kg	0.5			51	0.5	<0.5	11	1.8	<0.5	31	43	<0.5	<0.5	1	0.3
	Total PAHs	mg/kg	1	100		**300**	2.3	<1	68	13	<1	**180**	**260**	1.3	<1	4.2	-
TPH	C6 - C9	mg/kg	10		65	<20	<20	<10	<10	<10	<10	<10	<10	<10	<10	<10	-
	C10 - C14	mg/kg	50			<20	<20	<50	<50	<50	<50	<50	<50	<50	<50	<50	<100
	C15 - C28	mg/kg	100			840	<50	<100	210	<100	<100	470	690	<100	<100	<100	<100
	C29 - C36	mg/kg	100			380	<50	<100	580	<100	<100	200	420	<100	<100	<100	-
	C10 - C36 (Sum of total)	mg/kg	100		1000	**1230**	<100	<100	790	<100	<100	670	**1100**	<100	<100	<100	-
Asbestos		mg/kg				-	-	ND	-	ND	-	ND	-	ND	-	-	-
VOC	VOC	mg/kg				-	-	-	-	-	-	-	-	-	-	-	-
SVOC	SVOC	mg/kg				-	-	-	-	-	-	-	-	-	-	-	-

LOR: Limit of Reporting
ND: Not Detected
[1]Samples NBH29 were mislabelled BH29.
[shaded] Concentration above criteria

Table 2. Area B Soil Analytical Results
Sydney International Conference Exhibition and Entertainment Precinct

Field ID						CBH11_(0.5-0.6m)	CBH11_(1.0-1.1m)	CBH11_(2.0-2.1m)	CBH11_(3.0-3.1m)
LocCode						CBH11	CBH11	CBH11	CBH11
Sample Depth						0.5-0.6	1.0-1.1	2.0-2.1	3.0-3.1
Sampled Date						25/07/2012	26/07/2012	26/07/2012	26/07/2012
Matrix Description						Soil	Soil	Soil	Soil
Anlayte Group	**Analyte**	**Units**	**LOR**	**NEPM 1999 HIL F**	**NSW EPA 1994 Health and Ecological**				
Volatile	Benzene	mg/kg	0.5		1	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5		50	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5		130	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5			<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1			<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5		25	<1.5	<1.5	<1.5	<1.5
PAH	Acenaphthene	mg/kg	0.5			<0.5	2	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5			<0.5	0.7	<0.5	<0.5
	Anthracene	mg/kg	0.5			<0.5	5.1	1	<0.5
	Benzo(a)anthracene	mg/kg	0.5			0.6	11	1.8	<0.5
	Benzo(a)pyrene	mg/kg	0.5	5		0.6	**7.5**	1.1	<0.5
	Benzo(b)&(k)fluoranthene	mg/kg	1			1.1	13	2	<1
	Benzo(g,h,i)perylene	mg/kg	0.5			<0.5	3.2	0.5	<0.5
	Chrysene	mg/kg	0.5			0.6	6.7	1.3	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5			1.2	18	3.5	<0.5
	Fluorene	mg/kg	0.5			<0.5	2.7	0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			<0.5	3.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5			<0.5	1	<0.5	<0.5
	Phenanthrene	mg/kg	0.5			0.7	16	3.2	<0.5
	Pyrene	mg/kg	0.5			1.2	18	3.7	<0.5
	Total PAHs	mg/kg	1	100		6	**110**	19	<1
TPH	C6 - C9	mg/kg	10		65	<10	<10	<10	<10
	C10 - C14	mg/kg	50			<50	<50	<50	<50
	C15 - C28	mg/kg	100			<100	540	<100	<100
	C29 - C36	mg/kg	100			<100	280	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100		1000	<100	820	<100	<100
Asbestos		mg/kg				ND	ND	ND	-
VOC	VOC	mg/kg				-	-	-	-
SVOC	SVOC	mg/kg				-	-	-	-

LOR: Limit of Reporting
ND: Not Detected
[1]Samples NBH29 were mislabelled BH29.
Concentration above criteria

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH118_(0.5-0.6m)	BH118_(0.5-0.6m)_A	BH118_(1.0-1.1m)	BH118_(2.0-2.1m)	BH118_(2.0-2.1m)_A	BH118_(3.0-3.1m)	BH118_(3.5-3.6m)	BH119_(0.11-0.21m)	BH119-0.33m-ASB
			Sampled_Date-Time	12/12/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012
			Lab_Report_Number	363099	363099	363099	363099	363099	363099	363099	362912	
Chem_Group	**ChemName**	**Units**	**LOR**									
BTEX	Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Total BTEX	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	-
	Xylene (m & p)	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	-
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Xylene Total	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	-
TPH	C6 - C9	mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	-
	C10 - C14	mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	-
	C15 - C28	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	-
	C29 - C36	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	-
	C10 - C36 (Sum of total)	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	-
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Benzo(b)&(k)fluoranthene	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	-
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Chrysene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Fluorene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Naphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
	Total PAHs	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	-
Metals	Arsenic	mg/kg	2	<2	4.6	-	2.8	-	4.1	-	<2	-
	Cadmium	mg/kg	0.4	<0.4	<0.4	-	<0.4	-	<0.4	-	<0.4	-
	Chromium	mg/kg	5	7	5.6	-	6.1	-	<5	-	<5	-
	Copper	mg/kg	5	23	17	-	<5	-	5	-	75	-
	Lead	mg/kg	5	44	58	-	13	-	7.6	-	5.6	-
	Mercury	mg/kg	0.05	0.07	0.06	-	<0.05	-	<0.05	-	<0.05	-
	Nickel	mg/kg	5	7.3	11	-	<5	-	<5	-	210	-
	Zinc	mg/kg	5	280	250	-	78	-	140	-	90	-
Material	Asbestos		Detection	ND		ND					ND	Chrysotile

Notes:

-	Not Analysed
ND	Not Detected

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH119_(0.4-0.5m)	BH119_(0.8-0.9m)	BH119_(1.4-1.5m)	BH119_(1.4-1.5m)_A	BH119_(2.1-2.3m)	BH120_(0.03-0.13m)	H120_(0.03-0.13m)	BH120_(1.0-1.1m)	BH120_(1.5-1.6m)
			Sampled_Date-Time	12/12/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012	18/12/2012	18/12/2012	18/12/2012	18/12/2012
			Lab_Report_Number	362912	362912	362912	362912	362912	363975	363975	363975	363975
Chem_Group	**ChemName**	**Units**	**LOR**									
BTEX	Benzene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5	<1.5	-	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1	<1	-	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5	<1.5	-	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
TPH	C6 - C9	mg/kg	10	<10	-	<10	<10	<10	<10	<10	<10	<10
	C10 - C14	mg/kg	50	<50	-	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100	<100	-	<100	<100	<100	<100	<100	<100	390
	C29 - C36	mg/kg	100	<100	-	<100	<100	<100	<100	<100	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100	<100	-	<100	<100	<100	<100	<100	<100	390
PAH	Acenaphthene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.1
	Acenaphthylene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	12
	Benzo(a)pyrene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.4	8.7
	Benzo(b)&(k)fluoranthene	mg/kg	1	<1	-	<1	<1	<1	<1	<1	2.2	15
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1	4.6
	Chrysene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	9.6
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.9	27
	Fluorene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.8
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	4.1
	Naphthalene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	31
	Pyrene	mg/kg	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	2.1	23
	Total PAHs	mg/kg	1	<1	-	<1	<1	<1	<1	<1	13	140
Metals	Arsenic	mg/kg	2	4.8	-	16	3.8	34	4	-	6.1	-
	Cadmium	mg/kg	0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	-	<0.4	-
	Chromium	mg/kg	5	<5	-	24	21	35	110	-	6.7	-
	Copper	mg/kg	5	17	-	<5	24	96	43	-	51	-
	Lead	mg/kg	5	40	-	63	190	530	6.2	-	250	-
	Mercury	mg/kg	0.05	0.2	-	0.51	1.8	4.9	<0.05	-	0.57	-
	Nickel	mg/kg	5	6.3	-	<5	6.7	35	120	-	<5	-
	Zinc	mg/kg	5	26	-	30	70	220	79	-	190	-
Material	Asbestos		Detection	ND	ND				ND		ND	

Notes:

-	Not Analysed
ND	Not Detected

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH120_(1.5-1.6m)_A	BH120_(2.4-2.5m)	BH120_(3.5-3.6m)	BH121_(0.5-0.6m)	BH121_(0.5-0.6m)_A	BH121_(3.4-3.5m)	BH121A_(0.5-0.6m)	BH121A_(1.0-1.1m)	BH121A_(1.0-1.1m)_A
			Sampled_Date-Time	18/12/2012	18/12/2012	18/12/2012	18/12/2012	18/12/2012	18/12/2012	18/12/2012	18/12/2012	18/12/2012
			Lab_Report_Number	363975	363975	363975	363975	363975	363975	363975	363975	363975
Chem_Group	**ChemName**	**Units**	**LOR**									
BTEX	Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
TPH	C6 - C9	mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C10 - C14	mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100	160	<100	<100	<100	<100	<100	<100	520	1300
	C29 - C36	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	270	810
	C10 - C36 (Sum of total)	mg/kg	100	160	<100	<100	<100	<100	<100	<100	790	2100
PAH	Acenaphthene	mg/kg	0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5
	Anthracene	mg/kg	0.5	8.9	<0.5	<0.5	1.2	1.1	<0.5	<0.5	14	7.9
	Benzo(a)anthracene	mg/kg	0.5	5.6	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	18	31
	Benzo(a)pyrene	mg/kg	0.5	3.9	<0.5	<0.5	0.8	0.7	<0.5	0.5	13	22
	Benzo(b)&(k)fluoranthene	mg/kg	1	7.1	<1	<1	<1	1.4	<1	1.1	21	39
	Benzo(g,h,i)perylene	mg/kg	0.5	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	6.6	11
	Chrysene	mg/kg	0.5	4.8	<0.5	<0.5	<0.5	0.8	<0.5	0.6	14	23
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5
	Fluoranthene	mg/kg	0.5	12	<0.5	<0.5	2.3	2	<0.5	0.9	30	55
	Fluorene	mg/kg	0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	1.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	9.8
	Naphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5
	Phenanthrene	mg/kg	0.5	9.1	<0.5	<0.5	1.2	1.2	<0.5	<0.5	14	28
	Pyrene	mg/kg	0.5	10	<0.5	<0.5	2	1.7	<0.5	1	31	53
	Total PAHs	mg/kg	1	67	<1	<1	7.5	8.9	<1	4.8	160	280
Metals	Arsenic	mg/kg	2	-	-	-	8.7	-	-	14	-	-
	Cadmium	mg/kg	0.4	-	-	-	<0.4	-	-	<0.4	-	-
	Chromium	mg/kg	5	-	-	-	42	-	-	11	-	-
	Copper	mg/kg	5	-	-	-	130	-	-	93	-	-
	Lead	mg/kg	5	-	-	-	79	-	-	160	-	-
	Mercury	mg/kg	0.05	-	-	-	0.41	-	-	0.59	-	-
	Nickel	mg/kg	5	-	-	-	51	-	-	14	-	-
	Zinc	mg/kg	5	-	-	-	120	-	-	150	-	-
Material	Asbestos		Detection				ND			ND		

Notes:
- Not Analysed
ND Not Detected

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH121A_(1.5-1.6m)	BH121A_(2.5-2.6m)	BH122_(0.5-0.6m)	BH122_(1.5-1.6m)	BH122A_(0.5-0.6m)	BH122A_(1.0-1.1m)	BH122A_(1.5-1.6m)	BH122A_(1.5-1.6m)_A	BH122A_(2.0-2.1m)
			Sampled_Date-Time	18/12/2012	18/12/2012	13/12/2012	13/12/2012	13/12/2012	13/12/2012	13/12/2012	13/12/2012	13/12/2012
			Lab_Report_Number	363975	363975	363099	363099	363351	363351	363351	363351	363351
Chem_Group	**ChemName**	**Units**	**LOR**									
BTEX	Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	-	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1	<1	<1	<1	<1	<1	-	<1	<1	<1
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	-	<1.5	<1.5	<1.5
TPH	C6 - C9	mg/kg	10	<10	<10	<10	<10	<10	-	<10	<10	<10
	C10 - C14	mg/kg	50	<50	<50	<50	<50	<50	-	<50	<50	<50
	C15 - C28	mg/kg	100	350	<100	<100	<100	<100	-	180	<100	<100
	C29 - C36	mg/kg	100	270	<100	<100	<100	<100	-	<100	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100	620	<100	<100	<100	<100	-	180	<100	<100
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5	1.4	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5	3.6	<0.5	<0.5	<0.5	<0.5	-	0.7	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5	10	<0.5	<0.5	1.3	<0.5	-	2.2	1.3	<0.5
	Benzo(a)pyrene	mg/kg	0.5	7.8	<0.5	<0.5	1.3	<0.5	-	2.1	1.2	<0.5
	Benzo(b)&(k)fluoranthene	mg/kg	1	13	<1	<1	2	<1	-	3.5	2.1	<1
	Benzo(g,h,i)perylene	mg/kg	0.5	3.8	<0.5	<0.5	0.7	<0.5	-	1.1	0.7	<0.5
	Chrysene	mg/kg	0.5	8	<0.5	<0.5	1.1	<0.5	-	2	1.1	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5	18	0.8	0.9	2.4	<0.5	-	4.2	2.4	<0.5
	Fluorene	mg/kg	0.5	1.2	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	3.5	<0.5	<0.5	0.6	<0.5	-	1	0.6	<0.5
	Naphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5	14	<0.5	0.6	1.4	<0.5	-	2.7	1.4	0.8
	Pyrene	mg/kg	0.5	17	0.8	0.9	2.3	<0.5	-	4	2.2	<0.5
	Total PAHs	mg/kg	1	100	1.6	2.4	13	<1	-	24	13	<1
Metals	Arsenic	mg/kg	2	14	-	2.1	-	2.8	-	4.5	5.2	5
	Cadmium	mg/kg	0.4	<0.4	-	<0.4	-	<0.4	-	<0.4	<0.4	<0.4
	Chromium	mg/kg	5	27	-	11	-	7.5	-	11	11	11
	Copper	mg/kg	5	350	-	20	-	29	-	26	26	48
	Lead	mg/kg	5	2700	-	35	-	47	-	52	56	140
	Mercury	mg/kg	0.05	3.4	-	0.06	-	0.06	-	0.16	0.12	0.35
	Nickel	mg/kg	5	62	-	8	-	<5	-	<5	<5	<5
	Zinc	mg/kg	5	310	-	60	-	55	-	56	63	81
Material	Asbestos		Detection	ND		ND		ND	ND			

Notes:

-	Not Analysed
ND	Not Detected

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH122A_(3.0-3.1m)	BH122A_(3.4-3.5m)	BH123_(0.08-0.18m)	BH123_(0.5-0.6m)	BH123_(1.5-1.6m)	BH123_(1.5-1.6m)_A	BH123A_(0.5-0.6m)	BH123A_(1.0-1.1m)	BH123A_(1.0-1.1m)_A
			Sampled_Date-Time	13/12/2012	13/12/2012	13/12/2012	13/12/2012	13/12/2012	13/12/2012	13/12/2012	13/12/2012	13/12/2012
			Lab_Report_Number	363351	363351	363099	363099	363099	363099	363351	363351	363351
Chem_Group	**ChemName**	**Units**	**LOR**									
BTEX	Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
TPH	C6 - C9	mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C10 - C14	mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100	<100	<100	<100	<100	380	810	<100	110	140
	C29 - C36	mg/kg	100	<100	<100	<100	<100	100	220	<100	100	<100
	C10 - C36 (Sum of total)	mg/kg	100	<100	<100	<100	<100	480	1000	<100	210	140
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	0.8	2.6	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	4.8	5.3	<0.5	<0.5	0.8
	Anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	6	12	<0.5	<0.5	1.3
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	0.6	13	34	<0.5	1.5	2.8
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	0.7	14	30	<0.5	1.7	2.9
	Benzo(b)&(k)fluoranthene	mg/kg	1	<1	<1	<1	1.2	20	46	<1	2.7	4.6
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	6.7	13	<0.5	1.1	1.8
	Chrysene	mg/kg	0.5	<0.5	<0.5	<0.5	0.6	8.8	27	<0.5	1.4	2.7
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	1.6	4	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	<0.5	1	28	58	0.9	2.5	5.7
	Fluorene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	3.9	6.2	<0.5	<0.5	0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	5.6	12	<0.5	0.9	1.6
	Naphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	19	44	0.8	1.1	4.8
	Pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	1.1	25	55	0.9	2.6	5.5
	Total PAHs	mg/kg	1	<1	<1	<1	5.2	160	350	2.6	18	36
Metals	Arsenic	mg/kg	2	<2	-	-	-	-	-	7.6	6.4	6.1
	Cadmium	mg/kg	0.4	<0.4	-	-	-	-	-	0.4	<0.4	<0.4
	Chromium	mg/kg	5	7.6	-	-	-	-	-	10	<5	<5
	Copper	mg/kg	5	6.9	-	-	-	-	-	50	32	26
	Lead	mg/kg	5	9.3	-	-	-	-	-	69	47	36
	Mercury	mg/kg	0.05	0.11	-	-	-	-	-	0.12	0.11	0.1
	Nickel	mg/kg	5	<5	-	-	-	-	-	11	5.3	<5
	Zinc	mg/kg	5	<5	-	-	-	-	-	110	69	51
Material	Asbestos		Detection			ND	ND			ND	ND	

Notes:

-	Not Analysed
ND	Not Detected

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH123A_(2.0-2.1m)	BH123A_(3.0-3.1m)	BH123A_(4.0-4.1m)	BH124_(0.01-0.11m)	BH124_(0.5-0.6m)	BH124_(1.5-1.6m)	BH124_(2.5-2.6m)	BH124_(2.9-3.0m)	BH124_(2.9-3.0m)_A
			Sampled_Date-Time	13/12/2012	13/12/2012	13/12/2012	14/12/2012	14/12/2012	14/12/2012	14/12/2012	14/12/2012	14/12/2012
			Lab_Report_Number	363351	363351	363351	363351	363351	363351	363351	363351	363351
Chem_Group	**ChemName**	**Units**	**LOR**									
BTEX	Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Total BTEX	mg/kg	1.5	<1.5	<1.5	<1.5	-	<1.5	<1.5	-	-	-
	Xylene (m & p)	mg/kg	1	<1	<1	<1	-	<1	<1	<1	<1	-
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Xylene Total	mg/kg	1.5	<1.5	<1.5	<1.5	-	<1.5	<1.5	<1.5	<1.5	-
TPH	C6 - C9	mg/kg	10	<10	<10	<10	-	<10	<10	<10	<10	<10
	C10 - C14	mg/kg	50	<50	<50	<50	-	<50	<50	<50	620	110
	C15 - C28	mg/kg	100	<100	<100	<100	-	<100	<100	<100	3800	1300
	C29 - C36	mg/kg	100	<100	<100	<100	-	<100	<100	<100	350	220
	C10 - C36 (Sum of total)	mg/kg	100	<100	<100	<100	-	<100	<100	<100	4770	1600
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	-	0.5	<0.5	<0.5	<0.5	-
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Benzo(b)&(k)fluoranthene	mg/kg	1	<1	<1	<1	-	<1	<1	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Chrysene	mg/kg	0.5	<0.5	<0.5	<0.5	-	0.5	<0.5	<0.5	<0.5	-
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Fluoranthene	mg/kg	0.5	0.5	<0.5	<0.5	-	1.1	<0.5	<0.5	<0.5	-
	Fluorene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	0.9	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-
	Naphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	<0.5	-	1	<0.5	<0.5	1.3	-
	Pyrene	mg/kg	0.5	0.5	<0.5	<0.5	-	1	<0.5	<0.5	<0.5	-
	Total PAHs	mg/kg	1	1	<1	<1	-	4.1	<1	-	-	-
Metals	Arsenic	mg/kg	2	9.3	6.9	2.5	-	13	13	6.8	-	-
	Cadmium	mg/kg	0.4	<0.4	<0.4	<0.4	-	1	0.6	0.4	-	-
	Chromium	mg/kg	5	6.7	12	<5	-	12	11	8.5	-	-
	Copper	mg/kg	5	46	9.4	<5	-	92	140	59	-	-
	Lead	mg/kg	5	40	<5	<5	-	180	120	64	-	-
	Mercury	mg/kg	0.05	0.13	0.07	<0.05	-	0.22	0.26	0.23	-	-
	Nickel	mg/kg	5	<5	<5	<5	-	16	12	20	-	-
	Zinc	mg/kg	5	41	13	<5	-	240	170	94	-	-
Material	Asbestos		Detection				ND	ND				

Notes:
- Not Analysed
ND Not Detected

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH124_(3.4-3.5m)	BH124_(3.8-3.9m)	BH124_(4.6-4.8m)	BH124_(4.6-4.8m)_A	BH125_(0.23-0.33m)	BH125_(0.23-0.33m)_A	BH125_(1.0-1.1m)_A	BH125A_(0.5-0.6M)	BH125A_(0.5-0.6M)_A
			Sampled_Date-Time	14/12/2012	14/12/2012	14/12/2012	14/12/2012	11/12/2012	11/12/2012	11/12/2012	17/12/2012	17/12/2012
			Lab_Report_Number	363351	363351	363351	363351	362729	362729	362729	363837	363837
Chem_Group	**ChemName**	**Units**	**LOR**									
BTEX	Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5	-	-	-	-	<1.5	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
TPH	C6 - C9	mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C10 - C14	mg/kg	50	630	<50	660	630	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100	2700	<100	2600	3200	740	940	<100	<100	<100
	C29 - C36	mg/kg	100	220	160	310	320	470	530	<100	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100	3550	160	3570	4150	1200	1495	<100	<100	<100
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	0.6	2.1	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	13	18	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	13	18	0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	31	27	1	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	25	20	0.7	<0.5	<0.5
	Benzo(b)&(k)fluoranthene	mg/kg	1	-	-	-	-	39	33	1.4	<1	<1
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	12	7.8	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	24	18	0.9	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	3.1	1.8	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	65	66	1.9	<0.5	<0.5
	Fluorene	mg/kg	0.5	1.4	<0.5	1.1	1.2	4.5	15	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	9.8	7.4	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	1.6	1.9	65	87	1.4	<0.5	<0.5
	Pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	64	54	1.9	<0.5	<0.5
	Total PAHs	mg/kg	1	-	-	-	-	370	390	9.7	<1	<1
Metals	Arsenic	mg/kg	2	-	-	-	-	3.6	2.9	5.1	<2	-
	Cadmium	mg/kg	0.4	-	-	-	-	<0.4	<0.4	<0.4	<0.4	-
	Chromium	mg/kg	5	-	-	-	-	<5	<5	18	<5	-
	Copper	mg/kg	5	-	-	-	-	39	26	43	5.8	-
	Lead	mg/kg	5	-	-	-	-	84	99	110	13	-
	Mercury	mg/kg	0.05	-	-	-	-	0.24	0.21	0.34	<0.05	-
	Nickel	mg/kg	5	-	-	-	-	<5	<5	5.3	<5	-
	Zinc	mg/kg	5	-	-	-	-	74	93	77	12	-
Material	Asbestos		Detection					ND			ND	

Notes:
- Not Analysed
ND Not Detected

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH125A_(1.4-1.5M)	BH125A_(2.0-2.1M)	BH125A_(2.0-2.1M)_A	BH125A_(3.0-3.1M)	BH126_(0.31-0.41m)	BH126_(0.5-0.6m)	BH126_(0.5-0.6m)_A	BH126_(1.4-1.5m)	BH126_(2.4-2.5m)
			Sampled_Date-Time	17/12/2012	17/12/2012	17/12/2012	17/12/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012
			Lab_Report_Number	363837	363837	363837	363837	362912	362912	362912	362912	362912
Chem_Group	**ChemName**	**Units**	**LOR**									
BTEX	Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
TPH	C6 - C9	mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C10 - C14	mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	250
	C29 - C36	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	250
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5
	Anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	1.3	<0.5
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	<0.5	4.1	<0.5
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	3.1	<0.5
	Benzo(b)&(k)fluoranthene	mg/kg	1	<1	<1	<1	<1	<1	1.6	<1	5.9	<1
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5
	Chrysene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	3.1	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.8	<0.5	7.3	<0.5
	Fluorene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	<0.5
	Naphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.2	<0.5	3.7	<0.5
	Pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.5	<0.5	5.9	<0.5
	Total PAHs	mg/kg	1	<1	<1	<1	<1	<1	13	<1	38	<1
Metals	Arsenic	mg/kg	2	16	-	-	-	<2	<2	3.7	3.5	25
	Cadmium	mg/kg	0.4	<0.4	-	-	-	<0.4	<0.4	<0.4	<0.4	<0.4
	Chromium	mg/kg	5	15	-	-	-	<5	<5	<5	7.4	<5
	Copper	mg/kg	5	19	-	-	-	15	41	20	560	<5
	Lead	mg/kg	5	57	-	-	-	33	95	68	710	9.7
	Mercury	mg/kg	0.05	0.62	-	-	-	0.3	0.47	0.36	5.7	<0.05
	Nickel	mg/kg	5	9.1	-	-	-	<5	5.7	<5	7.4	<5
	Zinc	mg/kg	5	220	-	-	-	29	100	95	140	<5
Material	Asbestos		Detection	ND				ND	ND			

Notes:

-	Not Analysed
ND	Not Detected

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH127_(0.3-0.5M)	BH127_(0.3-0.5M)_A	BH127_(1.0-1.1m)	BH127_(1.5-1.6m)_A	BH127_(1.5-1.6m)	BH127_(2.6-2.7m)	BH127_(3.4-3.5m)	BH128_(0.28-0.38M)
			Sampled_Date-Time	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	17/12/2012
			Lab_Report_Number	362572	362572	362729	362729	362729	362729	362729	363837
Chem_Group	**ChemName**	**Units**	**LOR**								
BTEX	Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
TPH	C6 - C9	mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10
	C10 - C14	mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100	<100	<100	250	350	190	<100	<100	110
	C29 - C36	mg/kg	100	<100	<100	550	860	730	260	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100	<100	<100	800	1200	920	260	<100	110
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	<0.5	3.7	2.3	<0.5	<0.5	2.7
	Anthracene	mg/kg	0.5	<0.5	<0.5	0.5	6.7	3.6	<0.5	<0.5	2.8
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	0.8	15	7.4	<0.5	<0.5	4.4
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	0.8	12	5.9	<0.5	<0.5	2.9
	Benzo(b)&(k)fluoranthene	mg/kg	1	<1	<1	1.3	20	9.7	<1	<1	5
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	<0.5	4.9	2.6	<0.5	<0.5	1.6
	Chrysene	mg/kg	0.5	<0.5	<0.5	0.7	11	5.1	<0.5	<0.5	3
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	1.9	31	16	<0.5	0.5	8.8
	Fluorene	mg/kg	0.5	<0.5	<0.5	<0.5	3.1	1.8	<0.5	<0.5	1.7
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	<0.5	4.4	2.2	<0.5	<0.5	1.6
	Naphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	1.2	21	13	<0.5	<0.5	11
	Pyrene	mg/kg	0.5	<0.5	<0.5	1.9	28	14	<0.5	<0.5	7.4
	Total PAHs	mg/kg	1	<1	<1	9.1	160	84	<1	<1	53
Metals	Arsenic	mg/kg	2	<2	<2	3.6	5.2	4.4	<2	-	5.2
	Cadmium	mg/kg	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	<0.4
	Chromium	mg/kg	5	6.3	<5	9.3	7.6	5.5	<5	-	12
	Copper	mg/kg	5	55	64	28	43	42	<5	-	27
	Lead	mg/kg	5	6.8	11	85	190	160	<5	-	96
	Mercury	mg/kg	0.05	<0.05	<0.05	0.17	0.55	0.55	<0.05	-	0.27
	Nickel	mg/kg	5	120	130	15	14	15	<5	-	5.8
	Zinc	mg/kg	5	67	71	93	140	140	<5	-	94
Material	Asbestos		Detection	ND		ND					ND

Notes:

-	Not Analysed
ND	Not Detected

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	H128_(0.28-0.38M)_	BH128_(0.5-0.6M)	BH128_(1.5-1.6M)	BH128_(1.5-1.6M)_A	BH128_(2.0-2.1M)	BH128_(2.5-2.6M)	BH128_(2.9-3.0M)	BH129_(0.28-0.38M)	BH129_(0.24-0.28M)_A
			Sampled_Date-Time	17/12/2012	17/12/2012	17/12/2012	17/12/2012	17/12/2012	17/12/2012	17/12/2012	10/12/2012	10/12/2012
			Lab_Report_Number	363837	363837	363837	363837	363837	363837	363837	362572	362572
Chem_Group	**ChemName**	**Units**	**LOR**									
BTEX	Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
TPH	C6 - C9	mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C10 - C14	mg/kg	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C29 - C36	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5	0.6	1.2	1.2	0.7	<0.5	<0.5	<0.5	0.6	<0.5
	Benzo(a)pyrene	mg/kg	0.5	0.7	1.2	1.4	0.9	<0.5	<0.5	<0.5	0.6	<0.5
	Benzo(b)&(k)fluoranthene	mg/kg	1	1.1	2.1	2.3	1.6	<1	<1	<1	1.1	<1
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	0.9	1.1	0.7	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5	0.6	1.2	1.2	0.8	<0.5	<0.5	<0.5	0.6	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5	1.2	2	2	1.2	<0.5	<0.5	<0.5	1	<0.5
	Fluorene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	0.7	0.9	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5	0.7	1.2	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5	1.2	2	2	1.3	<0.5	<0.5	<0.5	1	<0.5
	Total PAHs	mg/kg	1	6.1	13	13	7.8	<1	<1	<1	4.9	<1
Metals	Arsenic	mg/kg	2	3.4	-	4.5	7.4	3.5	-	-	4.9	4.1
	Cadmium	mg/kg	0.4	<0.4	-	<0.4	<0.4	<0.4	-	-	0.5	<0.4
	Chromium	mg/kg	5	12	-	23	21	11	-	-	16	<5
	Copper	mg/kg	5	27	-	24	36	13	-	-	49	29
	Lead	mg/kg	5	89	-	200	430	93	-	-	150	52
	Mercury	mg/kg	0.05	0.18	-	1.5	1.2	0.54	-	-	0.68	0.43
	Nickel	mg/kg	5	5.6	-	8.2	12	<5	-	-	14	6.6
	Zinc	mg/kg	5	78	-	220	410	130	-	-	430	140
Material	Asbestos		Detection		ND							ND

Notes:

