RESPONSE TO SUBMISSIONS

Report

June 2017

ACS Management Project

AECOM

CALTEX

Response to Submissions

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21-Jun-2017

Job No.: 60488804

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Quality Information

Document Response to Submissions

Ref 60488804

Date 21-Jun-2017

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Reviewed by William Miles

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
01	18-Jan-2017	Draft - Response to Submissions	William Miles Associate Director - Environment	
02	21-Jun-2017	Final following comment from regulators	William Miles Associate Director - Environment	

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1.0 Introduction

1.1 Project Context

Caltex Australia Pty Ltd (hereafter referred to as Caltex) operates the Kurnell Terminal (the 'Site') on the southern side of Botany Bay, in Kurnell, NSW (refer to **Figure 1-1**). Between 1956 and 2014 the Site was used as both an oil refinery and a fuel terminal. In July 2012, Caltex announced that it would progress with converting the refinery to a finished product terminal (the 'Project'). In 2014 refining ceased and now the main purpose of the Site is as a fuel import terminal, although other ancillary and related operations also occur.

The primary objective of the Project was and remains "*to establish a viable, safe, reliable and sustainable finished product import terminal at Kurnell*". This includes providing a safe working environment at the terminal and also ensuring that the operation is not burdened by unnecessary costs.

The Project has been divided into two phases:

1. converting infrastructure to allow the Site to operate as a terminal and shutdown the refinery (the conversion works); and
2. demolition and removal of redundant infrastructure (the demolition works).

Caltex has received development consent to complete the conversion (SSD 5544) and demolition works (SSD 5544 MOD1).

During the two phases of the Project Caltex highlighted that certain parts of the Site contain Asbestos Contaminated Soils (ACSs). Potential options for managing ACSs were identified, one of which included containment on-site.

The ACSs are considered a potential health and safety risk for those working on parts of the Site where it is present, but importantly, the level of asbestos in the soils does not present a risk to the wider environment. Its presence is largely due to the historic use and subsequent degradation of asbestos containing materials (ACM) at the Site when it was operating as a refinery. The Kurnell Pipeways Asbestos Classification Report (AECOM, 2016a) identified that ACS is predominantly but not exclusively located within the certain sections of the pipeways that cross the Site (the 'pipeways').

Based on the presence of asbestos, Caltex require an Exemption Order under Section 419 of the *Work, Health and Safety Regulation 2011* in order to complete activities within the pipeways including conversion and demolition activities, routine maintenance, sampling, valve operations, weed removal etc. Further, Caltex staff and contractors require special processes and equipment in order to work in these areas. This ongoing maintenance and operation work is required to maintain the safety of the Site, its employees and the local community.

ACSs contained within the pipeways are currently being managed in situ, however in order to remove the ongoing health and safety risks and the operational constraints, Caltex proposed to excavate and place ACSs within an on-site containment cell (the ACS Modification works). The location of the ACS Modification works area is shown on **Figure 1-2**. Only ACS from the Site would be placed in this cell.

Caltex is seeking approval for the ACS Modification works as a modification to development consent SSD 5544 under S.96 (2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as the works are a continuation of the conversion process, but have identified potential impacts that were not considered under the initial consent. The end result of these works would be substantially the same development as the approved Project under SSD 5544.

This Statement of Environmental Effects (SEE) has been prepared to support the application for the ACS Modification works. The SEE was placed on exhibition for a minimum period of 14 days from 19 October 2016 up to and including 2 November 2016. Following exhibition of the SEE, the Department of Planning and Environment (DPE) provided Caltex with a number of submissions. This report responds to and addresses these submissions. Further detail in relation to the assessment process is provided in **Section 1.5** of this report.

1.2 Project Location

The Site is located on the Kurnell Peninsula within the Sutherland Shire Local Government Area (LGA), approximately 15 km south of Sydney's Central Business District. The Site is approximately 187 ha in size and consists of a number of lots and deposited plans.

1.3 Project Scope Modification

Since the exhibition of the SEE and receipt of the majority of the submissions, extensive consultation has been undertaken with the NSW Environment Protection Authority (NSW EPA) and DPE in regards to the proposed management of ACS from the pipeways classified as hazardous waste (the hazardous ACS) under the NSW EPA Waste Classification Guidelines.

The original proposal described in the SEE was to excavate and transport the hazardous ACS to an area on the Site where it would be potentially homogenised and biopiled under control conditions until it could be classified as 'restricted solid waste' as a minimum. If following biopiling the ACS could be classified as 'restricted solid waste', then this material would be moved to the proposed containment cell. Hazardous ACS that could not be classified as 'restricted solid waste' or 'general solid waste' would be sent off-site and disposal at an appropriately licenced facility. The biopiling process is described in more detail in section 4.4.2 of the SEE.

The EPA provided submissions to the SEE dated 2 November 2016 and 3 February 2017, which requested additional information to be provided by Caltex on the ACS Modification, in particular the management of asbestos during the homogenisation and biopiling process. Caltex provided a response to these submissions in a Draft Response to Submissions (RTS) Report, dated 10 January 2017, and Addendum Letter, dated 1 March 2017. Caltex met with the NSW EPA and DPE on 17 February 2017 to discuss the proposed modification and the issues raised by the NSW EPA.

On the basis of information provided to the NSW EPA, the NSW EPA provided a submission to DPE dated 16 May 2017, which stated that "*the NSW EPA does not support the proposed homogenisaton and biopiling treatment process to manage the ACS classified as hazardous waste. The EPA proposes that a way forward to manage the ACS is via an onsite containment cell without the homogenisation and biopiling treatment, subject to appropriate conditions*". In arriving at this position, the NSW EPA took into consideration a number of matters including the following:

- *"The handling of ACS should be minimised as far as practicable to reduce the potential for mobilisation of asbestos fibres.*
- *The method of homogenisation and biopiling process (including construction, treatment and deconstruction) has the potential to mobilise asbestos fibres.*
- *The homogenisation process involves dilution of the ACS classified as hazardous waste which increases the volume of soil requiring treatment. This is not consistent with the EPA's general waste classification principles.*
- *All the ACS was proposed to be placed into an onsite containment cell. An Asbestos Containment Cell Concept Design Report dated 29 September 2016 was provided in Appendix B of the SEE.*
- *Requirements that the EPA has applied to the use of containment cells to manage waste materials generated onsite at other premises.*
- *The concerns raised by the public submissions regarding asbestos management at the site"*.

The NSW EPA requested additional information is provided to assess the revised method for management of ACS classified as hazardous waste via direct placement within the containment cell.

This RtS Report provides a consolidated response to the three submissions provided by the NSW EPA on the 2 November 2016, 3 February 2017 and 16 May 2017. A copy of these submissions is provided in **Appendix A**.

1.4 Revised Project Description

Given the discussions and recommendations of the NSW EPA and the agreed design changes, the ACS Modification works as currently proposed now broadly involve the following activities:

- Construction:
  - Additional soil sampling within the pipeways to confirm the waste classification of the soil prior to placement in the containment cell;
  - Construction of the containment cell base and leachate collection system in the proposed cell location;
  - Installation of ground water monitoring wells down gradient of the proposed cell location;
  - Excavation and transportation of ACSs directly to the containment cell location for emplacement;
  - Filling and compaction of the ACSs into the containment cell;
  - Environmental management of the containment cell;
  - Verifying the removal of ACS from the pipeways; and
  - Closure of the containment cell.
- Operation:
  - Managing and monitoring the closed containment cell.

It is proposed that the containment cell would predominantly be used to dispose of ACSs from the pipeways in order to remove the hygiene risk and remove the WHS Regulation Exemption. However, Caltex are also proposing to dispose of ACSs from other parts of the Site if there is available capacity following disposal of the pipeway ACSs. These ACSs would need to be classified as either Special General Solid Waste or Special Restricted Solid Waste to be placed within the cell. All soils that would be placed within the containment cell would only be sourced from the Site. No material from off site would be accepted in the containment cell.

Equally, it's important to note that SSD 5544 MOD1 provided consent for the excavation, handling, management and transport of ACS at the Site. As such, the modification for the ACS Modification works does not require consent for the excavation, handling and transport of ACS from other parts of the Site (i.e. outside of the pipeways) to the containment cell. Indeed as the demolition works assessed the management of contaminated soils and ACS, the DEMP that is being used to manage these works contains a large number of measures that would be relevant to, and used to manage the ACS Modification works.

The works to construct, fill and close the cell are estimated to take approximately 18 months.

Further details regarding the Project can be found in Chapter 4 of the SEE.

1.5 Project Determination Process

The Project was identified as a State Significant Development (SSD) in accordance with Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011*, and is subject to the provisions of Part 4 of the EP&A Act. As such, a SEE was prepared to support the modification application for the demolition works in line with the requirements of S.96 (2) of the EP&A Act.

The SEE was placed on public exhibition between 19 October 2016 and 2 November 2016. Submissions were invited from anyone with an interest in the Project, including government authorities, private industry and members of the community. A total of 9 submissions were received from government authorities by DPE during the exhibition period. 27 submissions were received from the community, including one form letter (7 submissions) and one submission from the Kurnell Progress Association. The DPE sent these submissions to Caltex between the 25 October and 13 December 2016. In additional, as described in **Section 1.3** above, the NSW EPA have also provided additional submissions.

This RTS report has been prepared to respond to the issues raised in the submissions. In light of these responses, if alterations to the management and mitigation measures contained in the SEE are required, these changes are documented in **Chapter 11** of this report.

Following acceptance of the RTS report, the modification application will undergo assessment by DPE. DPE will prepare an assessment report for the ACS Modification works, taking into account relevant comments received from stakeholders. The assessment report will then be submitted to the Planning Assessment Commission (PAC) for determination under powers delegated from the Minister.