-	Not Analysed
ND	Not Detected

Table 1
Soil Analytical Results
BTEX, TPH, PAH, Metals and Asbestos
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH129_(1.0-1.1m)	BH129_(1.0-1.1m)_A	BH129_(1.5-1.6m)	BH129_(2.0-2.1m)	BH129_(2.9-3.0m)	BH129_(3.9-4.0m)	BH129_(5.0-5.1m)
			Sampled_Date-Time	11/12/2012	11/12/2012	11/12/2012	11/12/2012	11/12/2012	11/12/2012	11/12/2012
			Lab_Report_Number	362912	362912	362912	362912	362912	362912	362912
Chem_Group	**ChemName**	**Units**	**LOR**							
BTEX	Benzene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	1.5	<1.5	<1.5	-	<1.5	<1.5	<1.5	<1.5
	Xylene (m & p)	mg/kg	1	<1	<1	-	<1	<1	<1	<1
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	1.5	<1.5	<1.5	-	<1.5	<1.5	<1.5	<1.5
TPH	C6 - C9	mg/kg	10	<10	<10	-	<10	<10	<10	<10
	C10 - C14	mg/kg	50	<50	<50	-	<50	<50	<50	<50
	C15 - C28	mg/kg	100	<100	<100	-	<100	<100	<100	<100
	C29 - C36	mg/kg	100	<100	<100	-	<100	<100	<100	<100
	C10 - C36 (Sum of total)	mg/kg	100	<100	<100	-	<100	<100	<100	<100
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	-	1	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5	<0.5	<0.5	-	1.9	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	-	3.4	0.8	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	-	2.9	0.7	<0.5	<0.5
	Benzo(b)&(k)fluoranthene	mg/kg	1	<1	<1	-	4.7	1.1	<1	<1
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	-	1.4	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5	<0.5	<0.5	-	3.7	0.7	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5	1	1	-	11	1.5	<0.5	<0.5
	Fluorene	mg/kg	0.5	<0.5	<0.5	-	0.7	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	-	1.2	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	-	9.9	0.7	<0.5	<0.5
	Pyrene	mg/kg	0.5	0.9	0.9	-	9.2	1.4	<0.5	<0.5
	Total PAHs	mg/kg	1	1.9	1.9	-	51	6.9	<1	<1
Metals	Arsenic	mg/kg	2	9.6	6.9	-	9.3	-	-	-
	Cadmium	mg/kg	0.4	0.6	0.5	-	1.2	-	-	-
	Chromium	mg/kg	5	6.9	7.1	-	10	-	-	-
	Copper	mg/kg	5	150	130	-	110	-	-	-
	Lead	mg/kg	5	370	410	-	330	-	-	-
	Mercury	mg/kg	0.05	4.3	4.5	-	3	-	-	-
	Nickel	mg/kg	5	14	12	-	11	-	-	-
	Zinc	mg/kg	5	1700	1700	-	2200	-	-	-
Material	Asbestos		Detection	ND		ND				

Notes:

-	Not Analysed
ND	Not Detected

Table 2
Soil Analytical Results - VOC and SVOC
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH103_(2.5-2.6m)	BH111_(0.35-0.47m)	BH111_(0.35-0.47m)_A	BH111_(2.5-2.6m)	BH112_(0.34-0.40m)	BH112A_(0.8-0.9m)	BH112A_(2.9-3.0m)	BH120_(3.5-3.6m)	BH124_(2.5-2.6m)	BH124_(2.9-3.0m)	BH124_(3.4-3.5m)	BH124_(3.8-3.9m)
			Sampled_Date-Time	29/11/2012	30/11/2012	30/11/2012	30/11/2012	30/11/2012	30/11/2012	30/11/2012	18/12/2012	14/12/2012	14/12/2012	14/12/2012	14/12/2012
			Lab_Report_Number	361195	361385	361385	361385	361385	361703	361703	363975	363351	363351	363351	363351
Chem_Group	**ChemName**	**Units**	**LOR**												
Amino Aliphatics	N-nitrosodi-n-butylamine	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	N-nitrosodi-n-propylamine	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Amino Aromatics	2-naphthylamine	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.65	<0.5
	Diphenylamine	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anilines	2-nitroaniline	mg/kg	1	<1	-	-	<1	-	-	<1	<1	<1	<1	<1	<1
	Aniline	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorinated Hydrocarbons	Hexachlorocyclopentadiene	mg/kg	1	<2	-	-	<2	-	-	<2	<1	<2	<2	<2	<1
	Hexachloroethane	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Explosives	Nitrobenzene	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Halogenated Benzenes	Pentachlorobenzene	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MAH	1,2,4-trimethylbenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,3,5-trimethylbenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Isopropylbenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	n-butylbenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	n-propylbenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	p-isopropyltoluene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	sec-butylbenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Styrene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	tert-butylbenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
Nitroaromatics	4-aminobiphenyl	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pentachloronitrobenzene	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
OCP	4,4-DDE	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Aldrin	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Aldrin + Dieldrin	mg/kg		<1	-	-	<1	-	-	<1	<1	<1	<1	<1	<1
	d-BHC	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	DDD	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	DDT	mg/kg	1	<1	-	-	<1	-	-	<1	<1	<1	<1	<1	<1
	DDT+DDE+DDD	mg/kg		<2	-	-	<2	-	-	<2	<2	<2	<2	<2	<2
	Dieldrin	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endosulfan sulphate	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endrin	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endrin aldehyde	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endrin ketone	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	g-BHC (Lindane)	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	1.3	1	<0.5
	Heptachlor	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Heptachlor epoxide	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Hexachlorobenzene	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Methoxychlor	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
OPP	Azinophos methyl	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chlorpyrifos	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Coumaphos	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Demeton-O	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Demeton-S	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Diazinon	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dichlorvos	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dimethoate	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Disulfoton	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethoprop	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fenitrothion	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fensulfothion	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fenthion	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Malathion	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Methyl parathion	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Mevinphos (Phosdrin)	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Monocrotophos	mg/kg	10	<10	-	-	<10	-	-	<2	<10	<10	<10	<10	<10
	Parathion	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phorate	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Prothiofos	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ronnel	mg/kg	0.5	<0.5	-	-	<0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Stirophos	mg/kg	0.5	<0.5	-	-	<0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Trichloronate	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pesticides	Profenofos	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenol	2-chlorophenol	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2-methylphenol	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2-nitrophenol	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	3-&4-methylphenol	mg/kg	1	<1	-	-	<1	-	-	<1	<1	<1	<1	<1	<1
	4-chloro-3-methylphenol	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	4-nitrophenol	mg/kg	0.5	<4	-	-	<4	-	-	<4	<0.5	<0.5	<0.5	<0.5	<0.5
	Pentachlorophenol	mg/kg	1	<2	-	-	<2	-	-	<2	<1	<1	<1	<1	<1
	Phenol	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phthalates	Bis(2-ethylhexyl) phthalate	mg/kg	5	<5	-	-	<5	-	-	<5	<5	<5	<5	<5	<5
	Butyl benzyl phthalate	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Diethylphthalate	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dimethyl phthalate	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Table 2
Soil Analytical Results - VOC and SVOC
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH103_(2.5-2.6m)	BH111_(0.35-0.47m)	BH111_(0.35-0.47m)_A	BH111_(2.5-2.6m)	BH112_(0.34-0.40m)	BH112A_(0.8-0.9m)	BH112A_(2.9-3.0m)	BH120_(3.5-3.6m)	BH124_(2.5-2.6m)	BH124_(2.9-3.0m)	BH124_(3.4-3.5m)	BH124_(3.8-3.9m)
			Sampled_Date-Time	29/11/2012	30/11/2012	30/11/2012	30/11/2012	30/11/2012	30/11/2012	30/11/2012	18/12/2012	14/12/2012	14/12/2012	14/12/2012	14/12/2012
			Lab_Report_Number	361195	361385	361385	361385	361385	361703	361703	363975	363351	363351	363351	363351
Chem_Group	**ChemName**	**Units**	**LOR**												
	Di-n-butyl phthalate	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Di-n-octyl phthalate	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Solvents	Methyl Ethyl Ketone	mg/kg	5	-	<5	<5	-	<5	<5	<5	-	0.5	0.5	0.5	0.5
	2-hexanone (MBK)	mg/kg	5	-	<5	<5	-	<5	<5	<5	-	0.5	0.5	0.5	0.5
	2-pentanone	mg/kg	5	-	<5	<5	-	<5	<5	<5	-	0.5	0.5	0.5	0.5
	4-Methyl-2-pentanone	mg/kg	5	-	<5	<5	-	<5	<5	<5	-	0.5	0.5	0.5	0.5
	Carbon disulfide	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Vinyl acetate	mg/kg	5	-	<5	<5	-	<5	<5	<5	-	0.5	0.5	0.5	0.5
SVOCs	4-bromophenyl phenyl ether	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	4-chlorophenyl phenyl ether	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Bis(2-chloroethoxy) methane	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenzofuran	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	0.5	<0.5
	N-nitrosopiperidine	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VHC	1,1,1,2-tetrachloroethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,1,1-trichloroethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,1,2-trichloroethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,1-dichloroethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,1-dichloroethene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,2,3-trichloropropane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,2,4-trichlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,2-dibromo-3-chloropropane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,2-dibromoethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,2-dichlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,2-dichloroethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,2-dichloropropane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,3-dichlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,3-dichloropropane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	1,4-dichlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	2-chlorotoluene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	4-chlorotoluene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Bromobenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Bromodichloromethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Bromoform	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Bromomethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Carbon tetrachloride	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Chlorobenzene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Chlorodibromomethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Chloroethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Chloroform	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Chloromethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	cis-1,2-dichloroethene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	cis-1,3-dichloropropene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Dichlorodifluoromethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Dichloromethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Hexachlorobutadiene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5 - 0.5	<0.5 - 0.5	<0.5 - 0.5	<0.5 - 0.5
	Trichloroethene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Tetrachloroethene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	trans-1,2-dichloroethene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	trans-1,3-dichloropropene	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Trichlorofluoromethane	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	Vinyl chloride	mg/kg	0.5	-	<0.5	<0.5	-	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5
	2-chloronaphthalene	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2-methylnaphthalene	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	3-methylcholanthrene	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acetophenone	mg/kg	0.5	<0.5	-	-	<0.5	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:

-	Not Analysed
ND	Not Detected

Table 2
Soil Analytical Results - VOC and SVOC
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH124_(4.6-4.8m)	BH124_(4.6-4.8m)_A	BH126_(2.4-2.5m)	BH127_(2.6-2.7m)	BH127_(3.4-3.5m)	BH128_(2.0-2.1M)	BH128_(2.9-3.0M)	BH129_(2.0-2.1m)
			Sampled_Date-Time	14/12/2012	14/12/2012	12/12/2012	10/12/2012	10/12/2012	17/12/2012	17/12/2012	11/12/2012
			Lab_Report_Number	363351	363351	362912	362729	362729	363837	363837	362912
Chem_Group	**ChemName**	**Units**	**LOR**								
Amino Aliphatics	N-nitrosodi-n-butylamine	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	N-nitrosodi-n-propylamine	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Amino Aromatics	2-naphthylamine	mg/kg	0.5	0.8	0.7	<1	<0.5	<0.5	<0.5	<0.5	<1
	Diphenylamine	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Anilines	2-nitroaniline	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1
	Aniline	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorinated Hydrocarbons	Hexachlorocyclopentadiene	mg/kg	1	<2	<2	<1	<1	<1	<1	<1	<1
	Hexachloroethane	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Explosives	Nitrobenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Halogenated Benzenes	Pentachlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MAH	1,2,4-trimethylbenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,3,5-trimethylbenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Isopropylbenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	n-butylbenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	n-propylbenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	p-isopropyltoluene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	sec-butylbenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Styrene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	tert-butylbenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
Nitroaromatics	4-aminobiphenyl	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pentachloronitrobenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
OCP	4,4-DDE	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Aldrin	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Aldrin + Dieldrin	mg/kg		<1	<1	<1	<1	<1	<1	<1	<1
	d-BHC	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	DDD	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	DDT	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1
	DDT+DDE+DDD	mg/kg		<2	<2	<2	<2	<2	<2	<2	<2
	Dieldrin	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endosulfan sulphate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endrin	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endrin aldehyde	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Endrin ketone	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	g-BHC (Lindane)	mg/kg	0.5	0.9	1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Heptachlor	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Heptachlor epoxide	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Hexachlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Methoxychlor	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
OPP	Azinophos methyl	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chlorpyrifos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Coumaphos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Demeton-O	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Demeton-S	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Diazinon	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Disulfoton	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethoprop	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fenitrothion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fensulfothion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fenthion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Malathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Methyl parathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Mevinphos (Phosdrin)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Monocrotophos	mg/kg	10	<10	<10	<10	<10	<10	<10	<10	<10
	Parathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phorate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Prothiofos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Ronnel	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Stirophos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Trichloronate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Pesticides	Profenofos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenol	2-chlorophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2-methylphenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2-nitrophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	3-&4-methylphenol	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1
	4-chloro-3-methylphenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	4-nitrophenol	mg/kg	0.5	<0.5	<0.5	<0.5	<4	<0.5	<0.5	1.8	<0.5
	Pentachlorophenol	mg/kg	1	<1	<1	<1	<4	<1	<1	<1	<1
	Phenol	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phthalates	Bis(2-ethylhexyl) phthalate	mg/kg	5	<5	<5	<5	<5	<5	<5	<5	<5
	Butyl benzyl phthalate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Diethylphthalate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dimethyl phthalate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Table 2
Soil Analytical Results - VOC and SVOC
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH124_(4.6-4.8m)	BH124_(4.6-4.8m)_A	BH126_(2.4-2.5m)	BH127_(2.6-2.7m)	BH127_(3.4-3.5m)	BH128_(2.0-2.1M)	BH128_(2.9-3.0M)	BH129_(2.0-2.1m)
			Sampled_Date-Time	14/12/2012	14/12/2012	12/12/2012	10/12/2012	10/12/2012	17/12/2012	17/12/2012	11/12/2012
			Lab_Report_Number	363351	363351	362912	362729	362729	363837	363837	362912
Chem_Group	**ChemName**	**Units**	**LOR**								
	Di-n-butyl phthalate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Di-n-octyl phthalate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Solvents	Methyl Ethyl Ketone	mg/kg	5	0.5	0.5	-	-	-	-	-	-
	2-hexanone (MBK)	mg/kg	5	0.5	0.5	-	-	-	-	-	-
	2-pentanone	mg/kg	5	0.5	0.5	-	-	-	-	-	-
	4-Methyl-2-pentanone	mg/kg	5	0.5	0.5	-	-	-	-	-	-
	Carbon disulfide	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Vinyl acetate	mg/kg	5	0.5	0.5	-	-	-	-	-	-
SVOCs	4-bromophenyl phenyl ether	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	4-chlorophenyl phenyl ether	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Bis(2-chloroethoxy) methane	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenzofuran	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
	N-nitrosopiperidine	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VHC	1,1,1,2-tetrachloroethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,1-dichloroethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,2,3-trichloropropane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,2,4-trichlorobenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,2-dibromo-3-chloropropane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,2-dibromoethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,2-dichloroethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,2-dichloropropane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,3-dichlorobenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,3-dichloropropane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	2-chlorotoluene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	4-chlorotoluene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Bromobenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Bromodichloromethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Bromoform	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Bromomethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Carbon tetrachloride	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Chlorobenzene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Chlorodibromomethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Chloroethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Chloroform	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Chloromethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	cis-1,2-dichloroethene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	cis-1,3-dichloropropene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Dichlorodifluoromethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Dichloromethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Hexachlorobutadiene	mg/kg	0.5	<0.5 - 0.5	<0.5 - 0.5	<0.5	-	-	<0.5	<0.5	<0.5
	Trichloroethene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Tetrachloroethene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	trans-1,2-dichloroethene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	trans-1,3-dichloropropene	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Trichlorofluoromethane	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	Vinyl chloride	mg/kg	0.5	0.5	0.5	-	-	-	-	-	-
	2-chloronaphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2-methylnaphthalene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	3-methylcholanthrene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acetophenone	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:
- Not Analysed
ND Not Detected

Table 4
TCLP Analytical Data
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH102_(0.5-0.6)_A	BH106_(0.13-0.23)_A	BH107_(1.5-1.6)	BH109_(1.5-1.6)	BH111_(0.35-0.47)	BH115_(0.33-0.43)
			Sampled_Date-Time	3/12/2012	3/12/2012	6/12/2012	4/12/2012	30/11/2012	7/12/2012
			Lab_Report_Number	363634	363634	363811	363634	363634	363634
Chem_Group	**ChemName**	**Units**	**LOR**						
Inorganics	pH (Initial)	pH_Units	0.1	7.7 - 8.8	9.7 - 9.8	8.3	4.2 - 4.5	8.9	8.2
	Moisture Content (dried @ 103°C)	%	0.1	4.1 - 4.3	14 - 15	10	16 - 19	9.3	9.4
	pH (after HCL)	pH_Units	0.1	1.7	1.6	-	1.6	-	1.5
Metals	Arsenic	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	0.008	-
	Cadmium	mg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-
	Chromium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-
	Copper	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	0.007	-
	Lead	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.17
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
	Nickel	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-
	Zinc	mg/L	0.005	<0.005	<0.005	<0.005	0.007	<0.005	-
PAH	Acenaphthene	µg/L	1	-	-	<1	<1	-	-
	Acenaphthylene	µg/L	1	-	-	<1	<1	-	-
	Anthracene	µg/L	1	-	-	<1	<1	-	-
	Benzo(a)anthracene	µg/L	1	-	-	<1	<1	-	-
	Benzo(a)pyrene	µg/L	1	-	-	<1	<1	-	<1
	Benzo(b)&(k)fluoranthene	µg/L	2	-	-	<2	<2	-	-
	Benzo(g,h,i)perylene	µg/L	1	-	-	<1	<1	-	-
	Chrysene	µg/L	1	-	-	<1	<1	-	-
	Dibenz(a,h)anthracene	µg/L	1	-	-	<1	<1	-	-
	Fluoranthene	µg/L	1	-	-	<1	<1	-	-
	Fluorene	µg/L	1	-	-	<1	<1	-	-
	Indeno(1,2,3-c,d)pyrene	µg/L	1	-	-	<1	<1	-	-
	Naphthalene	µg/L	1	-	-	<1	<1	-	-
	Phenanthrene	µg/L	1	-	-	<1	<1	-	-
	Pyrene	µg/L	1	-	-	<1	<1	-	-
	Total PAHs	µg/L	2	-	-	<2	<2	-	-

Notes:
- Not Analysed

Table 4
TCLP Analytical Data
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH116_(0.7-0.8)	BH127_(0.3-0.5)_A	BH129_(0.28-0.38)
			Sampled_Date-Time	6/12/2012	10/12/2012	10/12/2012
			Lab_Report_Number	363634	363634	363634
Chem_Group	**ChemName**	**Units**	**LOR**			
Inorganics	pH (Initial)	pH_Units	0.1	8.7	9.2	5.7 - 8
	Moisture Content (dried @ 103°C)	%	0.1	15	6.9 - 7	10 - 11
	pH (after HCL)	pH_Units	0.1	1.5	1.6	1.6
Metals	Arsenic	mg/L	0.005	-	<0.005	<0.005
	Cadmium	mg/L	0.0005	-	<0.0005	<0.0005
	Chromium	mg/L	0.005	-	<0.005	<0.005
	Copper	mg/L	0.005	-	<0.005	<0.005
	Lead	mg/L	0.005	0.02	<0.005	<0.005
	Mercury	mg/L	0.0001	-	<0.0001	<0.0001
	Nickel	mg/L	0.005	<0.05	<0.005	<0.005
	Zinc	mg/L	0.005	-	<0.005	<0.005
PAH	Acenaphthene	µg/L	1	-	-	-
	Acenaphthylene	µg/L	1	-	-	-
	Anthracene	µg/L	1	-	-	-
	Benzo(a)anthracene	µg/L	1	-	-	-
	Benzo(a)pyrene	µg/L	1	-	-	-
	Benzo(b)&(k)fluoranthene	µg/L	2	-	-	-
	Benzo(g,h,i)perylene	µg/L	1	-	-	-
	Chrysene	µg/L	1	-	-	-
	Dibenz(a,h)anthracene	µg/L	1	-	-	-
	Fluoranthene	µg/L	1	-	-	-
	Fluorene	µg/L	1	-	-	-
	Indeno(1,2,3-c,d)pyrene	µg/L	1	-	-	-
	Naphthalene	µg/L	1	-	-	-
	Phenanthrene	µg/L	1	-	-	-
	Pyrene	µg/L	1	-	-	-
	Total PAHs	µg/L	2	-	-	-

Notes:
- Not Analysed

Table 5
ASLP Analytical Data
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH101A_(0.12-0.22)	BH102_(0.5-0.6)_A	BH106_(0.13-0.23)_A	BH107_(0.17-0.27)	BH107_(1.5-1.6)	BH109_(1.5-1.6)	BH110_(0.15-0.25)
			Sampled_Date-Time	29/11/2012	3/12/2012	3/12/2012	6/12/2012	6/12/2012	4/12/2012	4/12/2012
			Lab_Report_Number	363634	363634	363634	363634	363811	363634	363634
Chem_Gro	**ChemName**	**Units**	**LOR**							
Inorganics	pH (Initial)	pH_Units	0.1	8.6	8.8	8.6	10	4.5	4.2	8.3
	Moisture Content (dried @ 1	%	0.1	12	4.1 - 4.3	14 - 15	9	10	16 - 19	7.6
	pH (after HCL)	pH_Units	0.1	8.7	8.8	8.7	5.5	6.4	4.5	9.4
Metals	Arsenic	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Cadmium	mg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Chromium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Copper	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Lead	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Nickel	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Zinc	mg/L	0.005	0.016	<0.005	<0.005	<0.005	<0.005	0.007	<0.005
PAH	Acenaphthene	µg/L	1	-	-	-	-	<1	<1	-
	Acenaphthylene	µg/L	1	-	-	-	-	<1	<1	-
	Anthracene	µg/L	1	-	-	-	-	<1	<1	-
	Benzo(a)anthracene	µg/L	1	-	-	-	-	<1	<1	-
	Benzo(a)pyrene	µg/L	1	-	-	-	-	<1	<1	-
	Benzo(b)&(k)fluoranthene	µg/L	2	-	-	-	-	<2	<2	-
	Benzo(g,h,i)perylene	µg/L	1	-	-	-	-	<1	<1	-
	Chrysene	µg/L	1	-	-	-	-	<1	<1	-
	Dibenz(a,h)anthracene	µg/L	1	-	-	-	-	<1	<1	-
	Fluoranthene	µg/L	1	-	-	-	-	<1	<1	-
	Fluorene	µg/L	1	-	-	-	-	<1	<1	-
	Indeno(1,2,3-c,d)pyrene	µg/L	1	-	-	-	-	<1	<1	-
	Naphthalene	µg/L	1	-	-	-	-	<1	<1	-
	Phenanthrene	µg/L	1	-	-	-	-	<1	<1	-
	Pyrene	µg/L	1	-	-	-	-	<1	<1	-
	Total PAHs	µg/L	2	-	-	-	-	<2	<2	-
TPH	C10 - C14	µg/L	50	-	-	-	-	-	-	-
	C15 - C28	µg/L	100	-	-	-	-	-	-	-
	C29 - C36	µg/L	100	-	-	-	-	-	-	-
	C10 - C36 (Sum of total)	µg/L	100	-	-	-	-	-	-	-

Notes:
- Not Analysed

Table 5
ASLP Analytical Data
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

Chem_Gro	ChemName	Units	Field_ID	BH111_(0.35-0.47)	BH111_(0.35-0.47)	BH112_(0.34-0.4)	BH115_(1.0-1.1)	BH116_(0.04-0.1)	BH117_(0.25-0.35)	BH117_(0.9-1.0)
			Sampled_Date-Time	30/11/2012	3/12/2012	30/11/2012	7/12/2012	6/12/2012	5/12/2012	5/12/2012
			Lab_Report_Number	363634	363634	363634	363634	363634	363634	363634
			LOR							
Inorganics	pH (Initial)	pH_Units	0.1	8.9	8.9	7.5	8.2	10	9.1	7.7
	Moisture Content (dried @ 1	%	0.1	9.3	11	9.1	11	5.4	10	8.2
	pH (after HCL)	pH_Units	0.1	8.2	8.2	8.9	8.8	9.8	9.9	8.9
Metals	Arsenic	mg/L	0.005	0.008	-	<0.005	<0.005	<0.005	0.008	<0.005
	Cadmium	mg/L	0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	Chromium	mg/L	0.005	<0.005	-	<0.005	<0.005	0.014	<0.005	<0.005
	Copper	mg/L	0.005	0.007	-	<0.005	<0.005	<0.005	0.006	<0.005
	Lead	mg/L	0.005	<0.005	0.06	<0.005	<0.005	<0.005	<0.005	<0.005
	Mercury	mg/L	0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Nickel	mg/L	0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005
	Zinc	mg/L	0.005	<0.005	-	<0.005	<0.005	<0.005	0.005	<0.005
PAH	Acenaphthene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Acenaphthylene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Anthracene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Benzo(a)anthracene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Benzo(a)pyrene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Benzo(b)&(k)fluoranthene	µg/L	2	-	-	<2	<2	<2	<2	<2
	Benzo(g,h,i)perylene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Chrysene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Fluoranthene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Fluorene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Naphthalene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Phenanthrene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Pyrene	µg/L	1	-	-	<1	<1	<1	<1	<1
	Total PAHs	µg/L	2	-	-	<2	<2	<2	<2	<2
TPH	C10 - C14	µg/L	50	-	-	-	<50	<50	<50	<50
	C15 - C28	µg/L	100	-	-	-	100	300	<100	100
	C29 - C36	µg/L	100	-	-	-	<100	<100	<100	<100
	C10 - C36 (Sum of total)	µg/L	100	-	-	-	100	300	<100	100

Notes:
- Not Analysed

Table 5
ASLP Analytical Data
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	BH127_(0.3-0.5)_A	BH129_(0.28-0.38)
			Sampled_Date-Time	10/12/2012	10/12/2012
			Lab_Report_Number	363634	363634
Chem_Gr	**ChemName**	**Units**	**LOR**		
Inorganics	pH (Initial)	pH_Units	0.1	9.2	8
	Moisture Content (dried @	%	0.1	6.9 - 7	10 - 11
	pH (after HCL)	pH_Units	0.1	9.4	8.7
Metals	Arsenic	mg/L	0.005	<0.005	<0.005
	Cadmium	mg/L	0.0005	<0.0005	<0.0005
	Chromium	mg/L	0.005	<0.005	<0.005
	Copper	mg/L	0.005	<0.005	<0.005
	Lead	mg/L	0.005	<0.005	<0.005
	Mercury	mg/L	0.0001	<0.0001	<0.0001
	Nickel	mg/L	0.005	<0.005	<0.005
	Zinc	mg/L	0.005	<0.005	<0.005
PAH	Acenaphthene	µg/L	1	-	-
	Acenaphthylene	µg/L	1	-	-
	Anthracene	µg/L	1	-	-
	Benzo(a)anthracene	µg/L	1	-	-
	Benzo(a)pyrene	µg/L	1	-	-
	Benzo(b)&(k)fluoranthene	µg/L	2	-	-
	Benzo(g,h,i)perylene	µg/L	1	-	-
	Chrysene	µg/L	1	-	-
	Dibenz(a,h)anthracene	µg/L	1	-	-
	Fluoranthene	µg/L	1	-	-
	Fluorene	µg/L	1	-	-
	Indeno(1,2,3-c,d)pyrene	µg/L	1	-	-
	Naphthalene	µg/L	1	-	-
	Phenanthrene	µg/L	1	-	-
	Pyrene	µg/L	1	-	-
	Total PAHs	µg/L	2	-	-
TPH	C10 - C14	µg/L	50	-	-
	C15 - C28	µg/L	100	-	-
	C29 - C36	µg/L	100	-	-
	C10 - C36 (Sum of total)	µg/L	100	-	-

Notes:
- Not Analysed

Appendix B Groundwater Monitoring

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Table 2
Groundwater Analytical Results Summary
Sydney International Convention and Entertainment Centre

			Laboratory Batch	SE100820.001	SE100882.001	SE100882.002	SE100882.003
			Sample ID	BH1	BH12	BH13	DUP1
			Sample Date	4/7/2011	12/7/2011	12/7/2011	12/7/2011
Analyte Name	Units	Assessment Criteria	Reporting Limit				
BTEX							
Benzene	µg/L	950	0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	180	0.5	<0.5	13	<0.5	<0.5
Ethylbenzene	µg/L	80	0.5	<0.5	0.5	<0.5	<0.5
m/p-xylene	µg/L		1	<1	3	<1	<1
o-xylene	µg/L		0.5	<0.5	1.4	<0.5	<0.5
Total Xylenes	µg/L	75	1.5	<1.5	4.0	<1.5	<1.5
TPH							
TRH C6-C9		40	40	<40	<40	<40	<40
TRH C10-C14	µg/L	100	100	<100	<100	<100	<100
TRH C15-C28	µg/L	200	200	<200	<200	<200	<200
TRH C29-C36	µg/L	200	200	<200	<200	<200	<200
PAH							
Naphthalene	µg/L	16	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.6	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.5	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	1	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.5	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a&h)anthracene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	-	0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	-	1	<1	<1	<1	<1
Metals							
Arsenic, As	µg/L	24	1	2	<1	8	9
Cadmium, Cd	µg/L	0.2	0.1	0.2	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	1	7	<1	<1	<1
Copper, Cu	µg/L	1.4	1	21	4	3	2
Lead, Pb	µg/L	3.4	1	9	<1	<1	<1
Mercury	µg/L	0.6	0.1	<0.1	<0.1	<0.1	<0.1
Nickel, Ni	µg/L	11	1	3	3	3	3
Zinc, Zn	µg/L	8	1	530	250	160	190

Exceeds adopted assessment criteria

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

Table 3: Groundwater Analytical Results
Stage 2 - Detailed Site Investigation
Sydney International Conference Exhibition and Entertainment Precinct

Format Guideline Exceedances

				Sample ID	MW5	MW8	QC1		MW13	MW16	MW20	MW25	MW30
				Well ID	MW5	MW8	MW8	RPD %	MW13	MW16	MW20	MW25	MW30
				Sample Date	9/05/2012	9/05/2012	9/05/2012		9/05/2012	9/05/2012	9/05/2012	9/05/2012	9/05/2012
Chemical Group	**Chemical Name**	**Units**	**LOR**	**95% Trigger Values for Marine Water (ANZECC 2000)**									
Inorganics	pH (Lab)	pH_Units	0		7.1	7.3	7.5	3	7.1	6.8	7.1	7	7.4
	TDS	mg/L	10		18,400	24,700	27,500	11	14,800	30,400	447	18,900	19,700
Metals	Arsenic (Filtered)	mg/L	0.002	0.0023	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.002	<0.002
	Cadmium (Filtered)	mg/L	0.001	0.0055	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001
	Chromium (Filtered)	mg/L	0.01	0.0044	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01
	Copper (Filtered)	mg/L	0.001	0.0013	**0.002**	**0.005**	**0.005**	0	0.001	**0.003**	<0.001	<0.001	0.001
	Lead (Filtered)	mg/L	0.001	0.0044	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001
	Mercury	mg/L	0.0001	0.0004	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Nickel (Filtered)	mg/L	0.01	0.07	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01
	Zinc (Filtered)	mg/L	0.002	0.015	**0.043**	**0.034**	**0.027**	23	**0.039**	**0.019**	0.005	0.011	**0.02**
BTEX	Benzene	µg/L	0.5	500	<5	<5	<0.5	-	<0.5	<0.5	<0.5	<5	<0.5
	Ethylbenzene	µg/L	0.5	5	<5	<5	<0.5	-	<0.5	<0.5	<0.5	<5	<0.5
	Toluene	µg/L	0.5	180	<5	<5	<0.5	-	<0.5	<0.5	<0.5	<5	<0.5
	Xylene (m & p)	µg/L	1		<10	<10	<1	-	<1	<1	<1	<10	<1
	Xylene (o)	µg/L	0.5		<5	<5	<0.5	-	<0.5	<0.5	<0.5	<5	<0.5
	Xylene Total	µg/L	1.5	75	<15	<15	<1.5	-	<1.5	<1.5	<1.5	<15	<1.5
TPH	TPH C6 - C9	µg/L	40	40	<400	<400	<40	-	<40	<40	<40	<400	<40
	TPH C10 - C14	µg/L	100	100	<100	<100	<100	-	<100	<100	<100	<100	<100
	TPH C15 - C28	µg/L	200	200	<200	<200	<200	-	<200	<200	<200	<200	<200
	TPH C29 - C36	µg/L	200	200	<200	<200	<200	-	<200	<200	<200	<200	<200
PAH	Acenaphthene	µg/L	0.1		<0.1	<0.1	<0.1	-	0.3	<0.1	<0.1	<0.1	<0.1
	Acenaphthylene	µg/L	0.1		<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Anthracene	µg/L	0.1	0.2	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	0.1	<0.1
	Benzo(a)anthracene	µg/L	0.1		<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(a)pyrene	µg/L	0.1	0.2	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(b)fluoranthene	µg/L	0.1		<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(g,h,i)perylene	µg/L	0.1		<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Benzo(k)fluoranthene	µg/L	0.1		<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Chrysene	µg/L	0.1		<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Dibenz(a,h)anthracene	µg/L	0.1		<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Fluoranthene	µg/L	0.1	1.4	<0.1	<0.1	<0.1	-	0.2	<0.1	<0.1	0.2	<0.1
	Fluorene	µg/L	0.1		<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Indeno(1,2,3-c,d)pyrene	µg/L	0.1		<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Naphthalene	µg/L	0.1	70	<0.1	<0.1	<0.1	-	0.1	<0.1	<0.1	<0.1	<0.1
	Phenanthrene	µg/L	0.1	2	<0.1	<0.1	<0.1	-	0.3	<0.1	<0.1	0.4	<0.1
	Pyrene	µg/L	0.1		<0.1	<0.1	<0.1	-	0.2	<0.1	<0.1	0.1	<0.1
PCB	PCBs (Sum of total)	µg/L	5		-	-	-	-	-	-	-	-	<5
OCP	OCPs	µg/L	LOR		-	-	-	-	-	-	-	-	<LOR
OPP	OPPs	µg/L	LOR		-	-	-	-	-	-	-	-	<LOR
VOC / SVOC / VHC	1,2,4-trimethylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	1,3,5-trimethylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	Isopropylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	n-butylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	n-propylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	p-isopropyltoluene	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	sec-butylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	Styrene	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	tert-butylbenzene	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	2,2-dichloropropane	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	2-Nitropropane	mg/L	0.1		-	-	-	-	-	-	-	-	<0.1
	Methyl Ethyl Ketone	µg/L	10		-	-	-	-	-	-	-	-	<10
	2-hexanone (MBK)	µg/L	5		-	-	-	-	-	-	-	-	<5
	4-Methyl-2-pentanone	µg/L	5		-	-	-	-	-	-	-	-	<5
	Acetone	mg/L	0.01		-	-	-	-	-	-	-	-	<0.01
	Acrylonitrile	µg/L	0.5		-	-	-	-	-	-	-	-	<0.5
	Allyl chloride	mg/L	0.002		-	-	-	-	-	-	-	-	<0.002
	Carbon disulfide	µg/L	2		-	-	-	-	-	-	-	-	<2
	MTBE	mg/L	0.002		-	-	-	-	-	-	-	-	<0.002
	Vinyl acetate	µg/L	10		-	-	-	-	-	-	-	-	<10
	Total VHCs	µg/L	0.5		-	-	-	-	-	-	-	-	<LOR

Table 8. Groundwater Analytical Results
Sydney International Conference Exhibition and Entertainment Precinct

				Field Identification	MW05	MW06	MW08	MW09	MW13	MW16	MW20	MW25	QC1	MW30
				Comment									Duplicate of MW25	
				Sampled Date	2/08/2012	2/08/2012	2/08/2012	2/08/2012	2/08/2012	2/08/2012	2/08/2012	2/08/2012	2/08/2012	2/08/2012
Method_Type	**ChemName**	**Units**	**LOR**	**ANZECC 2000 Freshwater 95%**										
Volatile	Benzene	µg/L	1	950	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Ethylbenzene	µg/L	1	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Toluene	µg/L	1	180	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Total BTEX	mg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Xylene (m & p)	µg/L	2	75	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Xylene (o)	µg/L	1	75	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene Total	µg/L	3	75	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
PAH	Acenaphthene	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Acenaphthylene	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Anthracene	µg/L	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a)anthracene	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(a)pyrene	µg/L	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Benzo(b)&(k)fluoranthene	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Benzo(g,h,i)perylene	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chrysene	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Fluoranthene	µg/L	1	1.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Fluorene	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Naphthalene	µg/L	1	70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Phenanthrene	µg/L	1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Pyrene	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Total PAHs	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
TPH	C6 - C9	µg/L	20	40	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C14	µg/L	50	100	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	µg/L	100	200	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C29 - C36	µg/L	100	200	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C36 (Sum of total)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Other VOCs	VOC	µg/L			-	-	-	-	<LOR	-	<LOR	<LOR	-	-
Other SVOCs	SVOC	µg/L			-	-	-	-	<LOR	-	<LOR	<LOR	-	-

Concentration above criteria

Table 6
Groundwater Analytical Data
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	MW5	MW6	MW8	MW9	MW13	MW16	MW20	MW25	MW30	MW104	MW105	MW106
			Sampled_Date-Time	9/01/2013	10/01/2013	10/01/2013	8/01/2013	9/01/2013	8/01/2013	8/01/2013	8/01/2013	9/01/2013	9/01/2013	9/01/2013	9/01/2013
			Lab_Report_Number	364911	365010	365010	364798	364911	364798	364798	364798	364911	364911	364911	364911
Chem_Group	**ChemName**	**Units**	**LOR**												
BTEX	Benzene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Ethylbenzene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Toluene	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Total BTEX	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Xylene (m & p)	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Xylene (o)	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Xylene Total	µg/L	3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
TPH	C6 - C9	µg/L	10	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C14	µg/L	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C29 - C36	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C36 (Sum of total)	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
PAH	Acenaphthene	µg/L	0.01	<0.01	<0.01	<0.01	0.02	0.02	<0.01	<0.01	0.02	<0.01	<1	0.12	0.01
	Acenaphthylene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<1	0.01	<0.01
	Anthracene	µg/L	0.01	<0.01	<0.01	<0.01	0.05	0.02	<0.01	<0.01	0.01	0.01	<1	0.05	0.01
	Benzo(a)anthracene	µg/L	0.01	<0.01	<0.01	<0.01	0.01	0.03	<0.01	<0.01	0.01	0.01	1	0.01	<0.01
	Benzo(a)pyrene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	<1	0.01	<0.01
	Benzo(b)&(k)fluoranthene	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	0.02	<2	0.02	<0.02
	Benzo(g,h,i)perylene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<1	<0.01	<0.01
	Chrysene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1	<0.05	<0.05
	Dibenz(a,h)anthracene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.05	<0.05
	Fluoranthene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	2	0.11	<0.05
	Fluorene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	0.11	<0.05
	Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.05	<0.05
	Naphthalene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	0.27	<0.05
	Phenanthrene	µg/L	0.01	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<1	0.28	<0.05
	Pyrene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	0.16	<0.05	<0.05	<0.05	0.08	2	0.09	<0.05
	Total PAHs	µg/L	0.05	<0.05	<0.05	<0.05	0.16	0.39	<0.05	<0.05	<0.05	0.13	6	1.1	<0.05
Metals	Arsenic (Filtered)	mg/L	0.001	0.005	<0.001	0.002	0.001	0.004	0.001	<0.001	0.008	<0.001	0.003	<0.001	0.001
	Cadmium (Filtered)	mg/L	0.0001	<0.0001	0.0002	0.0002	<0.0001	0.0002	<0.0001	<0.0001	0.0001	0.0003	0.0003	0.0003	0.0002
	Chromium (Filtered)	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper (Filtered)	mg/L	0.001	0.001	0.001	0.003	<0.001	<0.001	0.001	<0.001	<0.001	0.001	0.004	0.003	<0.001
	Lead (Filtered)	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
	Mercury (Filtered)	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Nickel (Filtered)	mg/L	0.001	0.001	<0.001	<0.001	<0.001	0.002	0.001	<0.001	0.002	<0.001	0.003	0.005	<0.001
	Zinc (Filtered)	mg/L	0.001	0.03	<0.005	0.009	<0.005	0.008	0.006	<0.005	<0.005	0.012	0.042	0.028	<0.005

Notes:
- Not Analysed

Table 6
Groundwater Analytical Data
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	MW107	MW109	MW110A	MW117	MW120
			Sampled_Date-Time	9/01/2013	10/01/2013	9/01/2013	9/01/2013	10/01/2013
			Lab_Report_Number	364911	365010	364911	364911	365010
Chem_Group	**ChemName**	**Units**	**LOR**					
BTEX	Benzene	µg/L	1	<1	<1	<1	<1	<1
	Ethylbenzene	µg/L	1	<1	<1	<1	<1	<1
	Toluene	µg/L	1	<1	<1	<1	<1	<1
	Total BTEX	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Xylene (m & p)	µg/L	2	<2	<2	<2	<2	<2
	Xylene (o)	µg/L	1	<1	<1	<1	<1	<1
	Xylene Total	µg/L	3	<3	<3	<3	<3	<3
TPH	C6 - C9	µg/L	10	<20	<20	<20	<20	30
	C10 - C14	µg/L	50	<50	<50	<50	-	<50
	C15 - C28	µg/L	100	100	<100	<100	-	<100
	C29 - C36	µg/L	100	<100	<100	<100	-	<100
	C10 - C36 (Sum of total)	µg/L	100	100 - 175	<100	<100	-	<100
PAH	Acenaphthene	µg/L	0.01	<0.01	0.04	0.04	-	<0.01
	Acenaphthylene	µg/L	0.01	<0.01	0.01	0.03	-	<0.01
	Anthracene	µg/L	0.01	0.02	0.06	0.02	-	<0.01
	Benzo(a)anthracene	µg/L	0.01	0.01	0.07	0.02	-	<0.01
	Benzo(a)pyrene	µg/L	0.01	<0.01	0.03	0.02	-	<0.01
	Benzo(b)&(k)fluoranthene	µg/L	0.02	<0.02	0.06	0.04	-	<0.02
	Benzo(g,h,i)perylene	µg/L	0.01	<0.01	0.01	0.01	-	<0.01
	Chrysene	µg/L	0.01	<0.05	0.06	<0.05	-	<0.05
	Dibenz(a,h)anthracene	µg/L	0.01	<0.05	<0.05	<0.05	-	<0.05
	Fluoranthene	µg/L	0.01	<0.05	0.85	0.05	-	<0.05
	Fluorene	µg/L	0.01	<0.05	<0.05	0.05	-	<0.05
	Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.05	<0.05	<0.05	-	<0.05
	Naphthalene	µg/L	0.01	<0.05	<0.05	0.06	-	<0.05
	Phenanthrene	µg/L	0.01	<0.05	0.11	0.07	-	<0.05
	Pyrene	µg/L	0.01	<0.05	0.73	0.05	-	<0.05
	Total PAHs	µg/L	0.05	0.09	2	0.46	-	<0.05
Metals	Arsenic (Filtered)	mg/L	0.001	<0.001	0.001	0.008	0.003	0.005
	Cadmium (Filtered)	mg/L	0.0001	0.0004	0.0002	0.0002	0.0002	0.0002
	Chromium (Filtered)	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper (Filtered)	mg/L	0.001	0.001	<0.001	<0.001	0.001	0.002
	Lead (Filtered)	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Mercury (Filtered)	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Nickel (Filtered)	mg/L	0.001	0.013	0.002	<0.001	0.006	<0.001
	Zinc (Filtered)	mg/L	0.001	0.007	<0.005	0.007	0.006	<0.005

Notes:
- Not Analysed

Table 7
Groundwater - Comparison of Filtered and Unfiltered PAH Analytical Data
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

			Field_ID	MW5FILT	MW5	MW6FILT	MW6	MW8FILT	MW8	MW9FILT	MW9	MW13FILT	MW13	MW16FILT	MW16
			Sampled_Date-Time	9/01/2013	9/01/2013	10/01/2013	10/01/2013	10/01/2013	10/01/2013	8/01/2013	8/01/2013	9/01/2013	9/01/2013	8/01/2013	8/01/2013
			Lab_Report_Number	364911	364911	365010	365010	365010	365010	364828	364798	364911	364911	364828	364798
Chem_Group	**ChemName**	**Units**	**LOR**												
PAH	Acenaphthene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.02	<0.01	<0.01
	Acenaphthylene	µg/L	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
	Anthracene	µg/L	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.01	0.02	<0.01	<0.01
	Benzo(a)anthracene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.03	<0.01	<0.01
	Benzo(a)pyrene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
	Benzo(b)&(k)fluoranthene	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02
	Benzo(g,h,i)perylene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
	Chrysene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dibenz(a,h)anthracene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Fluoranthene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05
	Fluorene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Naphthalene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Phenanthrene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05
	Pyrene	µg/L	0.01	0.26	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.16	<0.05	<0.05
	Total PAHs	µg/L	0.05	0.28	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.16	<0.05	0.39	<0.05	<0.05

Notes:

- Not Analysed

Table 7
Groundwater - Comparison of Filtered and Unfiltered PAH Analytical Data
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

				MW20FILT	MW20	MW25FILT	MW25	MW30FILT	MW30	MW105FILT	MW105	MW106FILT	MW106	MW107FILT	MW107
				8/01/2013	8/01/2013	8/01/2013	8/01/2013	9/01/2013	9/01/2013	9/01/2013	9/01/2013	9/01/2013	9/01/2013	9/01/2013	9/01/2013
				364828	364798	364828	364798	364911	364911	364911	364911	364911	364911	364911	364911
Chem_Group	**ChemName**	**Units**	**LOR**												
PAH	Acenaphthene	µg/L	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.12	<0.01	0.01	<0.01	<0.01
	Acenaphthylene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
	Anthracene	µg/L	0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.05	<0.01	0.01	<0.01	0.02
	Benzo(a)anthracene	µg/L	0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.01
	Benzo(a)pyrene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
	Benzo(b)&(k)fluoranthene	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
	Benzo(g,h,i)perylene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Chrysene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Dibenz(a,h)anthracene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Fluoranthene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05
	Fluorene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05
	Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Naphthalene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<5	<0.05	<0.05	<0.05	<5
	Phenanthrene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.28	<0.05	<0.05	<0.05	<0.05
	Pyrene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	0.09	<0.05	<0.05	<0.05	<0.05
	Total PAHs	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	1.1	<0.05	<0.05	<0.05	0.09

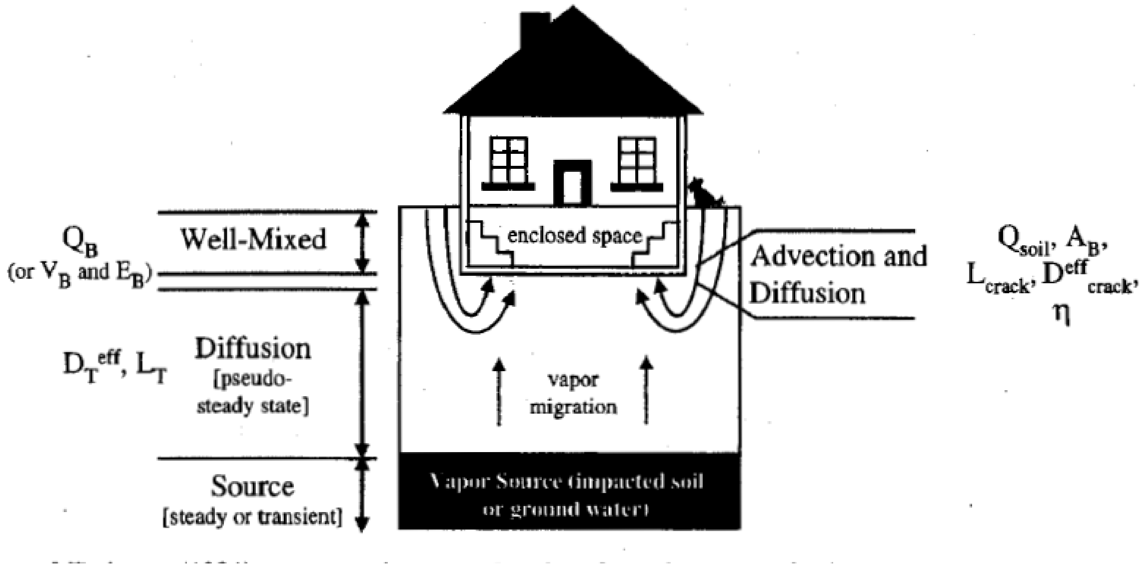
Table 7
Groundwater - Comparison of Filtered and Unfiltered PAH Analytical Data
Supplementary Site Investigation - Factual Report
Sydney International Conference, Exhibition and Entertainment Centre (SICEEP), Darling Harbour

				MW109FILT	MW109	MW110AFILT	MW110A	MW120FILT	MW120
				10/01/2013	10/01/2013	9/01/2013	9/01/2013	10/01/2013	10/01/2013
				365010	365010	364911	364911	365010	365010
Chem_Group	**ChemName**	**Units**	**LOR**						
PAH	Acenaphthene	µg/L	0.01	<0.01	0.04	<0.01	0.04	<0.01	<0.01
	Acenaphthylene	µg/L	0.01	<0.01	0.01	<0.01	0.03	<0.01	<0.01
	Anthracene	µg/L	0.01	<0.01	0.06	<0.01	0.02	<0.01	<0.01
	Benzo(a)anthracene	µg/L	0.01	<0.01	0.07	<0.01	0.02	<0.01	<0.01
	Benzo(a)pyrene	µg/L	0.01	<0.01	0.03	<0.01	0.02	<0.01	<0.01
	Benzo(b)&(k)fluoranthene	µg/L	0.02	<0.02	0.06	<0.02	0.04	<0.02	<0.02
	Benzo(g,h,i)perylene	µg/L	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01
	Chrysene	µg/L	0.01	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
	Dibenz(a,h)anthracene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Fluoranthene	µg/L	0.01	<0.05	0.85	<0.05	0.05	<0.05	<0.05
	Fluorene	µg/L	0.01	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
	Indeno(1,2,3-c,d)pyrene	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Naphthalene	µg/L	0.01	<0.05	<0.05	<0.05	<5	<0.05	<0.05
	Phenanthrene	µg/L	0.01	<0.05	0.11	<0.05	0.07	<0.05	<0.05
	Pyrene	µg/L	0.01	<0.05	0.73	<0.05	0.05	<0.05	<0.05
	Total PAHs	µg/L	0.05	<0.05	2	<0.05	0.46	<0.05	<0.05

Appendix C Vapour Modelling

C1 Introduction

The assessment of vapour migration and vapour intrusion into buildings on the site has been undertaken using Johnson & Ettinger equations as presented by US EPA (2004) and the outdoor model as presented by ASTM (2002). This requires estimation of the partitioning from a source concentration in soil or groundwater to vapour phase (directly above the source), or use of measured soil gas concentrations, diffusion as a key mechanism for vapour phase transport through the subsurface and entry into the building. Conceptually the migration of vapours entering a building are illustrated in the following:



(from Johnson and Ettinger 1991)

The following presents the equations (Johnson et al 1990 and Johnson and Ettinger 1991) used to estimate the vapour phase concentration directly above the source and diffusion through overlying soils.

C2 Vapour Phase-Partitioning

Soil Source

For a soil source, it is assumed that the vapour phase concentration directly above the soil is in equilibrium with the source and the concentration is related to the soil concentration by the following:

$$C_{source} = \frac{C_{soil} \bullet H' \bullet \rho_S}{\theta_{ws} + k_d \bullet \rho_S + H' \bullet \theta_{as}} \quad (\text{g/cm}^3) \qquad \textbf{...Equation VS3}$$

where:

Csoil	= Concentration in soil source zone (g/g)
H'	= Henry's Law constant (unitless)
ρ_S	= Soil bulk density (g soil/cm^3 soil)
θ_{ws}	= Volumetric water content in soil source zone (cm^3 water/cm^3 soil)
θ_{as}	= Volumetric air content in soil source zone (cm^3 air/cm^3 soil)

K_d = Soil-water partition coefficient (cm^3 air/g soil) = K_{oc} x f_{oc}
Koc = Soil organic carbon partition coefficient, chemical specific (cm^3/g)
f_{oc} = Soil organic carbon fraction (unitless)

The equilibrium vapour phase concentration is proportional to the soil concentration up to the soil saturation limit (C_{sat}), which is calculated using the following (with the saturated vapour phase calculated using Equation VS2 below):

$$C_{sat} = \frac{S}{\rho_s} \bullet [H' \bullet \theta_{as} + \theta_{ws} + K_d \bullet \rho_s] \quad \text{(mg/kg)} \quad \text{...Equation VS4}$$

where:
S = Pure component solubility in water (mg/L)

The saturated vapour phase concentration is estimated using the following relationship:

$$SVPC = \frac{VP \bullet MW}{T \bullet 62361} \quad \text{(g/cm}^3\text{)} \quad \text{...Equation VS2}$$

Where:
VP = vapour pressure of the contaminant (mmHg)
MW = molecular weight (g/mol)
T = soil temperature (K)
62361 = conversion (mmHg/K* cm^3/mol)

When residual free phase is present the vapour concentration is independent of the soil concentration but proportional to the mole fraction of the individual component of the residual phase mixture as below.

C3 Effective Diffusion

The total overall effective diffusion coefficient can be calculated for n different soil layers between the source and the enclosed floor (including the capillary fringe where relevant). This is estimated using Equation D1.

$$D_T^{eff} = \frac{L_T}{\sum_{i=1}^{n} L_i / D_i^{eff}} \quad \text{...Equation D1}$$

L_T = separation distance between the source and the building (cm)
L_i = thickness of the soil layer i (cm)
D_i^{eff} = effective diffusion coefficient across soil layer i (cm^2/s) – refer to Equation D2

$$D_i^{eff} = D_a \bullet \left[\frac{\theta_{ai}^{3.33}}{n_i^2}\right] + \left[\frac{D_w}{H'}\right] \bullet \left[\frac{\theta_{wi}^{3.33}}{n_i^2}\right] \quad \text{...Equation D2}$$

D_a = diffusivity in air, chemical specific (cm^2/s)
θ_{ai} = soil air-filled volume of layer i (cm^3/cm^3)
n_i = soil total porosity of layer i (cm^3/cm^3)
= $1-\rho_b/\rho_s$

ρ_b = soil dry bulk density, (g/cm^3)
ρ_s = soil particle density, (g/cm^3) - typically 2.65
D_w = diffusivity in water, chemical specific (cm^2/s)
θ_{wi} = soil water-filled volume of layer i, (cm^3/cm^3)

C4 Vapour Intrusion

The steady-state vapour-phase concentration of a contaminant inside a building ($C_{building}$) is calculated by applying the Johnson and Ettinger model assuming a steady-state mass transfer (i.e., infinite). This is calculated using Equation JE1.

$$C_{indoor} = C_{source} \bullet \alpha$$ …Equation JE1

Where
C_{indoor} = the steady-state vapor-phase concentration of a contaminant inside a building (µg/m^3)
α = attenuation coefficient [unitless], refer to Equation JE2
C_{source} = vapour concentration at the source (µg/m^3), refer to equations VS2.

The attenuation factor is calculated using the following:

$$\alpha = \frac{\left[\frac{D_T^{eff} \bullet A_B}{Q_{building} \bullet L_T}\right] \bullet \exp\left[\frac{Q_{soil} \bullet L_{crack}}{D^{crack} \bullet A_{crack}}\right]}{\left[\exp\left[\frac{Q_{soil} \bullet L_{crack}}{D^{crack} \bullet A_{crack}}\right] + \left[\frac{D_T^{eff} \bullet A_B}{Q_{building} \bullet L_T}\right] + \left[\frac{D_T^{eff} \bullet A_B}{Q_{soil} \bullet L_T}\right] \bullet \exp\left[\frac{Q_{soil} \bullet L_{crack}}{D^{crack} \bullet A_{crack}}\right]^{-1}\right]}$$ Equation JE2

Where:
D_T^{eff}. = total overall effective diffusion coefficient. Refer to Equations D1 and D2.
A_B = area of the enclosed space below the ground level which will vary depending on whether the building has a basement below the ground or not (cm^2).
$Q_{building}$. = building ventilation rate which is calculated using building parameters and air exchange rate (cm^3/s). Refer to Equation JE3.
L_T = separation distance between the source or soil vapour measurement and the building (cm).
Q_{soil}. = volumetric flowrate of soil vapour into the enclosed space. This represents the convective flow of vapours into a building though cracks in the floor and walls. It incorporates pressure driven flows and a default value of 5 L/min is recommended (2003), however it has been set to ensure the ratio of Qsoil:Qbuilding is 0.0001 (refer to main report for discussion).
L_{crack} = enclosed space foundation or slab thickness (cm).
D^{crack} = effective diffusion coefficient through the cracks (cm^2/s).
A_{crack} = area of total cracks which varies depending on whether there is a basement or not (cm^2), refer to Equation JE4.

The building ventilation rate is calculated using Equation JE3 for the building dimensions representing the living space of the building. It assumes that the total air volume entering the structure is mixed and that the vapour entering the structure is instantaneously and homogeneously distributed.

$$Q_{building} = \frac{(L_B \bullet W_B \bullet H_B \bullet ER)}{3600}$$ …Equation JE3

Where:
L_B = length of building, (cm)
W_B = width of building, (cm)
H_B = height of building, (cm)
ER = air exchange rate, (per hour)
3600 = conversion from hours to seconds

$$A_{crack} = n \bullet AB$$
$$AB = L_B \bullet W_B + (2 \bullet L_B \bullet L_h + 2 \bullet W_B \bullet L_h)$$ …Equation JE4

Where:

AB = area of enclosed space below ground, (cm^2)
n = ratio of crack area to total area (unitless)
A_{crack} = total crack area, (cm^2)
L_h = depth below ground, (cm)

The volumetric flow rate of soil vapour into the building can be calculated using Equation JE5. This represents the advective/convective flow rate of contaminant vapours in soil surrounding the building via the cracks in the building floor and walls. It incorporates pressure driven flows into the building that may be associated with wind effects on the structure, stack effects due to heating or unbalanced mechanical ventilation. This is of particular importance where a basement is present and where heating /ventilation effects are of significance.

Tracer testing of buildings where advection is the primary mechanism for intrusion into the building suggested a typical range for Qsoil from 1 to 10 L/min, with 5 L/min selected as a default by the US EPA (2003). The equation represents potential openings for soil vapour entry into a building. These openings include floor/wall joints associated with floating concrete slabs or a perimeter drain /sump system. The soil vapour permeability used is that for the type of material immediately under the slab.

$$Q_{soil} = \frac{2 \bullet \pi \bullet P \bullet k_v \bullet X_{crack}}{\mu \bullet \ln\left[2 \bullet \frac{Z_{crack}}{r_{crack}}\right]}$$ **...Equation JE5**

Where:

P = pressure differential between the soil surface and the enclose space, (g/cm.s^2) which may range from negligible (0.001-20Pa, or 0.0001 to 2 g/cm.s^2)
k_v = soil vapour permeability, (cm^2), calculated based on soil type beneath slab as per US EPA 2003
X_{crack} = floor-wall seam perimeter, (cm)
μ = viscosity of air, (g/cm.s)
Z_{crack} = crack depth below ground level, (cm)
r_{crack} = equivalent crack radius, (cm), refer to US EPA 2003 for approach.

However, for buildings constructed as slab-on-grade in climates where the potential for pressure differences to be driven by long term heating or unbalanced ventilation systems, the potential for pressure driven flows (advection) is considered negligible, consistent with the approach adopted in the ASTM guidance (2002). This results in Qsoil being essentially negligible and hence the attenuation factor is simplified and can be calculated using the following (as per ASTM 2002):

$$\alpha = \frac{\left[\frac{D_T^{eff}/L_T}{ER \bullet L_B}\right]}{\left[1+\left[\frac{D_T^{eff}/L_T}{ER \bullet L_B}\right]+\left[\frac{D_T^{eff}/L_T}{(D^{crack}/L^{crack}) \bullet \eta}\right]\right]}$$

Equation JE6

Where:

D_T^{eff}.	= total overall effective diffusion coefficient. Refer to Equations D1 and D2.
L_B	= enclosed-space volume: infiltration area ratio (cm).
ER	= enclosed-space air exchange rate (1/sec).
L_T	= separation distance between the source or soil gas measurement and the building (cm).
L_{crack}	= enclosed space foundation or slab thickness (cm).
D^{crack}	= effective diffusion coefficient through the cracks (cm^2/s).

Where there is no foundation, and diffusion is the primary mechanism by which vapours may migrate from the subsurface into a space (crawl-space, sub-slab ventilation system or indoors [where there is no slab or timber floor]), the attenuation is equal to the following (Johnson 2005):

$$\alpha_S = A = \frac{D_T^{eff}}{\left[\frac{Q_V}{A_B} \bullet L_T\right]}$$

Equation JE7

Where:

D_T^{eff}.	= total overall effective diffusion coefficient. Refer to Equations D1 and D2.
QV	= volumetric ventilation rate of space (cm^3/s)
	= VAER x V_S
VAER	= air exchange rate of space (1/sec)
Vs	= volume of space (cm^3)
	= AB x PVH
PVH	= height of the space
A_B	= area of the enclosed space below the ground level which will vary depending on whether the building has a basement below the ground or not (cm^2).
L_T	= separation distance between the source or soil gas measurement and the building (cm).

The vapour attenuation coefficient between vapours immediately beneath a foundation and indoor air, provided diffusion through the foundation is the dominant transport mechanism can be calculated using the following:

$$\alpha_F = \frac{A_B \bullet D_{crack}^{eff} \bullet n}{Q_B \bullet L_{crack}}$$

Equation JE8

Where:

$Q_{building}$.	= building ventilation rate which is calculated using building parameters and air exchange rate (cm^3/s). Refer to Equation JE3.

D_{crack}^{eff}.	= total overall effective diffusion coefficient through cracks in foundation. Refer to Equations D1 and D2.
n	= fraction of cracks in foundation (unitless)
A_B	= area of the enclosed space below the ground level which will vary depending on whether the building has a basement below the ground or not (cm^2).
L_{crack}	= enclosed space foundation or slab thickness (cm).
	= AB x PVH

C5 Model Assumptions

The following represent the major assumptions/limitations of the vapour models used to estimate indoor and outdoor exposure concentrations:

- Contaminant vapours enter a building structure primarily through cracks and openings in the walls and foundation;
- Convective transport occurs primarily within the building zone of influence and vapour velocities decrease rapidly with increasing distance from the building structure;
- Advection dominates vapour transport between the source of contamination and the building zone of influence;
- All vapours originating from below the building will enter the building unless the floors and walls are perfect vapour barriers;
- All soil properties in any horizontal plane are homogeneous;
- The contaminant is homogeneously distributed within the zone of contamination;
- The aerial extent of contamination is greater than that of the building floor in contact with the soil;
- Vapour transport occurs in the absence of convective water movement within the soil column (i.e., evaporation or infiltration), and in the absence of mechanical dispersion;
- The model does not account for transformation processes (e.g., biodegradation, hydrolysis, etc.);
- The soil layer in contact with the structure floor and walls is isotropic with respect to permeability; and
- Both the building ventilation rate and the difference in dynamic pressure between the interior of the structure and the soil surface are constant values.

C6 Outdoor Air and Excavations

Introduction

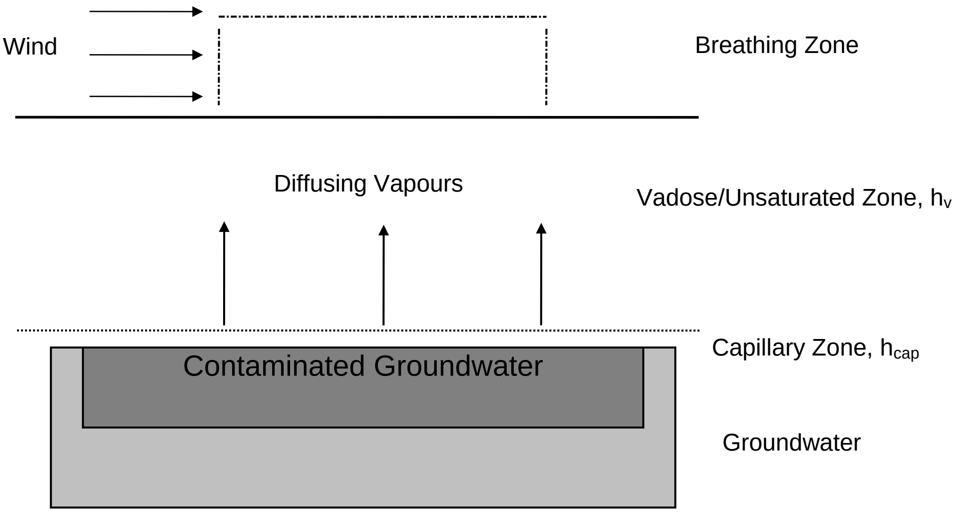
There are a number of models available for estimating potential concentrations of chemicals within the outdoor air environment associated with the migration from a subsurface source. Limited guidance is available for the estimation of concentrations in an excavation, hence the outdoor model adopted has also been utilised for calculations of concentrations within an excavation. The estimation of concentrations in outdoor air can be undertaken using two different methodologies outlined in the Soil Screening Guidelines (US EPA, 1996[5]) and the Risk Based Corrective Action at Petroleum Release Sites (ASTM, 2002[6]).

[5] USEPA, 1996. Soil Screening Guidance. Publication 9355.4-23, July 1996

[6] ASTM, 2002. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites. ASTM E 1739-95 (2002)

The model is used to assess vapour intrusion indoors only and assumed that the source is non-depleting.

Conceptual Model



Volatilisation from Soil and Groundwater to Ambient Air

Equations

The relevant equations associated with the estimation of outdoor air concentrations based on the approach outlined in the US EPA document "Soil Screening Guidance" (1996 and Supplement 2001 Exhibit D-3). This model uses air dispersion models to provide an estimate of potential dispersion of emissions above the ground as presented below.

$$C_o = \frac{J_S}{Q/C \bullet 10^{-9}}$$ **…Equation O1**

Where:

C_o = Outdoor air concentration ($\mu g/m^3$)

J_S = Contaminant flux from the surface of the ground (measured) ($g/s/m^2$)

Q/C = Dispersion term calculated for area ($g/s/m^2$ per kg/m^3)

10^{-9} = Units conversion to from kg/m^3 to $\mu g/m^3$

$$Q/C = 11.91 \bullet \exp\left(\frac{(\ln(Acres) - 18.4385)^2}{209.7845}\right)$$ **…Equation O2**

Where:

Q/C = Dispersion term calculated for area (g/s/m^2 per kg/m^3) based on climates similar to Los Angeles which is considered relevant for much of Australia, however for other areas, relevant parameters are selected.

Acres = Area of the source outside (acres)

A simpler approach more commonly used for small subsurface sources is the outdoor model presented in the ASTM (2002) guidance. Outdoor air concentrations have been estimated using a simple box model, which accounts for some atmospheric mixing. The concentration of volatile contaminants within the breathing zone of outdoor air has been estimated using Equation O3.

$$C_{outdoor} = C_S \bullet VF \qquad (mg/m^3) \qquad \text{...Equation O3}$$

Where:

C_s = concentration at the source (mg/m^3)

VF = volatilisation factor calculated for emissions from the source to air, refer to Equation O4.

As noted with the indoor air model, the vapour phase concentration at the source can be estimated using the following relationships:

- Where soil gas data is available and relevant to the quantification of vapour migration, the measured soil gas concentration is considered to be the concentration at the source, with migration modelled through overlying soils (from point of measurement to the surface); and
- Where no soil gas data is available, the concentration at the source is based on theoretical partitioning from the groundwater or soil source, as presented in Equations VS1 to VS5 (as required).

The volatilisation factor is calculated using the following:

$$VF = \frac{D_s^{eff} \bullet W}{U_{air} \bullet \delta \bullet L_{GW}} \qquad \text{....Equation O4}$$

where:

U_{air} = Wind speed above the ground surface in the ambient mixing zone (cm/s)

δ_{air} = Ambient air mixing zone height (cm)

L_{GW} = Depth to groundwater (= height of capillary zone, h_{cap}, + height of unsaturated zone, h_v) (cm)

W = Width of source area parallel to wind or groundwater flow direction (cm) (i.e. width and breadth of breathing zone)

D_{ws}^{eff} = Effective diffusion coefficient between the groundwater and soil surface (cm^2/s), refer to Equations D1 and D2.

ASTM (2002) also provides equations for estimating emissions to outdoor air from sources that are close to or at the surface of the ground.

Emissions into Excavation or Trench

Volatile COPCs have the potential to accumulate within trenches or excavations in areas where excavations intersect or are located directly above contaminated soil or groundwater. Workers have the potential to be exposed to these COPCs when working in or near the trench or excavation. It is unlikely that workers would spend an entire workday within any excavation or trench, and any exposure near the trench or excavation would result in exposure to significantly lower concentrations due to dilution.

Concentrations within an excavation have been estimated using the ASTM (2002) outdoor air model presented above, however the depth to the source is adjusted to reflect to depth from the base of the excavation to the source, the dimensions of the excavation are used and the wind speed is adjusted to reflect a more confined space scenario. A typical excavation is estimated as 1m x 10m x 1 to 1.5m depth (ANZECC 1992[7] notes the depth of most services is between 1 to 2m below ground surface). A wind speed considered representative of a more confined space within an excavation is 0.5 m/s.

Where groundwater seeps into an excavation, concentrations of volatile chemicals in groundwater that could be inhaled during excavation work can be estimated using an upper-bound volatilization factor (VF). The VF is based on workers in trenches flooded with groundwater off-gassing volatile organic compounds (VOCs). A methodology developed by the US EPA has been used to estimate a VF from water (VF_w) (US EPA 1999[8]). The EPA method examines the mass of a chemical that could be transferred from water to air and assumes:

$$VF_w\left(\frac{l}{m^3}\right) = \frac{(k_{lg})}{(k)\left(\frac{\mu}{L}\right)(H)} \bullet \left(\frac{1000l}{m^3}\right) \qquad \text{(mg/m}^3\text{ air)/(mg/L water)}$$

where:

k_{lg} = a conservative estimate of the overall mass transfer coefficient from the liquid phase to the gas phase of 3.0 x 10^{-6} m/s (US EPA 1999)

L = an average trench length of up to 30 meters (US EPA 1999)

H = an average trench depth of 3 meters (US EPA 1999)

μ = average wind speed in excavation of 1 mph (0.45 m/sec) over a year's time (US EPA 1999)

k = an air mixing rate between trench air and ambient air of 50 percent; uniform mixing of air occurs in the trench (US EPA 1999)

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[7] ANZECC 1992. Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites. Australian and New Zealand Environment and Conservation Council, National Health and Medical Research Council, January 1992.

[8] USEPA, 1999. *Derivation of a volatilization factor to estimate upper bound exposure point concentration for workers in trenches flooded with groundwater off-gassing volatile organic chemicals.* Region 8. Ref: 8EPR-PS. July 29, 1999

Using these assumptions, the US EPA's default, upper-bound volatilization factor (VF_w) is 0.133 litres per cubic meter (L/m^3) has been adopted (US EPA 1999). The VFw is applied directly to the relevant groundwater concentrations assumed to seep into an excavation to estimate an air concentration in the flooded trench. If this VF were considered in relation to phase partition equations for dissolved phase and LNAPL sources, the air concentration in an excavation would be approximately 2000 times lower (based on dispersion and dilution in excavation) than the vapour phase concentration estimated at an LNAPL source, assuming the product floods into an excavation.

C7 Key Modelling Parameters and Calculations

Calculations undertaken for the estimation of air emissions and concentrations associated with the presence of volatile COPCs from soil gas, surface water in a drain or groundwater seepage into an excavation are included in the calculation sheets in **Appendix D**.

Appendix D Risk Calculations

Dust and Vapour Modelling Calculations

Soil to Air Particulate Emission Factor (PEF) - Outdoors

(Reference: USEPA Soil Screening Guidance (1996), Supplemental Guidance (2002))

$$PEF = \frac{Q/C \bullet 3600}{0.036 \bullet (1-V) \bullet (\frac{U_m}{U_t})^3 \bullet F_x}$$

where:

		Site Data	Comments
A	area of site (acres)	**9.40**	Area of concern covers approx. 4 ha
Q/C =	dispersion factor ($g/m^2/s$ per kg/m^3)	**57.52**	Calculated using equations for outdoor worker from USEPA, 2001
V =	fraction of vegetative cover (unitless)	**0**	Assume no vegetation cover most of the time
U_m =	mean annual windspeed (m/s)	**3.8**	Mean windspeed from 9am and 3pm readings from Sydney Observatory Hill
U_t =	equivalent threshold value (m/s)	**11.3**	Calculated for a threshold velocity of 1 m/s (USEPA, 1996)
U_t/U_m =	ratio of threshold value to windspeed	**3.0**	Ratio
F_x =	windspeed distribution function (unitless)	**4.74E-03**	Value based on Ut/Um ratio, Cowherd (1985)

PEF = 3.21E+10 (m^3/kg)

COPC	Soil Concentration, C_{soil} (mg/kg)	Dust Concentration C_{dust} [$=C_{soil}/PEF$] (mg/m^3)
TRH C10-C14 Aromat	330	1.0E-08
TRH C10-C14 Aliphati	330	1.0E-08
TRH C15+ Aromatic	2100	6.5E-08
TRH C15+ Aliphatic	3100	9.7E-08
Benzo[a]anthracence	260	8.1E-09
Benzo[a]pyrene	200	6.2E-09
Benzo[b]fluoranthene	235	7.3E-09
Benzo[ghi]perylene	62	1.9E-09
Benzo[k]fluoranthene	105	3.3E-09
Chrysene	300	9.4E-09
Dibenz[ah]anthracene	19	5.9E-10
Indeno[123cd]pyrene	60	1.9E-09
Naphthalene	15	4.7E-10
2-naphthylamine	0.8	2.5E-11

PEF for fugitive dust emissions considered relevant for the quantification of inhalation exposures by outdoor workers on a residential or commercial/industrial site (including gardening and landscaping activities). However it is noted that the fugitive model may not be relevant for activities and conditions that may result in the generation of potentially high dust emissions such as dry soils (MC<8%), fine soils (high silt or clay content), high annual average winds (>5.3 m/s) and less than 50% vegetative cover.

Estimation of Vapour Concentrations from Soil Source - Maximum

Site Specific Physical Input Parameters	Units	Abbrev.	Value	Comments
Vadose Zone Layer 2 Characteristics				***Fill Materials***
Depth of Layer	[m]	vd2	**0.2**	Average depth of soil impacts
Moisture Content	[cm³/g]	mocon2	**0.08**	Default value for fill materials (CRC CARE 2011)
Organic Carbon Fraction	-	foc2	**0.003**	Assumed
Soil Bulk Density	[g/cm³]	rhob2	**1.625**	Default value for fill materials (CRC CARE 2011)
Density of Solids	[g/cm³]	sd2	2.65	site-specific assumption
Total Soil Porosity	[cm³/cm³]	theta2	0.39	1 - (rhob2/sd2)
Volumetric Water Content	[cm³/cm³]	wacon2	0.130	mocon2*rhob2
Volumetric Air Content	[cm³/cm³]	acon2	0.257	theta2-wacon2

Receptor Specific Input Parameters	Units	Abbrev.	Value	Comments
Building Characteristics				
Depth of Basement	[m]	basement	**0**	Slab on grade building
Width of Building	[m]	bwidth	**10**	Assumed area of separate room within main building
Length of Building	[m]	blength	**10**	Assumed area of separate room within main building
Area of Building Below Ground Level	[m²]	area	100.0	Calculated from building dimensions
Foundation/wall thickness	[m]	fthick	0.10	Minimum default from BCA
Building Mixing Height	[m]	boxh	**2.4**	Height from building plans
Hourly Volume Exchange of Fresh Air	[exch/hr]	exchanges	**2**	Assumed - commercial/retail minimum requirement
Fraction of Cracks in Walls and foundation	-	cracks	**0.001**	Default Value for type of building, USEPA 2003
Qbuilding	[cm³/s]	Qb	133333.3	Calculated, USEPA 2003
Is advective vapour flow significant?	-	Adv	yes	Based on building type/assumptions adopted
Qsoil	[cm³/s]	Qs	83.3	Calculated from default of 5L/min (USEPA 2003)
Acrack	[cm²]	Ac	1000	Calculated from building area and crack ratio, USEPA 2003
Volumetric Water Content in foundation/wall cracks	[cm³/cm³]	fwacon	0.12	Default Value
Volumetric Air Content in foundation/wall cracks	[cm³/cm³]	facon	0.260	Default Value
Outdoor Air Characteristics				
Depth of Excavation	[m]	exdepth	**1.5**	Assumed for most excavations likely to be undertaken
Length of Contaminated Area	[m]	length	**20**	Assumed area outdoors contributing to outdoor concentration
Width of Contaminated Area	[m]	width	**20**	Assumed area outdoors contributing to outdoor concentration
Length of Excavation through contamination	[m]	exlength	**10**	Assumed for excavation - contributing to concentration
Wind Speed Outdoors	[m/s]	wspd	**3.8**	Mean windspeed from 9am and 3pm readings from Observatory Hill
Wind Speed in Excavation	[m/s]	exwspd	**0.5**	Low wind speed in excavation
Height of Outdoor Mixing Zone	[m]	outboxh	1.5	Default Value

Chemical Specific Parameters	Water Solubility (mg/L)	MW (g/mol)	Koc (cm³/g)	Air Diffusion Coefficient (cm²/s)	Water Diffusion Coefficient (cm²/s)	Vapour Pressure (mmHg)	Henry's Law Constant (unitless)
TRH C10-C14 Aromatic	25	130	2510	0.1	1.0E-05	0.48	0.14
TRH C10-C14 Aliphatic	0.034	160	316000	0.1	1.0E-05	0.48	130
Naphthalene	31	128.16	933	0.0605	8.4E-06	0.087	0.018

Vapour Transport Calculations	Deff Layer 1 (cm²/s)	Deff Layer 2 (cm²/s)	Deff Foundations and Cracks (cm²/s)	Total Effective Diffusion (source to surface) (cm²/s)
TRH C10-C14 Aromatic		7.20E-3	5.04E-3	7.20E-3
TRH C10-C14 Aliphatic		7.19E-3	5.04E-3	7.19E-3
Naphthalene		4.36E-3	3.05E-3	4.36E-3

Phase Partitioning Results	Soil Concentration (mg/kg)	Vapour Phase Concentration (g/cm³)	Saturated Soil Concentration (mg/kg)	Saturated Vapour Concentration (g/cm³)	Mole Fraction (mol/mol)	Concentration above Free Phase (g/cm³)	Vapour Phase used in Calculation (g/cm³)
TRH C10-C14 Aromatic	330	6.1E-07	1.9E+02	3.5E-06	0	0.0E+00	**6.1E-07**
TRH C10-C14 Aliphatic	330	4.4E-06	3.3E+01	4.3E-06	0	0.0E+00	**4.3E-06**
Naphthalene	15	9.4E-09	8.9E+01	6.2E-07	0	0.0E+00	**9.4E-09**

Calculated Air Concentrations	Vapour Phase Concentration at Source (ug/m³)	Vapour Phase Concentration at Source (mg/m³)	JE Attenuation Coefficient (unitless)	Enclosed Space Concentration - Retail Ground Floor (mg/m³)	Enclosed Space Concentration - Residential First Floor (mg/m³)	Outdoor Air Concentration (mg/m³)	Excavation Air Concentration (mg/m³)
TRH C10-C14 Aromatic	6.1E+05	6.1E+02	5.1E-04	**3.1E-01**	**3.1E-02**	**7.6E-03**	**5.8E-02**
TRH C10-C14 Aliphatic	4.3E+06	4.3E+03	5.1E-04	**2.2E+00**	**2.2E-01**	**5.4E-02**	**4.1E-01**
Naphthalene	9.4E+03	9.4E+00	4.5E-04	**4.2E-03**	**4.2E-04**	**7.2E-05**	**5.4E-04**

Soil to Air Particulate Emission Factor (PEF) - Outdoors - 95% UCL

(Reference: USEPA Soil Screening Guidance (1996), Supplemental Guidance (2002))

$$PEF = \frac{Q/C \bullet 3600}{0.036 \bullet (1-V) \bullet (\frac{U_m}{U_t})^3 \bullet F_x}$$

where:

		Site Data	Comments
A	area of site (acres)	**9.40**	Area of concern covers approx. 4 ha
Q/C =	dispersion factor ($g/m^2/s$ per kg/m^3)	**57.52**	Calculated using equations for outdoor worker from USEPA, 2001
V =	fraction of vegetative cover (unitless)	**0**	Assume no vegetation cover most of the time
U_m =	mean annual windspeed (m/s)	**3.8**	Mean windspeed from 9am and 3pm readings from Sydney Observatory Hill
U_t =	equivalent threshold value (m/s)	**11.3**	Calculated for a threshold velocity of 1 m/s (USEPA, 1996)
U_t/U_m =	ratio of threshold value to windspeed	**3.0**	Ratio
F_x =	windspeed distribution function (unitless)	**4.74E-03**	Value based on Ut/Um ratio, Cowherd (1985)

PEF = 3.21E+10 (m^3/kg)

COPC	Soil Concentration, C_{soil} (mg/kg)	Dust Concentration C_{dust} [$=C_{soil}/PEF$] (mg/m^3)
TRH C10-C14 Aromat	40	1.2E-09
TRH C10-C14 Aliphati	40	1.2E-09
TRH C15+ Aromatic	300	9.4E-09
TRH C15+ Aliphatic	300	9.4E-09
Benzo[a]anthracence	12	3.7E-10
Benzo[a]pyrene	8	2.5E-10
Benzo[b]&[k]fluoranth	15	4.7E-10
Benzo[ghi]perylene	3.7	1.2E-10
Chrysene	12	3.7E-10
Dibenz[ah]anthracene	2.5	7.8E-11
Indeno[123cd]pyrene	3.3	1.0E-10
Naphthalene	1.1	3.4E-11
2-naphthylamine	0.8	2.5E-11

PEF for fugitive dust emissions considered relevant for the quantification of inhalation exposures by outdoor workers on a residential or commercial/industrial site (including gardening and landscaping activities). However it is noted that the fugitive model may not be relevant for activities and conditions that may result in the generation of potentially high dust emissions such as dry soils (MC<8%), fine soils (high silt or clay content), high annual average winds (>5.3 m/s) and less than 50% vegetative cover.

Estimation of Vapour Concentrations from Soil Source - 95%UCL

Site Specific Physical Input Parameters	Units	Abbrev.	Value	Comments
Vadose Zone Layer 2 Characteristics				***Fill Materials***
Depth of Layer	[m]	vd2	**0.2**	Average depth of soil impacts
Moisture Content	[cm^3/g]	mocon2	**0.08**	Default value for fill materials (CRC CARE 2011)
Organic Carbon Fraction	-	foc2	**0.003**	Assumed
Soil Bulk Density	[g/cm^3]	rhob2	**1.625**	Default value for fill materials (CRC CARE 2011)
Density of Solids	[g/cm^3]	sd2	2.65	site-specific assumption
Total Soil Porosity	[cm^3/cm^3]	theta2	0.39	1 - (rhob2/sd2)
Volumetric Water Content	[cm^3/cm^3]	wacon2	0.130	mocon2*rhob2
Volumetric Air Content	[cm^3/cm^3]	acon2	0.257	theta2-wacon2

Receptor Specific Input Parameters	Units	Abbrev.	Value	Comments
Building Characteristics				
Depth of Basement	[m]	basement	**0**	Slab on grade building
Width of Building	[m]	bwidth	**10**	Assumed area of separate room within main building
Length of Building	[m]	blength	**10**	Assumed area of separate room within main building
Area of Building Below Ground Level	[m^2]	area	100.0	Calculated from building dimensions
Foundation/wall thickness	[m]	fthick	0.10	Minimum default from BCA
Building Mixing Height	[m]	boxh	**2.4**	Height from building plans
Hourly Volume Exchange of Fresh Air	[exch/hr]	exchanges	**2**	Assumed - commercial/retail minimum requirement
Fraction of Cracks in Walls and foundation	-	cracks	**0.001**	Default Value for type of building, USEPA 2003
Qbuilding	[cm^3/s]	Qb	133333.3	Calculated, USEPA 2003
Is advective vapour flow significant?	-	Adv	yes	Based on building type/assumptions adopted
Qsoil	[cm^3/s]	Qs	83.3	Calculated from default of 5L/min (USEPA 2003)
Acrack	[cm^2]	Ac	1000	Calculated from building area and crack ratio, USEPA 2003
Volumetric Water Content in foundation/wall cracks	[cm^3/cm^3]	fwacon	0.12	Default Value
Volumetric Air Content in foundation/wall cracks	[cm^3/cm^3]	facon	0.260	Default Value
Outdoor Air Characteristics				
Depth of Excavation	[m]	exdepth	**1.5**	Assumed for most excavations likely to be undertaken
Length of Contaminated Area	[m]	length	**20**	Assumed area outdoors contributing to outdoor concentration
Width of Contaminated Area	[m]	width	**20**	Assumed area outdoors contributing to outdoor concentration
Length of Excavation through contamination	[m]	exlength	**10**	Assumed for excavation - contributing to concentration
Wind Speed Outdoors	[m/s]	wspd	**3.8**	Mean windspeed from 9am and 3pm readings from Observatory Hill
Wind Speed in Excavation	[m/s]	exwspd	**0.5**	Low wind speed in excavation
Height of Outdoor Mixing Zone	[m]	outboxh	1.5	Default Value

Chemical Specific Parameters	Water Solubility (mg/L)	MW (g/mol)	Koc (cm^3/g)	Air Diffusion Coefficient (cm^2/s)	Water Diffusion Coefficient (cm^2/s)	Vapour Pressure (mmHg)	Henry's Law Constant (unitless)
TRH C10-C14 Aromatic	25	130	2510	0.1	1.0E-05	0.48	0.14
TRH C10-C14 Aliphatic	0.034	160	316000	0.1	1.0E-05	0.48	130
Naphthalene	31	128.16	933	0.0605	8.4E-06	0.087	0.018

Vapour Transport Calculations	Deff Layer 1 (cm^2/s)	Deff Layer 2 (cm^2/s)	Deff Foundations and Cracks (cm^2/s)	Total Effective Diffusion (source to surface) (cm^2/s)
TRH C10-C14 Aromatic		7.20E-3	5.04E-3	7.20E-3
TRH C10-C14 Aliphatic		7.19E-3	5.04E-3	7.19E-3
Naphthalene		4.36E-3	3.05E-3	4.36E-3

Phase Partitioning Results	Soil Concentration (mg/kg)	Vapour Phase Concentration (g/cm^3)	Saturated Soil Concentration (mg/kg)	Saturated Vapour Concentration (g/cm^3)	Mole Fraction (mol/mol)	Concentration above Free Phase (g/cm^3)	Vapour Phase used in Calculation (g/cm^3)
TRH C10-C14 Aromatic	40	7.3E-08	1.9E+02	3.5E-06	0	0.0E+00	**7.3E-08**
TRH C10-C14 Aliphatic	40	5.4E-07	3.3E+01	4.3E-06	0	0.0E+00	**5.4E-07**
Naphthalene	1.1	6.9E-10	8.9E+01	6.2E-07	0	0.0E+00	**6.9E-10**

Calculated Air Concentrations	Vapour Phase Concentration at Source (ug/m^3)	Vapour Phase Concentration at Source (mg/m^3)	JE Attenuation Coefficient (unitless)	Enclosed Space Concentration - Retail Ground Floor (mg/m^3)	Enclosed Space Concentration - Residential First Floor (mg/m^3)	Outdoor Air Concentration (mg/m^3)	Excavation Air Concentration (mg/m^3)
TRH C10-C14 Aromatic	7.3E+04	7.3E+01	5.1E-04	**3.7E-02**	**3.7E-03**	**9.3E-04**	**7.0E-03**
TRH C10-C14 Aliphatic	5.4E+05	5.4E+02	5.1E-04	**2.7E-01**	**2.7E-02**	**6.8E-03**	**5.1E-02**
Naphthalene	6.9E+02	6.9E-01	4.5E-04	**3.1E-04**	**3.1E-05**	**5.3E-06**	**4.0E-05**

CONSTRUCTION PHASE

Intrusive Construction Worker

Exposure to Chemicals via Incidental Ingestion of Soil - Construction Workers Intrusive - Maximum

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad (mg/kg/day)$$

Parameters Relevant to Quantification of Exposure to Construction Workers Intrusive		
Ingestion Rate (IRs, mg/day)	100	Intake relevant to workers with enhanced ingestion (such as during maintenance works), MDEP 2002
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Exposure Frequency (EF, days/year)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	10	Assume construction works involving earthworks occur over the life of the project
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	3650	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor	Threshold TDI	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background)	Bioavailability		NonThreshold	Threshold	Non-Threshold Risk	Chronic Hazard Quotient
	(mg/kg-day)$^{-1}$	(mg/kg/day)		(mg/kg/day)	(%)	(mg/kg)	(mg/kg/day)	(mg/kg/day)	(unitless)	(unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	330	4.0E-05	2.8E-04	--	0.00773
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	330	4.0E-05	2.8E-04	--	0.00309
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	2100	2.5E-04	1.8E-03	--	0.06557
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	3100	3.7E-04	2.6E-03	--	0.00145
Benzo[a]anthracence	2.3E-02				100%	260	3.1E-05	2.2E-04	7.3E-7	--
Benzo[a]pyrene	2.3E-01				100%	200	2.4E-05	1.7E-04	5.6E-6	--
Benzo[b]fluoranthene	2.3E-02				100%	235	2.8E-05	2.0E-04	6.6E-7	--
Benzo[ghi]perylene	2.3E-03				100%	62	7.5E-06	5.2E-05	1.7E-8	--
Benzo[k]fluoranthene	2.3E-02				100%	105	1.3E-05	8.9E-05	2.9E-7	--
Chrysene	2.3E-03				100%	300	3.6E-05	2.5E-04	8.4E-8	--
Dibenz[ah]anthracene	2.3E-01				100%	19	2.3E-06	1.6E-05	5.3E-7	--
Indeno[123cd]pyrene	2.3E-02				100%	60	7.2E-06	5.1E-05	1.7E-7	--
Naphthalene		0.0200	5%	0.0190	100%	15	1.8E-06	1.3E-05	--	0.0006655
2-naphthylamine	1.8E+00				100%	0.8	9.6E-08	6.7E-07	1.7E-7	--
									8.3E-6	**0.0785**

Dermal Exposure to Chemicals via Contact with Soil - Construction Worker Intrusive - Maximum

$$\textit{Daily Chemical Intake}_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure for Construction Workers Intrusive		
Surface Area (SAs, cm^2)	2200	Exposed surface area (hands) as per Enhealth AEFG 2012
Adherence Factor (AF, mg/cm^2)	0.27	Value for hands of construction workers (USEPA 2011)
Fraction of Day Exposed	1	Assume the worker remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	10	Assume construction works involving earthworks occur over the life of the project
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	3650	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	0.2	330	4.7E-05	3.3E-04	--	0.00918
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	0.2	330	4.7E-05	3.3E-04	--	0.00367
TRH C15+ Aromatic		0.0300	10%	0.0270	0.2	2100	3.0E-04	2.1E-03	--	0.07789
TRH C15+ Aliphatic		2.0000	10%	1.8000	0.2	3100	4.4E-04	3.1E-03	--	0.00172
Benzo[a]anthracence	2.3E-02				0.06	260	1.1E-05	7.8E-05	2.6E-7	--
Benzo[a]pyrene	2.3E-01				0.06	200	8.6E-06	6.0E-05	2.0E-6	--
Benzo[b]fluoranthene	2.3E-02				0.06	235	1.0E-05	7.1E-05	2.4E-7	--
Benzo[ghi]perylene	2.3E-03				0.06	62	2.7E-06	1.9E-05	6.2E-9	--
Benzo[k]fluoranthene	2.3E-02				0.06	105	4.5E-06	3.2E-05	1.1E-7	--
Chrysene	2.3E-03				0.06	300	1.3E-05	9.0E-05	3.0E-8	--
Dibenz[ah]anthracene	2.3E-01				0.06	19	8.2E-07	5.7E-06	1.9E-7	--
Indeno[123cd]pyrene	2.3E-02				0.06	60	2.6E-06	1.8E-05	6.0E-8	--
Naphthalene		0.0200	5%	0.0190	0.06	15	6.4E-07	4.5E-06	--	0.000237
2-naphthylamine	1.8E+00				0.1	0.8	5.7E-08	4.0E-07	1.0E-7	--
									3.0E-6	**0.0927**

Inhalation of Dust and Vapours (derived from Soil Source) Construction Worker Intrusive - Maximum

$$\textit{Inhalation Exposure Conc}_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Construction Workers Intrusive		
Exposure Time (ET, hr/day)	8	Assume exposure to site related dust and vapours all day
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust and vapours is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	120	Assume construction works involving excavations undertaken all year but only work in trench every second day
Exposure Duration (ED, years)	10	Assume construction works involving earthworks occur over the life of the project
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	87600	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.18000	5.8E-02	9.1E-04	6.4E-03	--	0.0354
TRH C10-C14 Aliphatic		1.00000	10%	0.90000	4.1E-01	6.4E-03	4.5E-02	--	0.0499
TRH C15+ Aromatic		0.10500	10%	0.09450	6.5E-08	1.0E-09	7.2E-09	--	0.00000007592
TRH C15+ Aliphatic		7.00000	10%	6.30000	9.7E-08	1.5E-09	1.1E-08	--	0.00000000168
Benzo[a]anthracence	8.7E+00				8.1E-09	1.3E-10	8.9E-10	1.1E-9	--
Benzo[a]pyrene	8.7E+01				6.2E-09	9.8E-11	6.8E-10	8.5E-9	--
Benzo[b]fluoranthene	8.7E+00				7.3E-09	1.1E-10	8.0E-10	1.0E-9	--
Benzo[ghi]perylene	8.7E-01				1.9E-09	3.0E-11	2.1E-10	2.6E-11	--
Benzo[k]fluoranthene	8.7E+00				3.3E-09	5.1E-11	3.6E-10	4.5E-10	--
Chrysene	8.7E-01				9.4E-09	1.5E-10	1.0E-09	1.3E-10	--
Dibenz[ah]anthracene	8.7E+01				5.9E-10	9.3E-12	6.5E-11	8.1E-10	--
Indeno[123cd]pyrene	8.7E+00				1.9E-09	2.9E-11	2.0E-10	2.5E-10	--
Naphthalene		0.00300	5%	0.00285	5.4E-04	8.5E-06	6.0E-05	--	0.0209
2-naphthylamine					2.5E-11	3.9E-13	2.7E-12	--	--
								1.2E-8	**0.106**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data				Daily Exposure		Calculated Risk	
	Oral Slope Factor (mg/kg/d)-1	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Inhalation Exposure Concentration - NonThreshold mg/kg/day	Inhalation Exposure Concentration - Threshold mg/kg/day	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]fluoranthene								--
Benzo[ghi]perylene								--
Benzo[k]fluoranthene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				1.1E-13	7.8E-13	2.0E-13	--
							2.0E-13	

Exposure to Chemicals via Incidental Ingestion of Soil - Construction Workers Intrusive - 95% UCL

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Construction Workers Intrusive		
Ingestion Rate (IRs, mg/day)	100	Intake relevant to workers with enhanced ingestion (such as during maintenance works), MDEP 2002
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Exposure Frequency (EF, days/year)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	10	Assume construction works involving earthworks occur over the life of the project
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	3650	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor	Threshold TDI	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background)	Bioavailability		NonThreshold	Threshold	Non-Threshold Risk	Chronic Hazard Quotient
	$(mg/kg\text{-}day)^{-1}$	(mg/kg/day)		(mg/kg/day)	(%)	(mg/kg)	(mg/kg/day)	(mg/kg/day)	(unitless)	(unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	40	4.8E-06	3.4E-05	--	0.000937
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	40	4.8E-06	3.4E-05	--	0.000375
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	300	3.6E-05	2.5E-04	--	0.009367
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	300	3.6E-05	2.5E-04	--	0.000140
Benzo[a]anthracence	2.3E-02				100%	12	1.4E-06	1.0E-05	3.4E-8	--
Benzo[a]pyrene	2.3E-01				100%	8	9.6E-07	6.7E-06	2.2E-7	--
Benzo[b]&[k]fluoranthene	2.3E-02				100%	15	1.8E-06	1.3E-05	4.2E-8	--
Benzo[ghi]perylene	2.3E-03				100%	3.7	4.5E-07	3.1E-06	1.0E-9	--
Chrysene	2.3E-03				100%	12	1.4E-06	1.0E-05	3.4E-9	--
Dibenz[ah]anthracene	2.3E-01				100%	2.5	3.0E-07	2.1E-06	7.0E-8	--
Indeno[123cd]pyrene	2.3E-02				100%	3.3	4.0E-07	2.8E-06	9.3E-9	--
Naphthalene		0.0200	5%	0.0190	100%	1.1	1.3E-07	9.3E-07	--	0.0000488
2-naphthylamine	1.8E+00				100%	0.8	9.6E-08	6.7E-07	1.7E-7	--
									5.6E-7	**0.0109**

Dermal Exposure to Chemicals via Contact with Soil - Construction Worker Intrusive - 95% UCL

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ **(mg/kg/day)**

Parameters Relevant to Quantification of Exposure for Construction Workers Intrusive		
Surface Area (SAs, cm^2)	2200	Exposed surface area (hands) as per Enhealth AEFG 2012
Adherence Factor (AF, mg/cm^2)	0.27	Value for hands of construction workers (USEPA 2011)
Fraction of Day Exposed	1	Assume the worker remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	10	Assume construction works involving earthworks occur over the life of the project
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	3650	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	0.2	40	5.7E-06	4.0E-05	--	0.00111
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	0.2	40	5.7E-06	4.0E-05	--	0.00045
TRH C15+ Aromatic		0.0300	10%	0.0270	0.2	300	4.3E-05	3.0E-04	--	0.01113
TRH C15+ Aliphatic		2.0000	10%	1.8000	0.2	300	4.3E-05	3.0E-04	--	0.00017
Benzo[a]anthracence	2.3E-02				0.06	12	5.2E-07	3.6E-06	1.2E-8	--
Benzo[a]pyrene	2.3E-01				0.06	8	3.4E-07	2.4E-06	8.0E-8	--
Benzo[b]&[k]fluoranthene	2.3E-02				0.06	15	6.4E-07	4.5E-06	1.5E-8	--
Benzo[ghi]perylene	2.3E-03				0.06	3.7	1.6E-07	1.1E-06	3.7E-10	--
Chrysene	2.3E-03				0.06	12	5.2E-07	3.6E-06	1.2E-9	--
Dibenz[ah]anthracene	2.3E-01				0.06	2.5	1.1E-07	7.5E-07	2.5E-8	--
Indeno[123cd]pyrene	2.3E-02				0.06	3.3	1.4E-07	9.9E-07	3.3E-9	--
Naphthalene		0.0200	5%	0.0190	0.06	1.1	4.7E-08	3.3E-07	--	0.0000174
2-naphthylamine	1.8E+00				0.1	0.8	5.7E-08	4.0E-07	1.0E-7	--
									2.4E-7	**0.0129**

Inhalation of Dust and Vapours (derived from Soil Source) Construction Worker Intrusive - 95% UCL

$$\textit{Inhalation Exposure Conc}_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure for Construction Workers Intrusive		
Exposure Time (ET, hr/day)	8	Assume exposure to site related dust and vapours all day
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust and vapours is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	120	Assume construction works involving excavations undertaken all year but only work in trench every second day
Exposure Duration (ED, years)	10	Assume construction works involving earthworks occur over the life of the project
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	87600	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.18000	7.0E-03	1.1E-04	7.7E-04	--	0.00429
TRH C10-C14 Aliphatic		1.00000	10%	0.90000	5.1E-02	8.1E-04	5.6E-03	--	0.00627
TRH C15+ Aromatic		0.10500	10%	0.09450	9.4E-09	1.5E-10	1.0E-09	--	0.0000000108
TRH C15+ Aliphatic		7.00000	10%	6.30000	9.4E-09	1.5E-10	1.0E-09	--	0.000000000163
Benzo[a]anthracence	8.7E+00				3.7E-10	5.9E-12	4.1E-11	5.1E-11	--
Benzo[a]pyrene	8.7E+01				2.5E-10	3.9E-12	2.7E-11	3.4E-10	--
Benzo[b]&[k]fluoranthene	8.7E+00				4.7E-10	7.3E-12	5.1E-11	6.4E-11	--
Benzo[ghi]perylene	8.7E-01				1.2E-10	1.8E-12	1.3E-11	1.6E-12	--
Chrysene	8.7E-01				3.7E-10	5.9E-12	4.1E-11	5.1E-12	--
Dibenz[ah]anthracene	8.7E+01				7.8E-11	1.2E-12	8.5E-12	1.1E-10	--
Indeno[123cd]pyrene	8.7E+00				1.0E-10	1.6E-12	1.1E-11	1.4E-11	--
Naphthalene		0.00300	5%	0.00285	4.0E-05	6.2E-07	4.4E-06	--	0.00153
2-naphthylamine					2.5E-11	3.9E-13	2.7E-12	--	--
								5.8E-10	**0.0121**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data				Daily Exposure		Calculated Risk	
	Oral Slope Factor (mg/kg/d)-1	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Inhalation Exposure Concentration - NonThreshold mg/kg/day	Inhalation Exposure Concentration - Threshold mg/kg/day	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]&[k]fluoranthene								--
Benzo[ghi]perylene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				1.1E-13	7.8E-13	2.0E-13	--
							2.0E-13	

CONSTRUCTION PHASE

Construction Worker

Exposure to Chemicals via Incidental Ingestion of Soil - Construction Workers - Maximum

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Construction Workers		
Ingestion Rate (IRs, mg/day)	330	Intake for construction workers as per USEPA 2002
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Exposure Frequency (EF, days/year)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	1	Assume site earthworks completed in first year followed by building construction
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	365	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	330	1.3E-05	9.2E-04	--	0.02550
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	330	1.3E-05	9.2E-04	--	0.01020
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	2100	8.3E-05	5.8E-03	--	0.21637
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	3100	1.2E-04	8.6E-03	--	0.00479
Benzo[a]anthracence	2.3E-02				100%	260	1.0E-05	7.2E-04	2.4E-7	--
Benzo[a]pyrene	2.3E-01				100%	200	7.9E-06	5.6E-04	1.9E-6	--
Benzo[b]fluoranthene	2.3E-02				100%	235	9.3E-06	6.5E-04	2.2E-7	--
Benzo[ghi]perylene	2.3E-03				100%	62	2.5E-06	1.7E-04	5.7E-9	--
Benzo[k]fluoranthene	2.3E-02				100%	105	4.2E-06	2.9E-04	9.7E-8	--
Chrysene	2.3E-03				100%	300	1.2E-05	8.3E-04	2.8E-8	--
Dibenz[ah]anthracene	2.3E-01				100%	19	7.6E-07	5.3E-05	1.8E-7	--
Indeno[123cd]pyrene	2.3E-02				100%	60	2.4E-06	1.7E-04	5.6E-8	--
Naphthalene		0.0200	5%	0.0190	100%	15	6.0E-07	4.2E-05	--	0.00220
2-naphthylamine	1.8E+00				100%	0.8	3.2E-08	2.2E-06	5.7E-8	--
									2.7E-6	**0.259**

Dermal Exposure to Chemicals via Contact with Soil - Construction Worker - Maximum

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ (mg/kg/day)

Parameters Relevant to Quantification of Exposure for Construction Workers		
Surface Area (SAs, cm^2)	3300	Exposed surface area (hands) as per Enhealth AEFG 2012
Adherence Factor (AF, mg/cm^2)	0.27	Value for hands of construction workers (USEPA 2011)
Fraction of Day Exposed	1	Assume the worker remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	1	Assume site earthworks completed in first year followed by building construction
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	365	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	0.2	330	7.1E-06	5.0E-04	--	0.01377
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	0.2	330	7.1E-06	5.0E-04	--	0.00551
TRH C15+ Aromatic		0.0300	10%	0.0270	0.2	2100	4.5E-05	3.2E-03	--	0.11684
TRH C15+ Aliphatic		2.0000	10%	1.8000	0.2	3100	6.7E-05	4.7E-03	--	0.00259
Benzo[a]anthracence	2.3E-02				0.06	260	1.7E-06	1.2E-04	3.9E-8	--
Benzo[a]pyrene	2.3E-01				0.06	200	1.3E-06	9.0E-05	3.0E-7	--
Benzo[b]fluoranthene	2.3E-02				0.06	235	1.5E-06	1.1E-04	3.5E-8	--
Benzo[ghi]perylene	2.3E-03				0.06	62	4.0E-07	2.8E-05	9.3E-10	--
Benzo[k]fluoranthene	2.3E-02				0.06	105	6.8E-07	4.7E-05	1.6E-8	--
Chrysene	2.3E-03				0.06	300	1.9E-06	1.4E-04	4.5E-9	--
Dibenz[ah]anthracene	2.3E-01				0.06	19	1.2E-07	8.6E-06	2.9E-8	--
Indeno[123cd]pyrene	2.3E-02				0.06	60	3.9E-07	2.7E-05	9.0E-9	--
Naphthalene		0.0200	5%	0.0190	0.06	15	9.7E-08	6.8E-06	--	0.000356
2-naphthylamine	1.8E+00				0.1	0.8	8.6E-09	6.0E-07	1.5E-8	--
									4.5E-7	**0.139**

Inhalation of Dust and Vapours (derived from Soil Source) Construction Worker - Maximum

$$\mathit{Inhalation\,Exposure\,Conc}_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Construction Workers		
Exposure Time (ET, hr/day)	8	Assume exposure to site related dust and vapours all day
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust and vapours is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	1	Assume site earthworks completed in first year followed by building construction
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	8760	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.18000	7.6E-03	2.4E-05	1.7E-03	--	0.00930
TRH C10-C14 Aliphatic		1.00000	10%	0.90000	5.4E-02	1.7E-04	1.2E-02	--	0.0131
TRH C15+ Aromatic		0.10500	10%	0.09450	6.5E-08	2.0E-10	1.4E-08	--	0.000000152
TRH C15+ Aliphatic		7.00000	10%	6.30000	9.7E-08	3.0E-10	2.1E-08	--	0.00000000336
Benzo[a]anthracence	8.7E+00				8.1E-09	2.5E-11	1.8E-09	2.2E-10	--
Benzo[a]pyrene	8.7E+01				6.2E-09	2.0E-11	1.4E-09	1.7E-9	--
Benzo[b]fluoranthene	8.7E+00				7.3E-09	2.3E-11	1.6E-09	2.0E-10	--
Benzo[ghi]perylene	8.7E-01				1.9E-09	6.1E-12	4.2E-10	5.3E-12	--
Benzo[k]fluoranthene	8.7E+00				3.3E-09	1.0E-11	7.2E-10	8.9E-11	--
Chrysene	8.7E-01				9.4E-09	2.9E-11	2.0E-09	2.5E-11	--
Dibenz[ah]anthracene	8.7E+01				5.9E-10	1.9E-12	1.3E-10	1.6E-10	--
Indeno[123cd]pyrene	8.7E+00				1.9E-09	5.9E-12	4.1E-10	5.1E-11	--
Naphthalene		0.00300	5%	0.00285	7.2E-05	2.2E-07	1.6E-05	--	0.00551
2-naphthylamine					2.5E-11	7.8E-14	5.5E-12	--	--
								2.5E-9	**0.0280**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data				Daily Exposure		Calculated Risk	
	Oral Slope Factor (mg/kg/d)-1	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Inhalation Exposure Concentration - NonThreshold mg/kg/day	Inhalation Exposure Concentration - Threshold mg/kg/day	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]fluoranthene								--
Benzo[ghi]perylene								--
Benzo[k]fluoranthene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				2.2E-14	1.6E-12	4.0E-14	--
							4.0E-14	

Exposure to Chemicals via Incidental Ingestion of Soil - Construction Workers - 95%UCL

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Construction Workers		
Ingestion Rate (IRs, mg/day)	330	Intake for construction workers as per USEPA 2002
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Exposure Frequency (EF, days/year)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	1	Assume site earthworks completed in first year followed by building construction
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	365	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor	Threshold TDI	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background)	Bioavailability		NonThreshold	Threshold	Non-Threshold Risk	Chronic Hazard Quotient
	$(mg/kg\text{-}day)^{-1}$	(mg/kg/day)		(mg/kg/day)	(%)	(mg/kg)	(mg/kg/day)	(mg/kg/day)	(unitless)	(unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	40	1.6E-06	1.1E-04	--	0.00309
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	40	1.6E-06	1.1E-04	--	0.00124
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	300	1.2E-05	8.3E-04	--	0.03091
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	300	1.2E-05	8.3E-04	--	0.00046
Benzo[a]anthracence	2.3E-02				100%	12	4.8E-07	3.3E-05	1.1E-8	--
Benzo[a]pyrene	2.3E-01				100%	8	3.2E-07	2.2E-05	7.4E-8	--
Benzo[b]&[k]fluoranthene	2.3E-02				100%	15	6.0E-07	4.2E-05	1.4E-8	--
Benzo[ghi]perylene	2.3E-03				100%	3.7	1.5E-07	1.0E-05	3.4E-10	--
Chrysene	2.3E-03				100%	12	4.8E-07	3.3E-05	1.1E-9	--
Dibenz[ah]anthracene	2.3E-01				100%	2.5	9.9E-08	7.0E-06	2.3E-8	--
Indeno[123cd]pyrene	2.3E-02				100%	3.3	1.3E-07	9.2E-06	3.1E-9	--
Naphthalene		0.0200	5%	0.0190	100%	1.1	4.4E-08	3.1E-06	--	0.000161
2-naphthylamine	1.8E+00				100%	0.8	3.2E-08	2.2E-06	5.7E-8	--
									1.8E-7	**0.0359**

Dermal Exposure to Chemicals via Contact with Soil - Construction Worker - 95% UCL

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ (mg/kg/day)

Parameters Relevant to Quantification of Exposure to Construction Workers		
Surface Area (SAs, cm^2)	3300	Exposed surface area (hands) as per Enhealth AEFG 2012
Adherence Factor (AF, mg/cm^2)	0.27	Value for hands of construction workers (USEPA 2011)
Fraction of Day Exposed	1	Assume the worker remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	1	Assume site earthworks completed in first year followed by building construction
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	365	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	0.2	40	8.6E-07	6.0E-05	--	0.001669
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	0.2	40	8.6E-07	6.0E-05	--	0.000668
TRH C15+ Aromatic		0.0300	10%	0.0270	0.2	300	6.4E-06	4.5E-04	--	0.016691
TRH C15+ Aliphatic		2.0000	10%	1.8000	0.2	300	6.4E-06	4.5E-04	--	0.000250
Benzo[a]anthracence	2.3E-02				0.06	12	7.7E-08	5.4E-06	1.8E-9	--
Benzo[a]pyrene	2.3E-01				0.06	8	5.2E-08	3.6E-06	1.2E-8	--
Benzo[b]&[k]fluoranthene	2.3E-02				0.06	15	9.7E-08	6.8E-06	2.3E-9	--
Benzo[ghi]perylene	2.3E-03				0.06	3.7	2.4E-08	1.7E-06	5.6E-11	--
Chrysene	2.3E-03				0.06	12	7.7E-08	5.4E-06	1.8E-10	--
Dibenz[ah]anthracene	2.3E-01				0.06	2.5	1.6E-08	1.1E-06	3.8E-9	--
Indeno[123cd]pyrene	2.3E-02				0.06	3.3	2.1E-08	1.5E-06	5.0E-10	--
Naphthalene		0.0200	5%	0.0190	0.06	1.1	7.1E-09	5.0E-07	--	0.0000261
2-naphthylamine	1.8E+00				0.1	0.8	8.6E-09	6.0E-07	1.5E-8	--
									3.6E-8	**0.0193**

Inhalation of Dust and Vapours (derived from Soil Source) Construction Worker - 95% UCL

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Construction Workers		
Exposure Time (ET, hr/day)	8	Assume exposure to site related dust and vapours all day
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust and vapours is from site related soil
Deposition Fraction (DF, unitless)	0.75	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	0.5	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	1	Assume site earthworks completed in first year followed by building construction
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	8760	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.18000	9.7E-04	1.1E-06	7.9E-05	--	0.00044
TRH C10-C14 Aliphatic		1.00000	10%	0.90000	6.8E-03	8.0E-06	5.6E-04	--	0.000622
TRH C15+ Aromatic		0.10500	10%	0.09450	3.0E-04	3.5E-07	2.5E-05	--	0.00026
TRH C15+ Aliphatic		7.00000	10%	6.30000	3.0E-04	3.5E-07	2.5E-05	--	0.0000039
Benzo[a]anthracence	8.7E+00				1.2E-05	1.4E-08	9.9E-07	1.2E-7	--
Benzo[a]pyrene	8.7E+01				8.0E-06	9.4E-09	6.6E-07	8.2E-7	--
Benzo[b]&[k]fluoranthene	8.7E+00				1.5E-05	1.8E-08	1.2E-06	1.5E-7	--
Benzo[ghi]perylene	8.7E-01				3.7E-06	4.3E-09	3.0E-07	3.8E-9	--
Chrysene	8.7E-01				1.2E-05	1.4E-08	9.9E-07	1.2E-8	--
Dibenz[ah]anthracene	8.7E+01				2.5E-06	2.9E-09	2.1E-07	2.6E-7	--
Indeno[123cd]pyrene	8.7E+00				3.3E-06	3.9E-09	2.7E-07	3.4E-8	--
Naphthalene		0.00300	5%	0.00285	6.4E-06	7.5E-09	5.2E-07	--	0.000183
2-naphthylamine					8.0E-07	9.4E-10	6.6E-08	--	--
								1.4E-6	**0.00151**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data				Daily Exposure		Calculated Risk	
	Oral Slope Factor (mg/kg/d)-1	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Inhalation Exposure Concentration - NonThreshold mg/kg/day	Inhalation Exposure Concentration - Threshold mg/kg/day	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]&[k]fluoranthene								--
Benzo[ghi]perylene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				2.7E-10	1.9E-08	4.8E-10	--
							4.8E-10	

COMPLETED DEVELOPMENT

Intrusive Worker

Exposure to Chemicals via Incidental Ingestion of Soil - Intrusive Worker Post Completion - Maximum

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Intrusive Workers		
Ingestion Rate (IRs, mg/day)	100	Intake relevant to workers with enhanced ingestion (such as during maintenance works), MDEP 2002
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	10	Based on likely number of days digging trenches at the site
Exposure Duration (ED, years)	5	Exposures occur over 5 different years
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	1825	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	330	8.3E-07	1.2E-05	--	0.000322
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	330	8.3E-07	1.2E-05	--	0.000129
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	2100	5.3E-06	7.4E-05	--	0.00273
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	3100	7.8E-06	1.1E-04	--	0.0000605
Benzo[a]anthracence	2.3E-02				100%	260	6.5E-07	9.1E-06	1.5E-8	--
Benzo[a]pyrene	2.3E-01				100%	200	5.0E-07	7.0E-06	1.2E-7	--
Benzo[b]fluoranthene	2.3E-02				100%	235	5.9E-07	8.3E-06	1.4E-8	--
Benzo[ghi]perylene	2.3E-03				100%	62	1.6E-07	2.2E-06	3.6E-10	--
Benzo[k]fluoranthene	2.3E-02				100%	105	2.6E-07	3.7E-06	6.1E-9	--
Chrysene	2.3E-03				100%	300	7.5E-07	1.1E-05	1.8E-9	--
Dibenz[ah]anthracene	2.3E-01				100%	19	4.8E-08	6.7E-07	1.1E-8	--
Indeno[123cd]pyrene	2.3E-02				100%	60	1.5E-07	2.1E-06	3.5E-9	--
Naphthalene		0.0200	5%	0.0190	100%	15	3.8E-08	5.3E-07	--	0.0000277
2-naphthylamine	1.8E+00				100%	0.8	2.0E-09	2.8E-08	3.6E-9	--
									1.7E-7	**0.00327**

Dermal Exposure to Chemicals via Contact with Soil - Intrusive Worker Post Completion - Maximum

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ (mg/kg/day)

Parameters Relevant to Quantification of Exposure for Intrusive Workers		
Surface Area (SAs, cm^2)	3300	Based on hands (USEPA 2011 and NEPM 2010)
Adherence Factor (AF, mg/cm^2)	0.27	Value for hands of construction workers (USEPA 2011)
Fraction of Day Exposed	1	Assume the worker remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	10	Based on likely number of days digging trenches at the site
Exposure Duration (ED, years)	5	Exposures occur over 5 different years
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	1825	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor	Threshold TDI	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background)	Dermal Absorption (ABS)		Non-Threshold	Threshold	Non-Threshold Risk	Chronic Hazard Quotient
	$(mg/kg\text{-}day)^{-1}$	(mg/kg/day)		(mg/kg/day)		(mg/kg)	(mg/kg/day)	(mg/kg/day)	(unitless)	(unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	330	1.5E-06	2.1E-05	--	0.000574
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	330	1.5E-06	2.1E-05	--	0.000230
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	2100	9.4E-06	1.3E-04	--	0.00487
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	3100	1.4E-05	1.9E-04	--	0.000108
Benzo[a]anthracence	2.3E-02				0.06	260	3.5E-07	4.9E-06	8.1E-9	--
Benzo[a]pyrene	2.3E-01				0.06	200	2.7E-07	3.8E-06	6.3E-8	--
Benzo[b]fluoranthene	2.3E-02				0.06	235	3.2E-07	4.4E-06	7.3E-9	--
Benzo[ghi]perylene	2.3E-03				0.06	62	8.3E-08	1.2E-06	1.9E-10	--
Benzo[k]fluoranthene	2.3E-02				0.06	105	1.4E-07	2.0E-06	3.3E-9	--
Chrysene	2.3E-03				0.06	300	4.0E-07	5.6E-06	9.4E-10	--
Dibenz[ah]anthracene	2.3E-01				0.06	19	2.5E-08	3.6E-07	5.9E-9	--
Indeno[123cd]pyrene	2.3E-02				0.06	60	8.0E-08	1.1E-06	1.9E-9	--
Naphthalene		0.0200	5%	0.01900	0.06	15	2.0E-08	2.8E-07	--	0.0000148
2-naphthylamine	1.8E+00				0.1	0.8	1.8E-09	2.5E-08	3.2E-9	--
									9.3E-8	**0.00579**

Inhalation of Dust and Vapours (derived from Soil Source) Intrusive Worker Post Completion - Maximum

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Intrusive Workers		
Exposure Time (ET, hr/day)	8	Assume exposure to site related dust and vapours all day
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust and vapours is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	10	Time spent on site undertaking intrusive works
Exposure Duration (ED, years)	5	Time spent on site undertaking intrusive works
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	43800	USEPA 2009

Key Chemical	Toxicity Data: Inhalation Unit Risk $(mg/m^3)^{-1}$	Toxicity Data: Chronic TC air (mg/m^3)	Toxicity Data: Background Intake (% Chronic TC)	Toxicity Data: Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	Concentration in Air (Ca) (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - Threshold (mg/m^3)	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.18000	5.8E-02	3.8E-05	5.3E-04	--	0.002946
TRH C10-C14 Aliphatic		1.00000	10%	0.90000	4.1E-01	2.7E-04	3.7E-03	--	0.00416
TRH C15+ Aromatic		0.10500	10%	0.09450	6.5E-08	4.3E-11	6.0E-10	--	0.00000000633
TRH C15+ Aliphatic		7.00000	10%	6.30000	9.7E-08	6.3E-11	8.8E-10	--	0.000000000140
Benzo[a]anthracence	8.7E+00				8.1E-09	5.3E-12	7.4E-11	4.6E-11	--
Benzo[a]pyrene	8.7E+01				6.2E-09	4.1E-12	5.7E-11	3.5E-10	--
Benzo[b]fluoranthene	8.7E+00				7.3E-09	4.8E-12	6.7E-11	4.2E-11	--
Benzo[ghi]perylene	8.7E-01				1.9E-09	1.3E-12	1.8E-11	1.1E-12	--
Benzo[k]fluoranthene	8.7E+00				3.3E-09	2.1E-12	3.0E-11	1.9E-11	--
Chrysene	8.7E-01				9.4E-09	6.1E-12	8.5E-11	5.3E-12	--
Dibenz[ah]anthracene	8.7E+01				5.9E-10	3.9E-13	5.4E-12	3.4E-11	--
Indeno[123cd]pyrene	8.7E+00				1.9E-09	1.2E-12	1.7E-11	1.1E-11	--
Naphthalene		0.00300	5%	0.00285	5.4E-04	3.5E-07	5.0E-06	--	0.00174
2-naphthylamine					2.5E-11	1.6E-14	2.3E-13	--	--
								5.1E-10	**0.00885**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data: Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Toxicity Data: Threshold TDI (mg/kg/day)	Toxicity Data: Background Intake (% TDI)	Toxicity Data: TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold mg/kg/day	Daily Exposure: Inhalation Exposure Concentration - Threshold mg/kg/day	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic			10%		1.1E-05	1.5E-04		--
TRH C10-C14 Aliphatic			10%		7.7E-05	1.1E-03		--
TRH C15+ Aromatic			10%		1.2E-11	1.7E-10		--
TRH C15+ Aliphatic			10%		1.8E-11	2.5E-10		--
Benzo[a]anthracence					1.5E-12	2.1E-11		--
Benzo[a]pyrene					1.2E-12	1.6E-11		--
Benzo[b]fluoranthene					1.4E-12	1.9E-11		--
Benzo[ghi]perylene					3.6E-13	5.0E-12		--
Benzo[k]fluoranthene					6.1E-13	8.5E-12		--
Chrysene					1.7E-12	2.4E-11		--
Dibenz[ah]anthracene					1.1E-13	1.5E-12		--
Indeno[123cd]pyrene					3.5E-13	4.9E-12		--
Naphthalene			5%		1.0E-07	1.4E-06		--
2-naphthylamine	1.8E+00				4.7E-15	6.5E-14	8.4E-15	--
							8.4E-15	

Exposure to Chemicals via Incidental Ingestion of Soil - Intrusive Worker Post Completion - 95% UCL

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Intrusive Workers		
Ingestion Rate (IRs, mg/day)	100	Intake relevant to workers with enhanced ingestion (such as during maintenance works), MDEP 2002
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	10	Based on likely number of days digging trenches at the site
Exposure Duration (ED, years)	5	Exposures occur over 5 different years
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	1825	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	40	1.0E-07	1.4E-06	--	0.0000390
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	40	1.0E-07	1.4E-06	--	0.0000156
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	300	7.5E-07	1.1E-05	--	0.0003903
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	300	7.5E-07	1.1E-05	--	0.0000059
Benzo[a]anthracence	2.3E-02				100%	12	3.0E-08	4.2E-07	7.0E-10	--
Benzo[a]pyrene	2.3E-01				100%	8	2.0E-08	2.8E-07	4.7E-9	--
Benzo[b]&[k]fluoranthene	2.3E-02				100%	15	3.8E-08	5.3E-07	8.8E-10	--
Benzo[ghi]perylene	2.3E-03				100%	3.7	9.3E-09	1.3E-07	2.2E-11	--
Chrysene	2.3E-03				100%	12	3.0E-08	4.2E-07	7.0E-11	--
Dibenz[ah]anthracene	2.3E-01				100%	2.5	6.3E-09	8.8E-08	1.5E-9	--
Indeno[123cd]pyrene	2.3E-02				100%	3.3	8.3E-09	1.2E-07	1.9E-10	--
Naphthalene		0.0200	5%	0.0190	100%	1.1	2.8E-09	3.9E-08	--	0.00000203
2-naphthylamine	1.8E+00				100%	0.8	2.0E-09	2.8E-08	3.6E-9	--
									1.2E-8	**0.000453**

Dermal Exposure to Chemicals via Contact with Soil - Intrusive Worker Post Completion - 95% UCL

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ **(mg/kg/day)**

Parameters Relevant to Quantification of Exposure for Intrusive Workers		
Surface Area (SAs, cm^2)	3300	Based on hands (USEPA 2011 and NEPM 2010)
Adherence Factor (AF, mg/cm^2)	0.27	Value for hands of construction workers (USEPA 2011)
Fraction of Day Exposed	1	Assume the worker remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	10	Based on likely number of days digging trenches at the site
Exposure Duration (ED, years)	5	Exposures occur over 5 different years
Body Weight (BW, kg)	78	Average male and female adults from enHealth 2012
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	1825	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	40	1.8E-07	2.5E-06	--	0.0000695
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	40	1.8E-07	2.5E-06	--	0.0000278
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	300	1.3E-06	1.9E-05	--	0.0006955
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	300	1.3E-06	1.9E-05	--	0.0000104
Benzo[a]anthracence	2.3E-02				0.06	12	1.6E-08	2.3E-07	3.8E-10	--
Benzo[a]pyrene	2.3E-01				0.06	8	1.1E-08	1.5E-07	2.5E-9	--
Benzo[b]&[k]fluoranthene	2.3E-02				0.06	15	2.0E-08	2.8E-07	4.7E-10	--
Benzo[ghi]perylene	2.3E-03				0.06	3.7	5.0E-09	6.9E-08	1.2E-11	--
Chrysene	2.3E-03				0.06	12	1.6E-08	2.3E-07	3.8E-11	--
Dibenz[ah]anthracene	2.3E-01				0.06	2.5	3.4E-09	4.7E-08	7.8E-10	--
Indeno[123cd]pyrene	2.3E-02				0.06	3.3	4.4E-09	6.2E-08	1.0E-10	--
Naphthalene		0.0200	5%	0.01900	0.06	1.1	1.5E-09	2.1E-08	--	0.00000109
2-naphthylamine	1.8E+00				0.1	0.8	1.8E-09	2.5E-08	3.2E-9	--
									7.5E-9	**0.000804**

Inhalation of Dust and Vapours (derived from Soil Source) Intrusive Worker Post Completion - 95% UCL

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Intrusive Workers		
Exposure Time (ET, hr/day)	8	Assume exposure to site related dust and vapours all day
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust and vapours is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	10	Time spent on site undertaking intrusive works
Exposure Duration (ED, years)	5	Time spent on site undertaking intrusive works
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	43800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.18000	7.0E-03	4.6E-06	6.4E-05	--	0.000357
TRH C10-C14 Aliphatic		1.00000	10%	0.90000	5.1E-02	3.4E-05	4.7E-04	--	0.000523
TRH C15+ Aromatic		0.10500	10%	0.09450	9.4E-09	6.1E-12	8.5E-11	--	0.0000000009038
TRH C15+ Aliphatic		7.00000	10%	6.30000	9.4E-09	6.1E-12	8.5E-11	--	0.0000000000136
Benzo[a]anthracence	8.7E+00				3.7E-10	2.4E-13	3.4E-12	2.1E-12	--
Benzo[a]pyrene	8.7E+01				2.5E-10	1.6E-13	2.3E-12	1.4E-11	--
Benzo[b]&[k]fluoranthene	8.7E+00				4.7E-10	3.1E-13	4.3E-12	2.7E-12	--
Benzo[ghi]perylene	8.7E-01				1.2E-10	7.5E-14	1.1E-12	6.5E-14	--
Chrysene	8.7E-01				3.7E-10	2.4E-13	3.4E-12	2.1E-13	--
Dibenz[ah]anthracene	8.7E+01				7.8E-11	5.1E-14	7.1E-13	4.4E-12	--
Indeno[123cd]pyrene	8.7E+00				1.0E-10	6.7E-14	9.4E-13	5.8E-13	--
Naphthalene		0.00300	5%	0.00285	4.0E-05	2.6E-08	3.6E-07	--	0.000128
2-naphthylamine					2.5E-11	1.6E-14	2.3E-13	--	--
								2.4E-11	**0.001007**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data				Daily Exposure		Calculated Risk	
	Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Inhalation Exposure Concentration - NonThreshold mg/kg/day	Inhalation Exposure Concentration - Threshold mg/kg/day	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]&[k]fluoranthene								--
Benzo[ghi]perylene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				4.7E-15	6.5E-14	8.4E-15	--
							8.4E-15	

STAGED CONSTRUCTION

Recreational and Residential Child

Exposure to Chemicals via Incidental Ingestion of Soil Recreational Child - Maximum

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad (mg/kg/day)$$

Parameters Relevant to Quantification of Exposure to Recreational Child		
Ingestion Rate (IRs, mg/day)	100	As per Enhealth AEFG 2012
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	26	10% of average number of dry days
Exposure Duration (ED, years)	6	Exposures occur over childhood (0-5 years)
Body Weight (BW, kg)	15	Average for 2-3 year old enHealth AEFG 2012
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	2190	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	330	1.3E-05	1.6E-04	--	0.00435
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	330	1.3E-05	1.6E-04	--	0.00174
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	2100	8.5E-05	1.0E-03	--	0.0369
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	3100	1.3E-04	1.5E-03	--	0.000818
Benzo[a]anthracence	2.3E-02				100%	260	5.6E-05	1.2E-04	1.3E-6	--
Benzo[a]pyrene	2.3E-01				100%	200	4.3E-05	9.5E-05	1.0E-5	--
Benzo[b]fluoranthene	2.3E-02				100%	235	5.1E-05	1.1E-04	1.2E-6	--
Benzo[ghi]perylene	2.3E-03				100%	62	1.3E-05	2.9E-05	3.1E-8	--
Benzo[k]fluoranthene	2.3E-02				100%	105	2.3E-05	5.0E-05	5.3E-7	--
Chrysene	2.3E-03				100%	300	6.5E-05	1.4E-04	1.5E-7	--
Dibenz[ah]anthracene	2.3E-01				100%	19	4.1E-06	9.0E-06	9.6E-7	--
Indeno[123cd]pyrene	2.3E-02				100%	60	1.3E-05	2.8E-05	3.0E-7	--
Naphthalene		0.0200	5%	0.0190	100%	15	6.1E-07	7.1E-06	--	0.000375
2-naphthylamine	1.8E+00				100%	0.8	3.3E-08	3.8E-07	5.9E-8	--
									1.5E-5	**0.0442**

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Dermal Exposure to Chemicals via Contact with Soil Recreational Child - Maximum

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT} \quad (mg/kg/day)$$

Parameters Relevant to Quantification of Exposure for Recreational Child		
Surface Area (SAs, cm^2)	2700	Based on Enhealth AEFG 2012 and NPEM 2013
Adherence Factor (AF, mg/cm^2)	0.51	Value for hands (USEPA 2011)
Fraction of Day Exposed	1	Assume the child remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	26	10% of average number of dry days
Exposure Duration (ED, years)	6	Exposures occur over childhood (0-5 years)
Body Weight (BW, kg)	15	Average for 2-3 year old enHealth AEFG 2012
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	2190	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	330	3.7E-05	4.3E-04	--	0.0120
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	330	3.7E-05	4.3E-04	--	0.00480
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	2100	2.4E-04	2.7E-03	--	0.102
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	3100	3.5E-04	4.1E-03	--	0.00225
Benzo[a]anthracence	2.3E-02				0.06	260	4.6E-05	1.0E-04	1.1E-6	--
Benzo[a]pyrene	2.3E-01				0.06	200	3.6E-05	7.8E-05	8.3E-6	--
Benzo[b]fluoranthene	2.3E-02				0.06	235	4.2E-05	9.2E-05	9.8E-7	--
Benzo[ghi]perylene	2.3E-03				0.06	62	1.1E-05	2.4E-05	2.6E-8	--
Benzo[k]fluoranthene	2.3E-02				0.06	105	1.9E-05	4.1E-05	4.4E-7	--
Chrysene	2.3E-03				0.06	300	5.3E-05	1.2E-04	1.2E-7	--
Dibenz[ah]anthracene	2.3E-01				0.06	19	3.4E-06	7.5E-06	7.9E-7	--
Indeno[123cd]pyrene	2.3E-02				0.06	60	1.1E-05	2.4E-05	2.5E-7	--
Naphthalene		0.0200	5%	0.01900	0.06	15	5.0E-07	5.9E-06	--	0.000310
2-naphthylamine	1.8E+00				0.1	0.8	4.5E-08	5.2E-07	8.1E-8	--
									1.2E-5	**0.121**

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Inhalation of Dust (derived from Soil Source) Resident during Construction Works - 95% UCL

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Residents		
Exposure Time (ET, hr/day)	2	Assume exposure to site related dust and vapours all day
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust and vapours is from site related soil
Deposition Fraction (DF, unitless)	0.75	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	0.5	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	1	Assume site earthworks completed in first year followed by building construction
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	8760	USEPA 2009

Key Chemical	Toxicity Data: Inhalation Unit Risk $(mg/m^3)^{-1}$	Toxicity Data: Chronic TC air (mg/m^3)	Toxicity Data: Background Intake (% Chronic TC)	Toxicity Data: Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	Concentration in Air (Ca) (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - Threshold (mg/m^3)	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.18000	9.7E-04	2.8E-07	2.0E-05	--	0.000110
TRH C10-C14 Aliphatic		1.00000	10%	0.90000	6.8E-03	2.0E-06	1.4E-04	--	0.000156
TRH C15+ Aromatic		0.10500	10%	0.09450	3.0E-04	8.8E-08	6.2E-06	--	0.0000652
TRH C15+ Aliphatic		7.00000	10%	6.30000	3.0E-04	8.8E-08	6.2E-06	--	0.00000098
Benzo[a]anthracence	8.7E+00				1.2E-05	1.9E-08	2.5E-07	1.6E-7	--
Benzo[a]pyrene	8.7E+01				8.0E-06	1.2E-08	1.6E-07	1.1E-6	--
Benzo[b]&[k]fluoranthene	8.7E+00				1.5E-05	2.3E-08	3.1E-07	2.0E-7	--
Benzo[ghi]perylene	8.7E-01				3.7E-06	5.8E-09	7.6E-08	5.0E-9	--
Chrysene	8.7E-01				1.2E-05	1.9E-08	2.5E-07	1.6E-8	--
Dibenz[ah]anthracene	8.7E+01				2.5E-06	3.9E-09	5.1E-08	3.4E-7	--
Indeno[123cd]pyrene	8.7E+00				3.3E-06	5.1E-09	6.8E-08	4.5E-8	--
Naphthalene		0.00300	5%	0.00285	6.4E-06	1.9E-09	1.3E-07	--	0.0000458
2-naphthylamine					8.0E-07	2.3E-10	1.6E-08	--	--
								1.9E-6	**0.000378**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data: Oral Slope Factor (mg/kg/d)-1	Toxicity Data: Threshold TDI (mg/kg/day)	Toxicity Data: Background Intake (% TDI)	Toxicity Data: TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold mg/kg/day	Daily Exposure: Inhalation Exposure Concentration - Threshold mg/kg/day	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]&[k]fluoranthene								--
Benzo[ghi]perylene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				6.7E-11	4.7E-09	1.2E-10	--
							1.2E-10	

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Inhalation of Vapours Indoors (derived from Soil Source) Residential Site User - Maximum

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Residential Site Users		
Exposure Time (ET, hr/day)	20	Enhealth AEFG 2012
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assumed
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	365	Assumed for residents
Exposure Duration (ED, years)	30	Assumed for residents
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	3.1E-02	1.1E-02	2.6E-02	--	0.142
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	2.2E-01	7.7E-02	1.8E-01	--	0.201
Naphthalene		0.00300	5%	0.002850	4.2E-04	1.5E-04	3.5E-04	--	0.124
									0.471

Exposure to Chemicals via Incidental Ingestion of Soil Recreational Child - 95% UCL

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Recreational Child		
Ingestion Rate (IRs, mg/day)	100	As per Enhealth AEFG 2012
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	26	10% of average number of dry days
Exposure Duration (ED, years)	6	Exposures occur over childhood (0-5 years)
Body Weight (BW, kg)	15	Average for 2-3 year old enHealth AEFG 2012
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	2190	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	40	1.6E-06	1.9E-05	--	0.000528
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	40	1.6E-06	1.9E-05	--	0.000211
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	300	1.2E-05	1.4E-04	--	0.005277
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	300	1.2E-05	1.4E-04	--	0.000079
Benzo[a]anthracence	2.3E-02				100%	12	2.6E-06	5.7E-06	6.0E-8	--
Benzo[a]pyrene	2.3E-01				100%	8	1.7E-06	3.8E-06	4.0E-7	--
Benzo[b]&[k]fluoranthene	2.3E-02				100%	15	3.2E-06	7.1E-06	7.5E-8	--
Benzo[ghi]perylene	2.3E-03				100%	3.7	8.0E-07	1.8E-06	1.9E-9	--
Chrysene	2.3E-03				100%	12	2.6E-06	5.7E-06	6.0E-9	--
Dibenz[ah]anthracene	2.3E-01				100%	2.5	5.4E-07	1.2E-06	1.3E-7	--
Indeno[123cd]pyrene	2.3E-02				100%	3.3	7.1E-07	1.6E-06	1.7E-8	--
Naphthalene		0.0200	5%	0.0190	100%	1.1	4.5E-08	5.2E-07	--	0.0000275
2-naphthylamine	1.8E+00				100%	0.8	3.3E-08	3.8E-07	5.9E-8	--
									7.5E-7	**0.00612**

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Dermal Exposure to Chemicals via Contact with Soil Recreational Child - 95% UCL

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ **(mg/kg/day)**

Parameters Relevant to Quantification of Exposure for Recreational Child		
Surface Area (SAs, cm^2)	2700	Based on Enhealth AEFG 2012 and NEPM 2013
Adherence Factor (AF, mg/cm^2)	0.51	Value for hands (USEPA 2011)
Fraction of Day Exposed	1	Assume the child remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	26	10% of average number of dry days
Exposure Duration (ED, years)	6	Exposures occur over childhood (0-5 years)
Body Weight (BW, kg)	15	Average for 2-3 year old enHealth AEFG 2012
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	2190	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor	Threshold TDI	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background)	Dermal Absorption (ABS)		Non-Threshold	Threshold	Non-Threshold Risk	Chronic Hazard Quotient
	$(mg/kg\text{-}day)^{-1}$	(mg/kg/day)		(mg/kg/day)		(mg/kg)	(mg/kg/day)	(mg/kg/day)	(unitless)	(unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	40	4.5E-06	5.2E-05	--	0.001453
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	40	4.5E-06	5.2E-05	--	0.000581
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	300	3.4E-05	3.9E-04	--	0.014532
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	300	3.4E-05	3.9E-04	--	0.000218
Benzo[a]anthracence	2.3E-02				0.06	12	2.1E-06	4.7E-06	5.0E-8	--
Benzo[a]pyrene	2.3E-01				0.06	8	1.4E-06	3.1E-06	3.3E-7	--
Benzo[b]&[k]fluoranthene	2.3E-02				0.06	15	2.7E-06	5.9E-06	6.2E-8	--
Benzo[ghi]perylene	2.3E-03				0.06	3.7	6.6E-07	1.5E-06	1.5E-9	--
Chrysene	2.3E-03				0.06	12	2.1E-06	4.7E-06	5.0E-9	--
Dibenz[ah]anthracene	2.3E-01				0.06	2.5	4.5E-07	9.8E-07	1.0E-7	--
Indeno[123cd]pyrene	2.3E-02				0.06	3.3	5.9E-07	1.3E-06	1.4E-8	--
Naphthalene		0.0200	5%	0.01900	0.06	1.1	3.7E-08	4.3E-07	--	0.0000227
2-naphthylamine	1.8E+00				0.1	0.8	4.5E-08	5.2E-07	8.1E-8	--
									6.5E-7	**0.0168**

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Inhalation of Dust (derived from Soil Source) Resident during Construction Works - 95% UCL

$$\textit{Inhalation Exposure Conc}_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Residents		
Exposure Time (ET, hr/day)	2	Assume exposure to site related dust and vapours all day
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust and vapours is from site related soil
Deposition Fraction (DF, unitless)	0.75	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	0.5	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	1	Assume site earthworks completed in first year followed by building construction
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	8760	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.18000	9.7E-04	2.8E-07	2.0E-05	--	0.000110
TRH C10-C14 Aliphatic		1.00000	10%	0.90000	6.8E-03	2.0E-06	1.4E-04	--	0.000156
TRH C15+ Aromatic		0.10500	10%	0.09450	3.0E-04	8.8E-08	6.2E-06	--	0.0000652
TRH C15+ Aliphatic		7.00000	10%	6.30000	3.0E-04	8.8E-08	6.2E-06	--	0.00000098
Benzo[a]anthracence	8.7E+00				1.2E-05	1.9E-08	2.5E-07	1.6E-7	--
Benzo[a]pyrene	8.7E+01				8.0E-06	1.2E-08	1.6E-07	1.1E-6	--
Benzo[b]&[k]fluoranthene	8.7E+00				1.5E-05	2.3E-08	3.1E-07	2.0E-7	--
Benzo[ghi]perylene	8.7E-01				3.7E-06	5.8E-09	7.6E-08	5.0E-9	--
Chrysene	8.7E-01				1.2E-05	1.9E-08	2.5E-07	1.6E-8	--
Dibenz[ah]anthracene	8.7E+01				2.5E-06	3.9E-09	5.1E-08	3.4E-7	--
Indeno[123cd]pyrene	8.7E+00				3.3E-06	5.1E-09	6.8E-08	4.5E-8	--
Naphthalene		0.00300	5%	0.00285	6.4E-06	1.9E-09	1.3E-07	--	0.0000458
2-naphthylamine					8.0E-07	2.3E-10	1.6E-08	--	--
								1.9E-6	**0.000378**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data				Daily Exposure		Calculated Risk	
	Oral Slope Factor (mg/kg/d)-1	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Inhalation Exposure Concentration - NonThreshold mg/kg/day	Inhalation Exposure Concentration - Threshold mg/kg/day	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]&[k]fluoranthene								--
Benzo[ghi]perylene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				6.7E-11	4.7E-09	1.2E-10	--
							1.2E-10	

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Inhalation of Vapours (derived from Soil Source) Residential Site User - 95% UCL

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Residential Site Users		
Exposure Time (ET, hr/day)	20	Enhealth AEFG 2012
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assumed
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	365	Assumed for residents
Exposure Duration (ED, years)	30	Assumed for residents
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	3.7E-03	1.3E-03	3.1E-03	--	0.0172
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	2.7E-02	9.7E-03	2.3E-02	--	0.0252
Naphthalene		0.00300	5%	0.002850	3.1E-05	1.1E-05	2.6E-05	--	0.0091
									0.0518

COMPLETED DEVELOPMENT

Recreational and Residential Child

Exposure to Chemicals via Incidental Ingestion of Soil Recreational Child - Maximum

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Recreational Child		
Ingestion Rate (IRs, mg/day)	100	As per Enhealth AEFG 2012
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	26	10% of average number of dry days
Exposure Duration (ED, years)	6	Exposures occur over childhood (0-5 years)
Body Weight (BW, kg)	15	Average for 2-3 year old enHealth AEFG 2012
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	2190	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor	Threshold TDI	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background)	Bioavailability		NonThreshold	Threshold	Non-Threshold Risk	Chronic Hazard Quotient
	(mg/kg-day)$^{-1}$	(mg/kg/day)		(mg/kg/day)	(%)	(mg/kg)	(mg/kg/day)	(mg/kg/day)	(unitless)	(unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	330	1.3E-05	1.6E-04	--	0.00435
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	330	1.3E-05	1.6E-04	--	0.00174
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	2100	8.5E-05	1.0E-03	--	0.0369
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	3100	1.3E-04	1.5E-03	--	0.000818
Benzo[a]anthracence	2.3E-02				100%	260	5.6E-05	1.2E-04	1.3E-6	--
Benzo[a]pyrene	2.3E-01				100%	200	4.3E-05	9.5E-05	1.0E-5	--
Benzo[b]fluoranthene	2.3E-02				100%	235	5.1E-05	1.1E-04	1.2E-6	--
Benzo[ghi]perylene	2.3E-03				100%	62	1.3E-05	2.9E-05	3.1E-8	--
Benzo[k]fluoranthene	2.3E-02				100%	105	2.3E-05	5.0E-05	5.3E-7	--
Chrysene	2.3E-03				100%	300	6.5E-05	1.4E-04	1.5E-7	--
Dibenz[ah]anthracene	2.3E-01				100%	19	4.1E-06	9.0E-06	9.6E-7	--
Indeno[123cd]pyrene	2.3E-02				100%	60	1.3E-05	2.8E-05	3.0E-7	--
Naphthalene		0.0200	5%	0.0190	100%	15	6.1E-07	7.1E-06	--	0.000375
2-naphthylamine	1.8E+00				100%	0.8	3.3E-08	3.8E-07	5.9E-8	--
									1.5E-5	**0.0442**

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Dermal Exposure to Chemicals via Contact with Soil Recreational Child - Maximum

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure for Recreational Child		
Surface Area (SAs, cm^2)	2700	Based on Enhealth AEFG 2012 and NPEM 2013
Adherence Factor (AF, mg/cm^2)	0.51	Value for hands (USEPA 2011)
Fraction of Day Exposed	1	Assume the child remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	26	10% of average number of dry days
Exposure Duration (ED, years)	6	Exposures occur over childhood (0-5 years)
Body Weight (BW, kg)	15	Average for 2-3 year old enHealth AEFG 2012
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	2190	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor	Threshold TDI	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background)	Dermal Absorption (ABS)		Non-Threshold	Threshold	Non-Threshold Risk	Chronic Hazard Quotient
	$(mg/kg\text{-}day)^{-1}$	(mg/kg/day)		(mg/kg/day)		(mg/kg)	(mg/kg/day)	(mg/kg/day)	(unitless)	(unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	330	3.7E-05	4.3E-04	--	0.0120
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	330	3.7E-05	4.3E-04	--	0.00480
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	2100	2.4E-04	2.7E-03	--	0.102
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	3100	3.5E-04	4.1E-03	--	0.00225
Benzo[a]anthracence	2.3E-02				0.06	260	4.6E-05	1.0E-04	1.1E-6	--
Benzo[a]pyrene	2.3E-01				0.06	200	3.6E-05	7.8E-05	8.3E-6	--
Benzo[b]fluoranthene	2.3E-02				0.06	235	4.2E-05	9.2E-05	9.8E-7	--
Benzo[ghi]perylene	2.3E-03				0.06	62	1.1E-05	2.4E-05	2.6E-8	--
Benzo[k]fluoranthene	2.3E-02				0.06	105	1.9E-05	4.1E-05	4.4E-7	--
Chrysene	2.3E-03				0.06	300	5.3E-05	1.2E-04	1.2E-7	--
Dibenz[ah]anthracene	2.3E-01				0.06	19	3.4E-06	7.5E-06	7.9E-7	--
Indeno[123cd]pyrene	2.3E-02				0.06	60	1.1E-05	2.4E-05	2.5E-7	--
Naphthalene		0.0200	5%	0.01900	0.06	15	5.0E-07	5.9E-06	--	0.000310
2-naphthylamine	1.8E+00				0.1	0.8	4.5E-08	5.2E-07	8.1E-8	--
									1.2E-5	**0.121**

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Inhalation of Dust Outdoors (derived from Soil Source) Recreational Site User - Maximum

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Recreational Site User		
Exposure Time (ET, hr/day)	2	Assumed exposure to site related dust
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	265	Time spent on site undertaking intrusive works
Exposure Duration (ED, years)	6	Time spent on site undertaking intrusive works
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	52560	USEPA 2009

Key Chemical	Toxicity Data: Inhalation Unit Risk $(mg/m^3)^{-1}$	Toxicity Data: Chronic TC air (mg/m^3)	Toxicity Data: Background Intake (% Chronic TC)	Toxicity Data: Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	Concentration in Air (Ca) (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - Threshold (mg/m^3)	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	7.6E-03	4.0E-05	4.6E-04	--	0.002568
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	5.4E-02	2.8E-04	3.3E-03	--	0.00363
TRH C15+ Aromatic		0.10500	10%	0.094500	6.5E-08	3.4E-10	4.0E-09	--	0.00000004191
TRH C15+ Aliphatic		7.00000	10%	6.300000	9.7E-08	5.0E-10	5.8E-09	--	0.000000000928
Benzo[a]anthracence	8.7E+00				8.1E-09	2.2E-10	4.9E-10	1.9E-9	--
Benzo[a]pyrene	8.7E+01				6.2E-09	1.7E-10	3.8E-10	1.5E-8	--
Benzo[b]fluoranthene	8.7E+00				7.3E-09	2.0E-10	4.4E-10	1.8E-9	--
Benzo[ghi]perylene	8.7E-01				1.9E-09	5.3E-11	1.2E-10	4.6E-11	--
Benzo[k]fluoranthene	8.7E+00				3.3E-09	9.0E-11	2.0E-10	7.8E-10	--
Chrysene	8.7E-01				9.4E-09	2.6E-10	5.7E-10	2.2E-10	--
Dibenz[ah]anthracene	8.7E+01				5.9E-10	1.6E-11	3.6E-11	1.4E-9	--
Indeno[123cd]pyrene	8.7E+00				1.9E-09	5.1E-11	1.1E-10	4.5E-10	--
Naphthalene		0.00300	5%	0.002850	7.2E-05	3.7E-07	4.3E-06	--	0.00152
2-naphthylamine					2.5E-11	1.3E-13	1.5E-12	--	--
								2.2E-8	**0.00772**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data: Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Toxicity Data: Threshold TDI (mg/kg/day)	Toxicity Data: Background Intake (% TDI)	Toxicity Data: TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold mg/kg/day	Daily Exposure: Inhalation Exposure Concentration - Threshold mg/kg/day	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic			10%		1.1E-05	1.3E-04		--
TRH C10-C14 Aliphatic			10%		8.0E-05	9.3E-04		--
TRH C15+ Aromatic			10%		9.7E-11	1.1E-09		--
TRH C15+ Aliphatic			10%		1.4E-10	1.7E-09		--
Benzo[a]anthracence					6.4E-11	1.4E-10		--
Benzo[a]pyrene					4.9E-11	1.1E-10		--
Benzo[b]fluoranthene					5.8E-11	1.3E-10		--
Benzo[ghi]perylene					1.5E-11	3.3E-11		--
Benzo[k]fluoranthene					2.6E-11	5.7E-11		--
Chrysene					7.4E-11	1.6E-10		--
Dibenz[ah]anthracene					4.7E-12	1.0E-11		--
Indeno[123cd]pyrene					1.5E-11	3.2E-11		--
Naphthalene			5%		1.1E-07	1.2E-06		--
2-naphthylamine	1.8E+00				3.7E-14	4.3E-13	6.7E-14	--
							6.7E-14	

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

EnRiskS

Inhalation of Vapours Indoors (derived from Soil Source) Residential Site User - Maximum

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Residential Site Users		
Exposure Time (ET, hr/day)	20	Enhealth AEFG 2012
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assumed
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	365	Assumed for residents
Exposure Duration (ED, years)	30	Assumed for residents
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	3.1E-02	1.1E-02	2.6E-02	--	0.142
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	2.2E-01	7.7E-02	1.8E-01	--	0.201
Naphthalene		0.00300	5%	0.002850	4.2E-04	1.5E-04	3.5E-04	--	0.124
									0.471

Exposure to Chemicals via Incidental Ingestion of Soil Recreational Child - 95% UCL

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT}$$ (mg/kg/day)

Parameters Relevant to Quantification of Exposure to Recreational Child		
Ingestion Rate (IRs, mg/day)	100	As per Enhealth AEFG 2012
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	26	10% of average number of dry days
Exposure Duration (ED, years)	6	Exposures occur over childhood (0-5 years)
Body Weight (BW, kg)	15	Average for 2-3 year old enHealth AEFG 2012
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	2190	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	40	1.6E-06	1.9E-05	--	0.000528
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	40	1.6E-06	1.9E-05	--	0.000211
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	300	1.2E-05	1.4E-04	--	0.005277
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	300	1.2E-05	1.4E-04	--	0.000079
Benzo[a]anthracence	2.3E-02				100%	12	2.6E-06	5.7E-06	6.0E-8	--
Benzo[a]pyrene	2.3E-01				100%	8	1.7E-06	3.8E-06	4.0E-7	--
Benzo[b]&[k]fluoranthene	2.3E-02				100%	15	3.2E-06	7.1E-06	7.5E-8	--
Benzo[ghi]perylene	2.3E-03				100%	3.7	8.0E-07	1.8E-06	1.9E-9	--
Chrysene	2.3E-03				100%	12	2.6E-06	5.7E-06	6.0E-9	--
Dibenz[ah]anthracene	2.3E-01				100%	2.5	5.4E-07	1.2E-06	1.3E-7	--
Indeno[123cd]pyrene	2.3E-02				100%	3.3	7.1E-07	1.6E-06	1.7E-8	--
Naphthalene		0.0200	5%	0.0190	100%	1.1	4.5E-08	5.2E-07	--	0.0000275
2-naphthylamine	1.8E+00				100%	0.8	3.3E-08	3.8E-07	5.9E-8	--
									7.5E-7	**0.00612**

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Dermal Exposure to Chemicals via Contact with Soil Recreational Child - 95% UCL

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ (mg/kg/day)

Parameters Relevant to Quantification of Exposure for Recreational Child		
Surface Area (SAs, cm^2)	2700	Based on Enhealth AEFG 2012 and NEPM 2013
Adherence Factor (AF, mg/cm^2)	0.51	Value for hands (USEPA 2011)
Fraction of Day Exposed	1	Assume the child remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	26	10% of average number of dry days
Exposure Duration (ED, years)	6	Exposures occur over childhood (0-5 years)
Body Weight (BW, kg)	15	Average for 2-3 year old enHealth AEFG 2012
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	2190	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	40	4.5E-06	5.2E-05	--	0.001453
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	40	4.5E-06	5.2E-05	--	0.000581
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	300	3.4E-05	3.9E-04	--	0.014532
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	300	3.4E-05	3.9E-04	--	0.000218
Benzo[a]anthracence	2.3E-02				0.06	12	2.1E-06	4.7E-06	5.0E-8	--
Benzo[a]pyrene	2.3E-01				0.06	8	1.4E-06	3.1E-06	3.3E-7	--
Benzo[b]&[k]fluoranthene	2.3E-02				0.06	15	2.7E-06	5.9E-06	6.2E-8	--
Benzo[ghi]perylene	2.3E-03				0.06	3.7	6.6E-07	1.5E-06	1.5E-9	--
Chrysene	2.3E-03				0.06	12	2.1E-06	4.7E-06	5.0E-9	--
Dibenz[ah]anthracene	2.3E-01				0.06	2.5	4.5E-07	9.8E-07	1.0E-7	--
Indeno[123cd]pyrene	2.3E-02				0.06	3.3	5.9E-07	1.3E-06	1.4E-8	--
Naphthalene		0.0200	5%	0.01900	0.06	1.1	3.7E-08	4.3E-07	--	0.0000227
2-naphthylamine	1.8E+00				0.1	0.8	4.5E-08	5.2E-07	8.1E-8	--
									6.5E-7	**0.0168**

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Inhalation of Dust and Vapours Outdoors (derived from Soil Source) Recreational Site User - 95% UCL

$$\textit{Inhalation Exposure Conc}_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Recreational Site User		
Exposure Time (ET, hr/day)	2	Assumed exposure to site related dust
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	265	Time spent on site undertaking intrusive works
Exposure Duration (ED, years)	6	Time spent on site undertaking intrusive works
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	52560	USEPA 2009

Key Chemical	Toxicity Data: Inhalation Unit Risk $(mg/m^3)^{-1}$	Toxicity Data: Chronic TC air (mg/m^3)	Toxicity Data: Background Intake (% Chronic TC)	Toxicity Data: Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	Concentration in Air (Ca) (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - Threshold (mg/m^3)	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	9.3E-04	4.8E-06	5.6E-05	--	0.000311
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	6.8E-03	3.5E-05	4.1E-04	--	0.000456
TRH C15+ Aromatic		0.10500	10%	0.094500	9.4E-09	4.8E-11	5.7E-10	--	0.00000000599
TRH C15+ Aliphatic		7.00000	10%	6.300000	9.4E-09	4.8E-11	5.7E-10	--	0.000000000090
Benzo[a]anthracence	8.7E+00				3.7E-10	1.0E-11	2.3E-11	8.9E-11	--
Benzo[a]pyrene	8.7E+01				2.5E-10	6.9E-12	1.5E-11	6.0E-10	--
Benzo[b]&[k]fluoranthene	8.7E+00				4.7E-10	1.3E-11	2.8E-11	1.1E-10	--
Benzo[ghi]perylene	8.7E-01				1.2E-10	3.2E-12	7.0E-12	2.8E-12	--
Chrysene	8.7E-01				3.7E-10	1.0E-11	2.3E-11	8.9E-12	--
Dibenz[ah]anthracene	8.7E+01				7.8E-11	2.1E-12	4.7E-12	1.9E-10	--
Indeno[123cd]pyrene	8.7E+00				1.0E-10	2.8E-12	6.2E-12	2.5E-11	--
Naphthalene		0.00300	5%	0.002850	5.3E-06	2.7E-08	3.2E-07	--	0.000111
2-naphthylamine					2.5E-11	1.3E-13	1.5E-12	--	--
								1.0E-9	**0.000878**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data: Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Toxicity Data: Threshold TDI (mg/kg/day)	Toxicity Data: Background Intake (% TDI)	Toxicity Data: TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold mg/kg/day	Daily Exposure: Inhalation Exposure Concentration - Threshold mg/kg/day	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]&[k]fluoranthene								--
Benzo[ghi]perylene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				3.7E-14	4.3E-13	6.7E-14	--
							6.7E-14	

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Inhalation of Vapours (derived from Soil Source) Residential Site User - 95% UCL

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Residential Site Users		
Exposure Time (ET, hr/day)	20	Enhealth AEFG 2012
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assumed
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	365	Assumed for residents
Exposure Duration (ED, years)	30	Assumed for residents
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	3.7E-03	1.3E-03	3.1E-03	--	0.0172
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	2.7E-02	9.7E-03	2.3E-02	--	0.0252
Naphthalene		0.00300	5%	0.002850	3.1E-05	1.1E-05	2.6E-05	--	0.0091
									0.0518

STAGED CONSTRUCTION

Retail Worker or Car Park Attendant/ Car Wash

Inhalation of Vapours (derived from Soil Source) Retail Worker or Car Park Attendant - Maximum

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Exposure Time (ET, hr/day)	8	Enhealth AEFG 2012
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assumed
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Working year
Exposure Duration (ED, years)	30	Working lifetime
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	3.1E-01	2.9E-02	6.7E-02	--	0.374
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	2.2E+00	2.0E-01	4.8E-01	--	0.528
Naphthalene		0.00300	5%	0.002850	4.2E-03	4.0E-04	9.3E-04	--	0.326
									1.238

Inhalation of Dust (derived from Soil Source) Retail Worker during Construction Works - 95% UCL

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Retail Worker		
Exposure Time (ET, hr/day)	2	Assume exposure to site related dust and vapours all day
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust and vapours is from site related soil
Deposition Fraction (DF, unitless)	0.75	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	0.5	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	1	Assume site earthworks completed in first year followed by building construction
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	8760	USEPA 2009

Key Chemical	Toxicity Data: Inhalation Unit Risk $(mg/m^3)^{-1}$	Toxicity Data: Chronic TC air (mg/m^3)	Toxicity Data: Background Intake (% Chronic TC)	Toxicity Data: Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	Concentration in Air (Ca) (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - Threshold (mg/m^3)	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.18000	9.7E-04	2.8E-07	2.0E-05	--	0.000110
TRH C10-C14 Aliphatic		1.00000	10%	0.90000	6.8E-03	2.0E-06	1.4E-04	--	0.000156
TRH C15+ Aromatic		0.10500	10%	0.09450	3.0E-04	8.8E-08	6.2E-06	--	0.0000652
TRH C15+ Aliphatic		7.00000	10%	6.30000	3.0E-04	8.8E-08	6.2E-06	--	0.00000098
Benzo[a]anthracence	8.7E+00				1.2E-05	3.5E-09	2.5E-07	3.1E-8	--
Benzo[a]pyrene	8.7E+01				8.0E-06	2.3E-09	1.6E-07	2.0E-7	--
Benzo[b]&[k]fluoranthene	8.7E+00				1.5E-05	4.4E-09	3.1E-07	3.8E-8	--
Benzo[ghi]perylene	8.7E-01				3.7E-06	1.1E-09	7.6E-08	9.4E-10	--
Chrysene	8.7E-01				1.2E-05	3.5E-09	2.5E-07	3.1E-9	--
Dibenz[ah]anthracene	8.7E+01				2.5E-06	7.3E-10	5.1E-08	6.4E-8	--
Indeno[123cd]pyrene	8.7E+00				3.3E-06	9.7E-10	6.8E-08	8.4E-9	--
Naphthalene		0.00300	5%	0.00285	6.4E-06	1.9E-09	1.3E-07	--	0.0000458
2-naphthylamine					8.0E-07	2.3E-10	1.6E-08	--	--
								3.5E-7	**0.000378**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data: Oral Slope Factor (mg/kg/d)-1	Toxicity Data: Threshold TDI (mg/kg/day)	Toxicity Data: Background Intake (% TDI)	Toxicity Data: TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold mg/kg/day	Daily Exposure: Inhalation Exposure Concentration - Threshold mg/kg/day	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]&[k]fluoranthene								--
Benzo[ghi]perylene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				6.7E-11	4.7E-09	1.2E-10	--
							1.2E-10	

Exposure to Chemicals via Incidental Ingestion of Soil Retail/Commercial Worker or Car Park Attendant - Maximum

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Ingestion Rate (IRs, mg/day)	25	As per Enhealth AEFG 2012
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	240	Working year
Exposure Duration (ED, years)	30	Working lifetime
Body Weight (BW, kg)	70	Adult -As per Enhealth AEFG 2012
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	10950	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor	Threshold TDI	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background)	Bioavailability		NonThreshold	Threshold	Non-Threshold Risk	Chronic Hazard Quotient
	$(mg/kg\text{-}day)^{-1}$	(mg/kg/day)		(mg/kg/day)	(%)	(mg/kg)	(mg/kg/day)	(mg/kg/day)	(unitless)	(unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	330	3.3E-05	7.7E-05	--	0.002153
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	330	3.3E-05	7.7E-05	--	0.000861
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	2100	2.1E-04	4.9E-04	--	0.018265
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	3100	3.1E-04	7.3E-04	--	0.000404
Benzo[a]anthracence	2.3E-02				100%	260	2.6E-05	6.1E-05	6.1E-7	--
Benzo[a]pyrene	2.3E-01				100%	200	2.0E-05	4.7E-05	4.7E-6	--
Benzo[b]fluoranthene	2.3E-02				100%	235	2.4E-05	5.5E-05	5.5E-7	--
Benzo[ghi]perylene	2.3E-03				100%	62	6.2E-06	1.5E-05	1.5E-8	--
Benzo[k]fluoranthene	2.3E-02				100%	105	1.1E-05	2.5E-05	2.5E-7	--
Chrysene	2.3E-03				100%	300	3.0E-05	7.0E-05	7.0E-8	--
Dibenz[ah]anthracene	2.3E-01				100%	19	1.9E-06	4.5E-06	4.5E-7	--
Indeno[123cd]pyrene	2.3E-02				100%	60	6.0E-06	1.4E-05	1.4E-7	--
Naphthalene		0.0200	5%	0.0190	100%	15	1.5E-06	3.5E-06	--	0.000185
2-naphthylamine	1.8E+00				100%	0.8	8.1E-08	1.9E-07	1.4E-7	--
									6.9E-6	**0.0219**

Dermal Exposure to Chemicals via Contact with Soil Retail/Commercial Worker or Car Park Attendant - Maximum

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ **(mg/kg/day)**

Parameters Relevant to Quantification of Exposure for Retail Worker or Car Park Attendant		
Surface Area (SAs, cm^2)	2200	Based on hands (Enhealth AEFG 2012)
Adherence Factor (AF, mg/cm^2)	0.51	Value for hands (USEPA 2011)
Fraction of Day Exposed	1	Assume the person remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	240	working year
Exposure Duration (ED, years)	30	working lifetime
Body Weight (BW, kg)	70	Adult -As per Enhealth AEFG 2012
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	10950	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	330	3.0E-04	7.0E-04	--	0.0193
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	330	3.0E-04	7.0E-04	--	0.00773
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	2100	1.9E-03	4.4E-03	--	0.164
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	3100	2.8E-03	6.5E-03	--	0.00363
Benzo[a]anthracence	2.3E-02				0.06	260	7.0E-05	1.6E-04	1.6E-6	--
Benzo[a]pyrene	2.3E-01				0.06	200	5.4E-05	1.3E-04	1.3E-5	--
Benzo[b]fluoranthene	2.3E-02				0.06	235	6.4E-05	1.5E-04	1.5E-6	--
Benzo[ghi]perylene	2.3E-03				0.06	62	1.7E-05	3.9E-05	3.9E-8	--
Benzo[k]fluoranthene	2.3E-02				0.06	105	2.8E-05	6.6E-05	6.6E-7	--
Chrysene	2.3E-03				0.06	300	8.1E-05	1.9E-04	1.9E-7	--
Dibenz[ah]anthracene	2.3E-01				0.06	19	5.1E-06	1.2E-05	1.2E-6	--
Indeno[123cd]pyrene	2.3E-02				0.06	60	1.6E-05	3.8E-05	3.8E-7	--
Naphthalene		0.0200	5%	0.01900	0.06	15	4.1E-06	9.5E-06	--	0.000499
2-naphthylamine	1.8E+00				0.1	0.8	3.6E-07	8.4E-07	6.5E-7	--
									1.9E-5	**0.195**

Inhalation of Vapours (derived from Soil Source) Retail Worker or Car Park Attendant - 95% UCL

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \qquad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Exposure Time (ET, hr/day)	8	Enhealth AEFG 2012
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assumed
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Working year
Exposure Duration (ED, years)	30	Exposures occur over working lifetime
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	3.7E-02	3.5E-03	8.2E-03	--	0.045
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	2.7E-01	2.6E-02	6.0E-02	--	0.066
Naphthalene		0.00300	5%	0.002850	3.1E-04	2.9E-05	6.8E-05	--	0.024
									0.136

Inhalation of Dust (derived from Soil Source) Retail Worker during Construction Works - 95% UCL

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Retail Worker		
Exposure Time (ET, hr/day)	2	Assume exposure to site related dust and vapours all day
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust and vapours is from site related soil
Deposition Fraction (DF, unitless)	0.75	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	0.5	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Assume construction works involving excavations undertaken all year
Exposure Duration (ED, years)	1	Assume site earthworks completed in first year followed by building construction
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	8760	USEPA 2009

Key Chemical	Toxicity Data: Inhalation Unit Risk $(mg/m^3)^{-1}$	Toxicity Data: Chronic TC air (mg/m^3)	Toxicity Data: Background Intake (% Chronic TC)	Toxicity Data: Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	Concentration in Air (Ca) (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - Threshold (mg/m^3)	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.18000	9.7E-04	2.8E-07	2.0E-05	--	0.000110
TRH C10-C14 Aliphatic		1.00000	10%	0.90000	6.8E-03	2.0E-06	1.4E-04	--	0.000156
TRH C15+ Aromatic		0.10500	10%	0.09450	3.0E-04	8.8E-08	6.2E-06	--	0.0000652
TRH C15+ Aliphatic		7.00000	10%	6.30000	3.0E-04	8.8E-08	6.2E-06	--	0.00000098
Benzo[a]anthracence	8.7E+00				1.2E-05	3.5E-09	2.5E-07	3.1E-8	--
Benzo[a]pyrene	8.7E+01				8.0E-06	2.3E-09	1.6E-07	2.0E-7	--
Benzo[b]&[k]fluoranthene	8.7E+00				1.5E-05	4.4E-09	3.1E-07	3.8E-8	--
Benzo[ghi]perylene	8.7E-01				3.7E-06	1.1E-09	7.6E-08	9.4E-10	--
Chrysene	8.7E-01				1.2E-05	3.5E-09	2.5E-07	3.1E-9	--
Dibenz[ah]anthracene	8.7E+01				2.5E-06	7.3E-10	5.1E-08	6.4E-8	--
Indeno[123cd]pyrene	8.7E+00				3.3E-06	9.7E-10	6.8E-08	8.4E-9	--
Naphthalene		0.00300	5%	0.00285	6.4E-06	1.9E-09	1.3E-07	--	0.0000458
2-naphthylamine					8.0E-07	2.3E-10	1.6E-08	--	--
								3.5E-7	**0.000378**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data: Oral Slope Factor (mg/kg/d)-1	Toxicity Data: Threshold TDI (mg/kg/day)	Toxicity Data: Background Intake (% TDI)	Toxicity Data: TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold mg/kg/day	Daily Exposure: Inhalation Exposure Concentration - Threshold mg/kg/day	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]&[k]fluoranthene								--
Benzo[ghi]perylene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				6.7E-11	4.7E-09	1.2E-10	--
							1.2E-10	

Exposure to Chemicals via Incidental Ingestion of Soil Retail Worker or Car Park Attendant - 95% UCL

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad (mg/kg/day)$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Ingestion Rate (IRs, mg/day)	25	As per Enhealth AEFG 2012
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	240	Working year
Exposure Duration (ED, years)	30	Exposures occur over working lifetime
Body Weight (BW, kg)	70	Adult
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	10950	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	40	4.0E-06	9.4E-06	--	0.000261
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	40	4.0E-06	9.4E-06	--	0.000104
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	300	3.0E-05	7.0E-05	--	0.002609
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	300	3.0E-05	7.0E-05	--	0.000039
Benzo[a]anthracence	2.3E-02				100%	12	1.2E-06	2.8E-06	2.8E-8	--
Benzo[a]pyrene	2.3E-01				100%	8	8.1E-07	1.9E-06	1.9E-7	--
Benzo[b]&[k]fluoranthene	2.3E-02				100%	15	1.5E-06	3.5E-06	3.5E-8	--
Benzo[ghi]perylene	2.3E-03				100%	3.7	3.7E-07	8.7E-07	8.7E-10	--
Chrysene	2.3E-03				100%	12	1.2E-06	2.8E-06	2.8E-9	--
Dibenz[ah]anthracene	2.3E-01				100%	2.5	2.5E-07	5.9E-07	5.9E-8	--
Indeno[123cd]pyrene	2.3E-02				100%	3.3	3.3E-07	7.7E-07	7.7E-9	--
Naphthalene		0.0200	5%	0.0190	100%	1.1	1.1E-07	2.6E-07	--	0.0000136
2-naphthylamine	1.8E+00				100%	0.8	8.1E-08	1.9E-07	1.4E-7	--
									4.7E-7	**0.00303**

Dermal Exposure to Chemicals via Contact with Soil Retail Worker or Car Park Attendant - 95% UCL

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure for Retail Worker or Car Park Attendant		
Surface Area (SAs, cm^2)	2200	Based on hands (Enhealth AEFG 2012)
Adherence Factor (AF, mg/cm^2)	0.51	Value for hands (USEPA 2011)
Fraction of Day Exposed	1	Assume the person remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	240	Working year
Exposure Duration (ED, years)	30	Exposures occur over working lifetime
Body Weight (BW, kg)	70	Adult
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	10950	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	40	3.6E-05	8.4E-05	--	0.002342
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	40	3.6E-05	8.4E-05	--	0.000937
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	300	2.7E-04	6.3E-04	--	0.023421
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	300	2.7E-04	6.3E-04	--	0.000351
Benzo[a]anthracence	2.3E-02				0.06	12	3.3E-06	7.6E-06	7.6E-8	--
Benzo[a]pyrene	2.3E-01				0.06	8	2.2E-06	5.1E-06	5.1E-7	--
Benzo[b]&[k]fluoranthene	2.3E-02				0.06	15	4.1E-06	9.5E-06	9.5E-8	--
Benzo[ghi]perylene	2.3E-03				0.06	3.7	1.0E-06	2.3E-06	2.3E-9	--
Chrysene	2.3E-03				0.06	12	3.3E-06	7.6E-06	7.6E-9	--
Dibenz[ah]anthracene	2.3E-01				0.06	2.5	6.8E-07	1.6E-06	1.6E-7	--
Indeno[123cd]pyrene	2.3E-02				0.06	3.3	8.9E-07	2.1E-06	2.1E-8	--
Naphthalene		0.0200	5%	0.01900	0.06	1.1	3.0E-07	7.0E-07	--	0.0000366
2-naphthylamine	1.8E+00				0.1	0.8	3.6E-07	8.4E-07	6.5E-7	--
									1.5E-6	**0.0271**

COMPLETED DEVELOPMENT

Retail Worker or Car Park Attendant/ Car Wash

Inhalation of Vapours (derived from Soil Source) Retail Worker or Car Park Attendant - Maximum

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Exposure Time (ET, hr/day)	8	Enhealth AEFG 2012
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assumed
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Working year
Exposure Duration (ED, years)	30	Working lifetime
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	3.1E-01	2.9E-02	6.7E-02	--	0.374
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	2.2E+00	2.0E-01	4.8E-01	--	0.528
Naphthalene		0.00300	5%	0.002850	4.2E-03	4.0E-04	9.3E-04	--	0.326
									1.238

Inhalation of Dust Outdoors (derived from Soil Source) Retail Worker - Maximum

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Exposure Time (ET, hr/day)	1	Assumed exposure to site related dust
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Working year
Exposure Duration (ED, years)	30	Working lifetime
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data: Inhalation Unit Risk $(mg/m^3)^{-1}$	Toxicity Data: Chronic TC air (mg/m^3)	Toxicity Data: Background Intake (% Chronic TC)	Toxicity Data: Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	Concentration in Air (Ca) (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - Threshold (mg/m^3)	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	7.6E-03	9.0E-05	2.1E-04	--	0.001163
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	5.4E-02	6.3E-04	1.5E-03	--	0.00164
TRH C15+ Aromatic		0.10500	10%	0.094500	6.5E-08	7.7E-10	1.8E-09	--	0.0000000190
TRH C15+ Aliphatic		7.00000	10%	6.300000	9.7E-08	1.1E-09	2.6E-09	--	0.000000000420
Benzo[a]anthracence	8.7E+00				8.1E-09	9.5E-11	2.2E-10	8.3E-10	--
Benzo[a]pyrene	8.7E+01				6.2E-09	7.3E-11	1.7E-10	6.4E-9	--
Benzo[b]fluoranthene	8.7E+00				7.3E-09	8.6E-11	2.0E-10	7.5E-10	--
Benzo[ghi]perylene	8.7E-01				1.9E-09	2.3E-11	5.3E-11	2.0E-11	--
Benzo[k]fluoranthene	8.7E+00				3.3E-09	3.8E-11	9.0E-11	3.3E-10	--
Chrysene	8.7E-01				9.4E-09	1.1E-10	2.6E-10	9.6E-11	--
Dibenz[ah]anthracene	8.7E+01				5.9E-10	7.0E-12	1.6E-11	6.1E-10	--
Indeno[123cd]pyrene	8.7E+00				1.9E-09	2.2E-11	5.1E-11	1.9E-10	--
Naphthalene		0.00300	5%	0.002850	7.2E-05	8.4E-07	2.0E-06	--	0.000688
2-naphthylamine					2.5E-11	2.9E-13	6.8E-13	--	--
								9.2E-9	**0.00349**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data: Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Toxicity Data: Threshold TDI (mg/kg/day)	Toxicity Data: Background Intake (% TDI)	Toxicity Data: TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold mg/kg/day	Daily Exposure: Inhalation Exposure Concentration - Threshold mg/kg/day	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]fluoranthene								--
Benzo[ghi]perylene								--
Benzo[k]fluoranthene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				8.4E-14	2.0E-13	1.5E-13	--
							1.5E-13	

Exposure to Chemicals via Incidental Ingestion of Soil Retail/Commercial Worker or Car Park Attendant - Maximum

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Ingestion Rate (IRs, mg/day)	25	As per Enhealth AEFG 2012
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	240	Working year
Exposure Duration (ED, years)	30	Working lifetime
Body Weight (BW, kg)	70	Adult -As per Enhealth AEFG 2012
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	10950	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	330	3.3E-05	7.7E-05	--	0.002153
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	330	3.3E-05	7.7E-05	--	0.000861
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	2100	2.1E-04	4.9E-04	--	0.018265
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	3100	3.1E-04	7.3E-04	--	0.000404
Benzo[a]anthracence	2.3E-02				100%	260	2.6E-05	6.1E-05	6.1E-7	--
Benzo[a]pyrene	2.3E-01				100%	200	2.0E-05	4.7E-05	4.7E-6	--
Benzo[b]fluoranthene	2.3E-02				100%	235	2.4E-05	5.5E-05	5.5E-7	--
Benzo[ghi]perylene	2.3E-03				100%	62	6.2E-06	1.5E-05	1.5E-8	--
Benzo[k]fluoranthene	2.3E-02				100%	105	1.1E-05	2.5E-05	2.5E-7	--
Chrysene	2.3E-03				100%	300	3.0E-05	7.0E-05	7.0E-8	--
Dibenz[ah]anthracene	2.3E-01				100%	19	1.9E-06	4.5E-06	4.5E-7	--
Indeno[123cd]pyrene	2.3E-02				100%	60	6.0E-06	1.4E-05	1.4E-7	--
Naphthalene		0.0200	5%	0.0190	100%	15	1.5E-06	3.5E-06	--	0.000185
2-naphthylamine	1.8E+00				100%	0.8	8.1E-08	1.9E-07	1.4E-7	--
									6.9E-6	**0.0219**

Dermal Exposure to Chemicals via Contact with Soil Retail/Commercial Worker or Car Park Attendant - Maximum

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ **(mg/kg/day)**

Parameters Relevant to Quantification of Exposure for Retail Worker or Car Park Attendant		
Surface Area (SAs, cm^2)	2200	Based on hands (Enhealth AEFG 2012)
Adherence Factor (AF, mg/cm^2)	0.51	Value for hands (USEPA 2011)
Fraction of Day Exposed	1	Assume the person remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	240	working year
Exposure Duration (ED, years)	30	working lifetime
Body Weight (BW, kg)	70	Adult -As per Enhealth AEFG 2012
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	10950	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	330	3.0E-04	7.0E-04	--	0.0193
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	330	3.0E-04	7.0E-04	--	0.00773
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	2100	1.9E-03	4.4E-03	--	0.164
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	3100	2.8E-03	6.5E-03	--	0.00363
Benzo[a]anthracence	2.3E-02				0.06	260	7.0E-05	1.6E-04	1.6E-6	--
Benzo[a]pyrene	2.3E-01				0.06	200	5.4E-05	1.3E-04	1.3E-5	--
Benzo[b]fluoranthene	2.3E-02				0.06	235	6.4E-05	1.5E-04	1.5E-6	--
Benzo[ghi]perylene	2.3E-03				0.06	62	1.7E-05	3.9E-05	3.9E-8	--
Benzo[k]fluoranthene	2.3E-02				0.06	105	2.8E-05	6.6E-05	6.6E-7	--
Chrysene	2.3E-03				0.06	300	8.1E-05	1.9E-04	1.9E-7	--
Dibenz[ah]anthracene	2.3E-01				0.06	19	5.1E-06	1.2E-05	1.2E-6	--
Indeno[123cd]pyrene	2.3E-02				0.06	60	1.6E-05	3.8E-05	3.8E-7	--
Naphthalene		0.0200	5%	0.01900	0.06	15	4.1E-06	9.5E-06	--	0.000499
2-naphthylamine	1.8E+00				0.1	0.8	3.6E-07	8.4E-07	6.5E-7	--
									1.9E-5	**0.195**

Inhalation of Vapours (derived from Soil Source) Retail Worker or Car Park Attendant - 95% UCL

$$Inhalation\ Exposure\ Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Exposure Time (ET, hr/day)	8	Enhealth AEFG 2012
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assumed
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Working year
Exposure Duration (ED, years)	30	Exposures occur over working lifetime
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	3.7E-02	3.5E-03	8.2E-03	--	0.045
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	2.7E-01	2.6E-02	6.0E-02	--	0.066
Naphthalene		0.00300	5%	0.002850	3.1E-04	2.9E-05	6.8E-05	--	0.024
									0.136

Inhalation of Dust Outdoors (derived from Soil Source) Retail Worker - 95% UCL

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Exposure Time (ET, hr/day)	1	Assumed exposure to site related dust
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Working year
Exposure Duration (ED, years)	30	Exposures occur over working lifetime
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	1.2E-09	1.5E-11	3.4E-11	--	0.000000000190
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	1.2E-09	1.5E-11	3.4E-11	--	0.000000000038
TRH C15+ Aromatic		0.10500	10%	0.094500	9.4E-09	1.1E-10	2.6E-10	--	0.000000002711
TRH C15+ Aliphatic		7.00000	10%	6.300000	9.4E-09	1.1E-10	2.6E-10	--	0.000000000041
Benzo[a]anthracence	8.7E+00				3.7E-10	4.4E-12	1.0E-11	3.8E-11	--
Benzo[a]pyrene	8.7E+01				2.5E-10	2.9E-12	6.8E-12	2.5E-10	--
Benzo[b]&[k]fluoranthene	8.7E+00				4.7E-10	5.5E-12	1.3E-11	4.8E-11	--
Benzo[ghi]perylene	8.7E-01				1.2E-10	1.4E-12	3.2E-12	1.2E-12	--
Chrysene	8.7E-01				3.7E-10	4.4E-12	1.0E-11	3.8E-12	--
Dibenz[ah]anthracene	8.7E+01				7.8E-11	9.2E-13	2.1E-12	8.0E-11	--
Indeno[123cd]pyrene	8.7E+00				1.0E-10	1.2E-12	2.8E-12	1.1E-11	--
Naphthalene		0.00300	5%	0.002850	3.4E-11	4.0E-13	9.4E-13	--	0.000000000330
2-naphthylamine					2.5E-11	2.9E-13	6.8E-13	--	--
								4.4E-10	**0.0000000033**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data				Daily Exposure		Calculated Risk	
	Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Inhalation Exposure Concentration - NonThreshold mg/kg/day	Inhalation Exposure Concentration - Threshold mg/kg/day	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]anthracence								--
Benzo[a]pyrene								--
Benzo[b]&[k]fluoranthene								--
Benzo[ghi]perylene								--
Chrysene								--
Dibenz[ah]anthracene								--
Indeno[123cd]pyrene								--
Naphthalene								--
2-naphthylamine	1.8E+00				8.4E-14	2.0E-13	1.5E-13	--
							1.5E-13	

Exposure to Chemicals via Incidental Ingestion of Soil Retail Worker or Car Park Attendant - 95% UCL

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Ingestion Rate (IRs, mg/day)	25	As per Enhealth AEFG 2012
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	240	Working year
Exposure Duration (ED, years)	30	Exposures occur over working lifetime
Body Weight (BW, kg)	70	Adult
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	10950	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	40	4.0E-06	9.4E-06	--	0.000261
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	40	4.0E-06	9.4E-06	--	0.000104
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	300	3.0E-05	7.0E-05	--	0.002609
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	300	3.0E-05	7.0E-05	--	0.000039
Benzo[a]anthracence	2.3E-02				100%	12	1.2E-06	2.8E-06	2.8E-8	--
Benzo[a]pyrene	2.3E-01				100%	8	8.1E-07	1.9E-06	1.9E-7	--
Benzo[b]&[k]fluoranthene	2.3E-02				100%	15	1.5E-06	3.5E-06	3.5E-8	--
Benzo[ghi]perylene	2.3E-03				100%	3.7	3.7E-07	8.7E-07	8.7E-10	--
Chrysene	2.3E-03				100%	12	1.2E-06	2.8E-06	2.8E-9	--
Dibenz[ah]anthracene	2.3E-01				100%	2.5	2.5E-07	5.9E-07	5.9E-8	--
Indeno[123cd]pyrene	2.3E-02				100%	3.3	3.3E-07	7.7E-07	7.7E-9	--
Naphthalene		0.0200	5%	0.0190	100%	1.1	1.1E-07	2.6E-07	--	0.0000136
2-naphthylamine	1.8E+00				100%	0.8	8.1E-08	1.9E-07	1.4E-7	--
									4.7E-7	**0.00303**

Dermal Exposure to Chemicals via Contact with Soil Retail Worker or Car Park Attendant - 95% UCL

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ (mg/kg/day)

Parameters Relevant to Quantification of Exposure for Retail Worker or Car Park Attendant		
Surface Area (SAs, cm^2)	2200	Based on hands (Enhealth AEFG 2012)
Adherence Factor (AF, mg/cm^2)	0.51	Value for hands (USEPA 2011)
Fraction of Day Exposed	1	Assume the person remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	240	Working year
Exposure Duration (ED, years)	30	Exposures occur over working lifetime
Body Weight (BW, kg)	70	Adult
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	10950	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	40	3.6E-05	8.4E-05	--	0.002342
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	40	3.6E-05	8.4E-05	--	0.000937
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	300	2.7E-04	6.3E-04	--	0.023421
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	300	2.7E-04	6.3E-04	--	0.000351
Benzo[a]anthracence	2.3E-02				0.06	12	3.3E-06	7.6E-06	7.6E-8	--
Benzo[a]pyrene	2.3E-01				0.06	8	2.2E-06	5.1E-06	5.1E-7	--
Benzo[b]&[k]fluoranthene	2.3E-02				0.06	15	4.1E-06	9.5E-06	9.5E-8	--
Benzo[ghi]perylene	2.3E-03				0.06	3.7	1.0E-06	2.3E-06	2.3E-9	--
Chrysene	2.3E-03				0.06	12	3.3E-06	7.6E-06	7.6E-9	--
Dibenz[ah]anthracene	2.3E-01				0.06	2.5	6.8E-07	1.6E-06	1.6E-7	--
Indeno[123cd]pyrene	2.3E-02				0.06	3.3	8.9E-07	2.1E-06	2.1E-8	--
Naphthalene		0.0200	5%	0.01900	0.06	1.1	3.0E-07	7.0E-07	--	0.0000366
2-naphthylamine	1.8E+00				0.1	0.8	3.6E-07	8.4E-07	6.5E-7	--
									1.5E-6	**0.0271**

Calculation of Site Specific Trigger Levels

Estimation of Vapour Concentrations from Soil Source - SSTL Calculation

Site Specific Physical Input Parameters	Units	Abbrev.	Value	Comments
Vadose Zone Layer 2 Characteristics				***Fill Materials***
Depth of Layer	[m]	vd2	**0.2**	Average depth of soil impacts
Moisture Content	[cm^3/g]	mocon2	**0.08**	Default value for fill materials (CRC CARE 2011)
Organic Carbon Fraction	-	foc2	**0.003**	Assumed
Soil Bulk Density	[g/cm^3]	rhob2	**1.625**	Default value for fill materials (CRC CARE 2011)
Density of Solids	[g/cm^3]	sd2	2.65	site-specific assumption
Total Soil Porosity	[cm^3/cm^3]	theta2	0.39	1 - (rhob2/sd2)
Volumetric Water Content	[cm^3/cm^3]	wacon2	0.130	mocon2*rhob2
Volumetric Air Content	[cm^3/cm^3]	acon2	0.257	theta2-wacon2

Receptor Specific Input Parameters	Units	Abbrev.	Value	Comments
Building Characteristics				
Depth of Basement	[m]	basement	**0**	Slab on grade building
Width of Building	[m]	bwidth	**10**	Assumed area of separate room within main building
Length of Building	[m]	blength	**10**	Assumed area of separate room within main building
Area of Building Below Ground Level	[m^2]	area	100.0	Calculated from building dimensions
Foundation/wall thickness	[m]	fthick	0.10	Minimum default from BCA
Building Mixing Height	[m]	boxh	**2.4**	Height from building plans
Hourly Volume Exchange of Fresh Air	[exch/hr]	exchanges	**2**	Assumed - commercial/retail minimum requirement
Fraction of Cracks in Walls and foundation	-	cracks	**0.001**	Default Value for type of building, USEPA 2003
Qbuilding	[cm^3/s]	Qb	133333.3	Calculated, USEPA 2003
Is advective vapour flow significant?	-	Adv	yes	Based on building type/assumptions adopted
Qsoil	[cm^3/s]	Qs	83.3	Calculated from default of 5L/min (USEPA 2003)
Acrack	[cm^2]	Ac	1000	Calculated from building area and crack ratio, USEPA 2003
Volumetric Water Content in foundation/wall cracks	[cm^3/cm^3]	fwacon	0.12	Default Value
Volumetric Air Content in foundation/wall cracks	[cm^3/cm^3]	facon	0.260	Default Value
Outdoor Air Characteristics				
Depth of Excavation	[m]	exdepth	**1.5**	Assumed for most excavations likely to be undertaken
Length of Contaminated Area	[m]	length	**20**	Assumed area outdoors contributing to outdoor concentration
Width of Contaminated Area	[m]	width	**20**	Assumed area outdoors contributing to outdoor concentration
Length of Excavation through contamination	[m]	exlength	**10**	Assumed for excavation - contributing to concentration
Wind Speed Outdoors	[m/s]	wspd	**3.8**	Mean windspeed from 9am and 3pm readings from Observatory Hill
Wind Speed in Excavation	[m/s]	exwspd	**0.5**	Low wind speed in excavation
Height of Outdoor Mixing Zone	[m]	outboxh	1.5	Default Value

Chemical Specific Parameters	Water Solubility (mg/L)	MW (g/mol)	Koc (cm^3/g)	Air Diffusion Coefficient (cm^2/s)	Water Diffusion Coefficient (cm^2/s)	Vapour Pressure (mmHg)	Henry's Law Constant (unitless)
TRH C10-C14 Aromatic	25	130	2510	0.1	1.0E-05	0.48	0.14
TRH C10-C14 Aliphatic	0.034	160	316000	0.1	1.0E-05	0.48	130
Naphthalene	31	128.16	933	0.0605	8.4E-06	0.087	0.018

Vapour Transport Calculations	Deff Layer 1 (cm^2/s)	Deff Layer 2 (cm^2/s)	Deff Foundations and Cracks (cm^2/s)	Total Effective Diffusion (source to surface) (cm^2/s)
TRH C10-C14 Aromatic		7.20E-3	5.04E-3	7.20E-3
TRH C10-C14 Aliphatic		7.19E-3	5.04E-3	7.19E-3
Naphthalene		4.36E-3	3.05E-3	4.36E-3

Phase Partitioning Results	Soil Concentration (mg/kg)	Vapour Phase Concentration (g/cm^3)	Saturated Soil Concentration (mg/kg)	Saturated Vapour Concentration (g/cm^3)	Mole Fraction (mol/mol)	Concentration above Free Phase (g/cm^3)	Vapour Phase used in Calculation (g/cm^3)
TRH C10-C14 Aromatic	180	3.3E-07	1.9E+02	3.5E-06	0	0.0E+00	**3.3E-07**
TRH C10-C14 Aliphatic	180	2.4E-06	3.3E+01	4.3E-06	0	0.0E+00	**2.4E-06**
Naphthalene	7	4.4E-09	8.9E+01	6.2E-07	0	0.0E+00	**4.4E-09**

Calculated Air Concentrations	Vapour Phase Concentration at Source (ug/m^3)	Vapour Phase Concentration at Source (mg/m^3)	JE Attenuation Coefficient (unitless)	Enclosed Space Concentration - Retail Ground Floor (mg/m^3)	Enclosed Space Concentration - Residential First Floor (mg/m^3)	Outdoor Air Concentration (mg/m^3)	Excavation Air Concentration (mg/m^3)
TRH C10-C14 Aromatic	3.3E+05	3.3E+02	5.1E-04	**1.7E-01**	**1.7E-02**	**4.2E-03**	**3.2E-02**
TRH C10-C14 Aliphatic	2.4E+06	2.4E+03	5.1E-04	**1.2E+00**	**1.2E-01**	**3.0E-02**	**2.3E-01**
Naphthalene	4.4E+03	4.4E+00	4.5E-04	**2.0E-03**	**2.0E-04**	**3.3E-05**	**2.5E-04**

Soil to Air Particulate Emission Factor (PEF) - Rest of Site

(Reference: USEPA Soil Screening Guidance (1996), Supplemental Guidance (2002))

$$PEF = \frac{Q/C \bullet 3600}{0.036 \bullet (1-V) \bullet (\frac{U_m}{U_t})^3 \bullet F_x}$$

where:		Site Data	Comments
A	area of site (acres)	**9.40**	Area of concern covers approx. 4 ha
Q/C =	dispersion factor (g/m^2/s per kg/m^3)	**57.52**	Calculated using equations for outdoor worker from USEPA, 2001
V =	fraction of vegetative cover (unitless)	**0**	Assume no vegetation cover most of the time
U_m =	mean annual windspeed (m/s)	**3.8**	Mean windspeed from 9am and 3pm readings from Sydney Observatory Hill
U_t =	equivalent threshold value (m/s)	**11.3**	Calculated for a threshold velocity of 1 m/s (USEPA, 1996)
U_t/U_m =	ratio of threshold value to windspeed	**3.0**	Ratio
F_x =	windspeed distribution function (unitless)	**4.74E-03**	Value based on Ut/Um ratio, Cowherd (1985)

PEF = 3.21E+10 (m^3/kg)

COPC	Soil Concentration, C_{soil} (mg/kg)	Dust Concentration C_{dust} [$=C_{soil}$/PEF] (mg/m^3)
TRH C10-C14 Aromat	180	5.6E-09
TRH C10-C14 Aliphati	180	5.6E-09
TRH C15+ Aromatic	1250	3.9E-08
TRH C15+ Aliphatic	1250	3.9E-08
Benzo[a]anthracence	0	0.0E+00
Benzo[a]pyrene TEFs	50	1.6E-09
Benzo[b]fluoranthene	0	0.0E+00
Benzo[ghi]perylene	0	0.0E+00
Benzo[k]fluoranthene	0	0.0E+00
Chrysene	0	0.0E+00
Dibenz[ah]anthracene	0	0.0E+00
Indeno[123cd]pyrene	0	0.0E+00
Naphthalene	7	2.2E-10
2-naphthylamine	0.8	2.5E-11

PEF for fugitive dust emissions considered relevant for the quantification of inhalation exposures by outdoor workers on a residential or commercial/industrial site (including gardening and landscaping activities). However it is noted that the fugitive model may not be relevant for activities and conditions that may result in the generation of potentially high dust emissions such as dry soils (MC<8%), fine soils (high silt or clay content), high annual average winds (>5.3 m/s) and less than 50% vegetative cover.

Soil to Air Particulate Emission Factor (PEF) - Open Space Areas

(Reference: USEPA Soil Screening Guidance (1996), Supplemental Guidance (2002))

$$PEF = \frac{Q/C \bullet 3600}{0.036 \bullet (1-V) \bullet (\frac{U_m}{U_t})^3 \bullet F_x}$$

where:		Site Data	Comments
A	area of site (acres)	**9.40**	Area of concern covers approx. 4 ha
Q/C =	dispersion factor (g/m^2/s per kg/m^3)	**57.52**	Calculated using equations for outdoor worker from USEPA, 2001
V =	fraction of vegetative cover (unitless)	**0**	Assume no vegetation cover most of the time
U_m =	mean annual windspeed (m/s)	**3.8**	Mean windspeed from 9am and 3pm readings from Sydney Observatory Hill
U_t =	equivalent threshold value (m/s)	**11.3**	Calculated for a threshold velocity of 1 m/s (USEPA, 1996)
U_t/U_m =	ratio of threshold value to windspeed	**3.0**	Ratio
F_x =	windspeed distribution function (unitless)	**4.74E-03**	Value based on Ut/Um ratio, Cowherd (1985)

PEF = 3.21E+10 (m^3/kg)

COPC	Soil Concentration, C_{soil} (mg/kg)	Dust Concentration C_{dust} [=C_{soil}/PEF] (mg/m^3)
TRH C10-C14 Aromat	180	5.6E-09
TRH C10-C14 Aliphati	180	5.6E-09
TRH C15+ Aromatic	1250	3.9E-08
TRH C15+ Aliphatic	1250	3.9E-08
Benzo[a]anthracence	0	0.0E+00
Benzo[a]pyrene TEFs	20	6.2E-10
Benzo[b]fluoranthene	0	0.0E+00
Benzo[ghi]perylene	0	0.0E+00
Benzo[k]fluoranthene	0	0.0E+00
Chrysene	0	0.0E+00
Dibenz[ah]anthracene	0	0.0E+00
Indeno[123cd]pyrene	0	0.0E+00
Naphthalene	7	2.2E-10
2-naphthylamine	0.8	2.5E-11

PEF for fugitive dust emissions considered relevant for the quantification of inhalation exposures by outdoor workers on a residential or commercial/industrial site (including gardening and landscaping activities). However it is noted that the fugitive model may not be relevant for activities and conditions that may result in the generation of potentially high dust emissions such as dry soils (MC<8%), fine soils (high silt or clay content), high annual average winds (>5.3 m/s) and less than 50% vegetative cover.

Exposure to Chemicals via Incidental Ingestion of Soil Recreational Child - Site Specific Trigger Levels - Open Space

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad (mg/kg/day)$$

Parameters Relevant to Quantification of Exposure to Recreational Child		
Ingestion Rate (IRs, mg/day)	100	As per Enhealth AEFG 2012
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	160	Average number of dry days
Exposure Duration (ED, years)	6	Exposures occur over childhood (0-5 years)
Body Weight (BW, kg)	15	Average for 2-3 year old enHealth AEFG 2012
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	2190	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	180	4.5E-05	5.3E-04	--	0.0146
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	180	4.5E-05	5.3E-04	--	0.0058
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	1250	3.1E-04	3.7E-03	--	0.135
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	1250	3.1E-04	3.7E-03	--	0.0020
Benzo[a]anthracence	2.3E-02				100%				--	--
Benzo[a]pyrene TEFs	2.3E-01				100%	20	2.7E-05	5.8E-05	6.2E-6	--
Benzo[b]fluoranthene	2.3E-02				100%				--	--
Benzo[ghi]perylene	2.3E-03				100%				--	--
Benzo[k]fluoranthene	2.3E-02				100%				--	--
Chrysene	2.3E-03				100%				--	--
Dibenz[ah]anthracene	2.3E-01				100%				--	--
Indeno[123cd]pyrene	2.3E-02				100%				--	--
Naphthalene		0.0200	5%	0.0190	100%	7	1.8E-06	2.0E-05	--	0.00108
2-naphthylamine	1.8E+00				100%	0.8	2.0E-07	2.3E-06	3.6E-7	--
									6.5E-6	**0.159**

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Dermal Exposure to Chemicals via Contact with Soil Recreational Child - Site Specific Trigger Levels - Open Space

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ (mg/kg/day)

Parameters Relevant to Quantification of Exposure for Recreational Child		
Surface Area (SAs, cm^2)	2700	Based on hands (Enhealth AEFG 2012)
Adherence Factor (AF, mg/cm^2)	0.51	Value for hands (USEPA 2011)
Fraction of Day Exposed	1	Assume the child remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	160	Average number of dry days
Exposure Duration (ED, years)	6	Exposures occur over childhood (0-5 years)
Body Weight (BW, kg)	15	Average for 2-3 year old enHealth AEFG 2012
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	2190	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	180	1.2E-04	1.4E-03	--	0.0402
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	180	1.2E-04	1.4E-03	--	0.0161
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	1250	8.6E-04	1.0E-02	--	0.373
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	1250	8.6E-04	1.0E-02	--	0.00559
Benzo[a]anthracence	2.3E-02				0.06				--	--
Benzo[a]pyrene TEFs	2.3E-01				0.06	20	2.2E-05	4.8E-05	5.1E-6	--
Benzo[b]fluoranthene	2.3E-02				0.06				--	--
Benzo[ghi]perylene	2.3E-03				0.06				--	--
Benzo[k]fluoranthene	2.3E-02				0.06				--	--
Chrysene	2.3E-03				0.06				--	--
Dibenz[ah]anthracene	2.3E-01				0.06				--	--
Indeno[123cd]pyrene	2.3E-02				0.06				--	--
Naphthalene		0.0200	5%	0.01900	0.06	7	1.4E-06	1.7E-05	--	0.000890
2-naphthylamine	1.8E+00				0.1	0.8	2.8E-07	3.2E-06	5.0E-7	--
									5.6E-6	**0.435**

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Inhalation of Dust and Vapours Outdoors (derived from Soil Source) Recreational Site User - Site Specific Trigger Levels - Open Space

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Recreational Site User		
Exposure Time (ET, hr/day)	2	Assumed exposure to site related dust
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	265	Time spent on site undertaking intrusive works
Exposure Duration (ED, years)	6	Time spent on site undertaking intrusive works
Age Dependent Adjustment Weighting Factor	5.3	10 fold for first 2 years of life and 3 fold for next 4 years
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	52560	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	4.2E-03	2.2E-05	2.5E-04	--	0.001401
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	3.0E-02	1.6E-04	1.8E-03	--	0.0020
TRH C15+ Aromatic		0.10500	10%	0.094500	3.9E-08	2.0E-10	2.4E-09	--	0.000000025
TRH C15+ Aliphatic		7.00000	10%	6.300000	3.9E-08	2.0E-10	2.4E-09	--	0.0000000004
Benzo[a]anthracence	8.7E+00							--	--
Benzo[a]pyrene TEFs	8.7E+01				6.2E-10	1.7E-11	3.8E-11	1.5E-9	--
Benzo[b]fluoranthene	8.7E+00							--	--
Benzo[ghi]perylene	8.7E-01							--	--
Benzo[k]fluoranthene	8.7E+00							--	--
Chrysene	8.7E-01							--	--
Dibenz[ah]anthracene	8.7E+01							--	--
Indeno[123cd]pyrene	8.7E+00							--	--
Naphthalene		0.00300	5%	0.002850	3.3E-05	1.7E-07	2.0E-06	--	0.0007
2-naphthylamine					2.5E-11	1.3E-13	1.5E-12	--	--
								1.5E-9	**0.0042**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data				Daily Exposure		Calculated Risk		
	Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Inhalation Exposure Concentration - NonThreshold mg/kg/day	Inhalation Exposure Concentration - Threshold mg/kg/day	Non-Threshold Risk (unitless)	% Total Risk	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic			10%		6.2E-06	7.2E-05			--
TRH C10-C14 Aliphatic			10%		4.5E-05	5.3E-04			--
TRH C15+ Aromatic			10%		5.8E-11	6.7E-10			--
TRH C15+ Aliphatic			10%		5.8E-11	6.7E-10			--
Benzo[a]anthracence									--
Benzo[a]pyrene TEFs					4.9E-12	1.1E-11			--
Benzo[b]fluoranthene									--
Benzo[ghi]perylene									--
Benzo[k]fluoranthene									--
Chrysene									--
Dibenz[ah]anthracene									--
Indeno[123cd]pyrene									--
Naphthalene			5%		5.0E-08	5.8E-07			--
2-naphthylamine	1.8E+00				3.7E-14	4.3E-13	6.7E-14		--
							6.7E-14		

Note - age dependent adjustment factor included in daily intake calculation for carcinogenic PAHs

Inhalation of Vapours (derived from Soil Source) Residential Site User - Site Specific Trigger Levels

$$\textit{Inhalation Exposure Conc}_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Residential Site Users		
Exposure Time (ET, hr/day)	20	Enhealth AEFG 2012
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assumed
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	365	Assumed for residents
Exposure Duration (ED, years)	30	Assumed for residents
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	1.7E-02	6.0E-03	1.4E-02	--	0.0776
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	1.2E-01	4.4E-02	1.0E-01	--	0.1135
Naphthalene		0.00300	5%	0.002850	2.0E-04	7.1E-05	1.6E-04	--	0.0578
									0.251

Inhalation of Vapours (derived from Soil Source) Retail Worker or Car Park Attendant - Site Specific Trigger Level Calculations - Rest of Site

$$Inhalation\ Exposure\ Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Exposure Time (ET, hr/day)	8	Enhealth AEFG 2012
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assumed
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Time spent on site undertaking intrusive works
Exposure Duration (ED, years)	30	Time spent on site undertaking intrusive works
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data				Concentration	Daily Exposure		Calculated Risk	
	Inhalation Unit Risk $(mg/m^3)^{-1}$	Chronic TC air (mg/m^3)	Background Intake (% Chronic TC)	Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	in Air (Ca) (mg/m^3)	Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Inhalation Exposure Concentration - Threshold (mg/m^3)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	1.7E-01	1.6E-02	3.7E-02	--	0.204
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	1.2E+00	1.2E-01	2.7E-01	--	0.299
Naphthalene		0.00300	5%	0.002850	2.0E-03	1.9E-04	4.3E-04	--	0.152
									0.659

Exposure to Chemicals via Incidental Ingestion of Soil Retail Worker or Car Park Attendant - Site Specific Trigger Level Calculations - Rest of Site

$$Daily\ Chemical\ Intake_{IS} = C_S \bullet \frac{IR_S \bullet FI \bullet CF \bullet B \bullet EF \bullet ED}{BW \bullet AT} \quad \text{(mg/kg/day)}$$

Parameters Relevant to Quantification of Exposure to Retail Worker or Car Park Attendant		
Ingestion Rate (IRs, mg/day)	25	As per Enhealth AEFG 2012
Fraction Ingested from Source (FI, unitless)	100%	Assumed to be 100%
Bioavailability (B)	100%	Relevant to all CoPC considered
Exposure Frequency (EF, days/year)	240	Working year
Exposure Duration (ED, years)	30	Working lifetime
Body Weight (BW, kg)	70	Adult
Conversion Factor (CF)	1.00E-06	conversion from mg to kg
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	10950	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Bioavailability (%)	(mg/kg)	NonThreshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.0360	100%	180	1.8E-05	4.2E-05	--	0.0012
TRH C10-C14 Aliphatic		0.1000	10%	0.0900	100%	180	1.8E-05	4.2E-05	--	0.0005
TRH C15+ Aromatic		0.0300	10%	0.0270	100%	1250	1.3E-04	2.9E-04	--	0.011
TRH C15+ Aliphatic		2.0000	10%	1.8000	100%	1250	1.3E-04	2.9E-04	--	0.0002
Benzo[a]pyrene TEFs	2.3E-01				100%	50	5.0E-06	1.2E-05	1.2E-6	--
Naphthalene		0.0200	5%	0.0190	100%	7	7.0E-07	1.6E-06	--	0.00009
2-naphthylamine	1.8E+00				100%	0.8	8.1E-08	1.9E-07	1.4E-7	--
									1.3E-6	**0.013**

Dermal Exposure to Chemicals via Contact with Soil Retail Worker or Car Park Attendant - Site Specific Trigger Level Calculations - Rest of Site

$$Daily\ Chemical\ Intake_{DS} = C_S \bullet \frac{SA_S \bullet AF \bullet FE \bullet ABS \bullet CF \bullet EF \bullet ED}{BW \bullet AT}$$ (mg/kg/day)

Parameters Relevant to Quantification of Exposure for Retail Worker or Car Park Attendant		
Surface Area (SAs, cm^2)	2200	Based on hands (Enhealth AEFG 2012)
Adherence Factor (AF, mg/cm^2)	0.51	Value for hands (USEPA 2011)
Fraction of Day Exposed	1	Assume the person remains dirty for a whole day
Conversion Factor (CF)	1.E-06	Conversion of units
Dermal absorption (ABS, unitless)	Chemical-specific (as below)	
Exposure Frequency (EF, days/yr)	240	working year
Exposure Duration (ED, years)	30	working lifetime
Body Weight (BW, kg)	70	Adult
Averaging Time - NonThreshold (Atc, days)	25550	USEPA 1989 and CSMS 1996
Averaging Time - Threshold (Atn, days)	10950	USEPA 1989 and CSMS 1996

Key Chemical	Toxicity Data					Concentration in Soil (Cs)	Daily Intake		Calculated Risk	
	Non-Threshold Slope Factor (mg/kg-day)$^{-1}$	Threshold TDI (mg/kg/day)	Background Intake (% TDI)	TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Dermal Absorption (ABS)	(mg/kg)	Non-Threshold (mg/kg/day)	Threshold (mg/kg/day)	Non-Threshold Risk (unitless)	Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.0400	10%	0.03600	0.2	180	1.6E-04	3.8E-04	--	0.0105
TRH C10-C14 Aliphatic		0.1000	10%	0.09000	0.2	180	1.6E-04	3.8E-04	--	0.0042
TRH C15+ Aromatic		0.0300	10%	0.02700	0.2	1250	1.1E-03	2.6E-03	--	0.098
TRH C15+ Aliphatic		2.0000	10%	1.80000	0.2	1250	1.1E-03	2.6E-03	--	0.00146
Benzo[a]pyrene TEFs	2.3E-01				0.06	50	1.4E-05	3.2E-05	3.2E-6	--
Naphthalene		0.0200	5%	0.01900	0.06	7	1.9E-06	4.4E-06	--	0.000233
2-naphthylamine	1.8E+00				0.1	0.8	3.6E-07	8.4E-07	6.5E-7	--
									3.8E-6	**0.114**

Inhalation of Dust Outdoors (derived from Soil Source) Retail Worker - Site Specific Trigger Level Calculations - Rest of Site

$$Inhalation\,Exposure\,Conc_P = C_a \bullet \frac{ET \bullet FI \bullet DF \bullet CC \bullet EF \bullet ED}{AT} \quad (mg/m^3)$$

Parameters Relevant to Quantification of Exposure to Recreational Site User		
Exposure Time (ET, hr/day)	1	Assumed exposure to site related dust
Fraction Inhaled from Contaminated Source (FI, unitless)	1	Assume all of dust is from site related soil
Deposition Fraction (DF, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Cilliary Clearance (CC, unitless)	1	Assume dust generated is small enough to penetrate into lungs
Exposure Frequency (EF, days/yr)	240	Time spent on site undertaking intrusive works
Exposure Duration (ED, years)	30	Time spent on site undertaking intrusive works
Averaging Time - NonThreshold (Atc, hours)	613200	USEPA 2009
Averaging Time - Threshold (Atn, hours)	262800	USEPA 2009

Key Chemical	Toxicity Data: Inhalation Unit Risk $(mg/m^3)^{-1}$	Toxicity Data: Chronic TC air (mg/m^3)	Toxicity Data: Background Intake (% Chronic TC)	Toxicity Data: Chronic TC Allowable for Assessment (TC-Background) (mg/m^3)	Concentration in Air (Ca) (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold (mg/m^3)	Daily Exposure: Inhalation Exposure Concentration - Threshold (mg/m^3)	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic		0.20000	10%	0.180000	5.6E-09	6.6E-11	1.5E-10	--	0.00000000085
TRH C10-C14 Aliphatic		1.00000	10%	0.900000	5.6E-09	6.6E-11	1.5E-10	--	0.00000000017
TRH C15+ Aromatic		0.10500	10%	0.094500	3.9E-08	4.6E-10	1.1E-09	--	0.00000001130
TRH C15+ Aliphatic		7.00000	10%	6.300000	3.9E-08	4.6E-10	1.1E-09	--	0.00000000017
Benzo[a]pyrene TEFs	8.7E+01				1.6E-09	1.8E-11	4.3E-11	1.6E-9	--
Naphthalene		0.00300	5%	0.002850	2.2E-10	2.6E-12	6.0E-12	--	0.00000000210
2-naphthylamine					2.5E-11	2.9E-13	6.8E-13	--	--
								1.6E-9	**0.000000015**

INHALATION RISK ASSESSED VIA ORAL EXPOSURE GUIDANCE VALUES

Key Chemical	Toxicity Data: Non-Threshold Slope Factor $(mg/kg\text{-}day)^{-1}$	Toxicity Data: Threshold TDI (mg/kg/day)	Toxicity Data: Background Intake (% TDI)	Toxicity Data: TDI Allowable for Assessment (TDI-Background) (mg/kg/day)	Daily Exposure: Inhalation Exposure Concentration - NonThreshold mg/kg/day	Daily Exposure: Inhalation Exposure Concentration - Threshold mg/kg/day	Calculated Risk: Non-Threshold Risk (unitless)	Calculated Risk: Chronic Hazard Quotient (unitless)
TRH C10-C14 Aromatic								--
TRH C10-C14 Aliphatic								--
TRH C15+ Aromatic								--
TRH C15+ Aliphatic								--
Benzo[a]pyrene TEFs								--
Naphthalene								--
2-naphthylamine	1.8E+00				8.4E-14	2.0E-13	1.5E-13	--
							1.5E-13	