1.6 Document Structure

This report comprises the following:

- Chapter 1: Introduction including background and context
- Chapter 2: Summary of consultation during and after the exhibition stage
- Chapters 3 – 9: Response to the submissions
- Chapter 10: Project Scope Modification
- Chapter 11: The revised Management and Mitigation Measures for the ACS Modification works

The submissions report is supported by the following Appendices:

- Appendix A: A copy of the submissions from public bodies received in full
- Appendix B: A summary of the issues raised by the public in their submissions.
- Appendix C: Original Management and Mitigation Measures from the SEE
- Appendix D: Example Asbestos Control Plans and Decontamination Procedures
- Appendix E: BioCover product information sheet
- Appendix F: Draft Remediation Action Plan

KEY

- The Site
- Caltex Land Ownership
- Towra Point Aquatic Reserve
- National Park
- Towra Point Nature Reserve

AECOM

0 100 200 400 m

SCALE 1:15,000 | SIZE A3

SHEET 01 of 01 | COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE **FIGURE 1-1** - SITE LOCATION

PROJECT KURNELL ACS MODIFICATION

CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD

DRAWN	DATE	MAP #	REV	Project
MJB	29/09/2016	G001	03	60488804
CHECK WM	DATE 30/09/2016			

KEY

- The Site
- Caltex Land Ownership
- ACS Modification Works Area
- Pipeways to be excavated
- Special General & Special Restricted Soil in Pipeways
- Special Hazardous Soil in Pipeways
- Containment Cell Works Area

AECOM

0 50 100 200 m

Disclaimer Spatial data used under licence from Land and Property Management Authority, NSW © 2016.

AECOM makes no representations or warranties of any kind, about the accuracy, reliability, completeness, suitability or fitness for purpose in relation to the map content.

SCALE 1:9,000	SIZE A3
SHEET 01 of 01	COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE
FIGURE 1.2 - PROPOSED ACS MODIFICATION FINAL

PROJECT
KURNELL ACS MODIFICATION

CLIENT
CALTEX PETROLEUM AUSTRALIA PTY LTD

DRAWN	DATE	MAP #	REV	Project
MJB	24-May-17			
CHECK WM	DATE 30/09/2016	G002 04		60488804

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2.0 Exhibition Consultation

2.1 Stakeholder and Community Consultation

Caltex has undertaken consultation prior to, and throughout the development approval process. Caltex personnel maintain an ongoing and open dialogue with residents who live and work on the Kurnell Peninsula. Regular community meetings, announcements and feedback sessions with the residents are part of this consultation process.

The consultation strategy undertaken as part of the SEE was used to identify and discuss potential issues that certain stakeholders may have with the ACS Modification works. The consultation effort up to exhibition is explained in detail within Chapter 6 of the SEE.

Part 4 of the EP&A Act, requires that the SEE be exhibited for at least 14 days unless the exhibition period falls over a school holiday in which case this period can be extended to 30 days. As stated above, the SEE was placed on public exhibition between 19 October 2016 and 2 November 2016. During this time, members of the public, statutory agencies and other stakeholders were invited to comment on the ACS Modification works via a submission to the DPE.

Following the exhibition period, Caltex conducted two letter box drops and held a community information session (as part of the quarterly community briefing) to allow members of the community to speak directly to the Project team. This session was held at the terminal on 6 December 2016 from 6:00 to 8:00 pm. In total, 10 stakeholders attended, one from the NSW Environment Protection Authority (NSW EPA), and nine from the Kurnell community. A range of issues were discussed. Those relevant to the ACS Modification works are presented alongside a response in **Table 2-1** below. A brief update regarding the ACS Management works was also provided at the quarterly community briefing on the 28 March 2017. No specific questions were asked by the members of the community.

Table 2-1 Community Information Session Questions

Community Question	Caltex Response
ACS Modification –General Questions	
What will happen to the pipeways once the ACS is removed? Will the pipeways be backfilled?	The pipeways are part of the Site's existing stormwater management system. Runoff from within the pipeways is able to be discharged off-site, if it is determined that the surface water meets the discharge requirements of Site's EPL. In the event that the runoff does not meet the EPL requirements or is suspected to be contaminated, surface water from the pipeways is directed to the Site's oily water sewer system (OWSS) and would be treated at the Site's wastewater treatment plant (WWTP) prior to discharge offsite. As such, the pipeways would not be backfilled as they remain an important part of the Site's stormwater infrastructure. However, in order to maintain the function of the pipeways as stormwater drains the pipeways may require regrading.
Is Caltex proposing to bring asbestos waste from off-site for disposal in the ACS containment cell?	No material from off site would be accepted in the containment cell. The environment licence for the Site, issued by the NSW EPA, EPL 837 states that Caltex "*must not cause, permit or allow any waste to be received at the premises*", except the waste expressly referred to in the EPL. The EPL does not permit asbestos to be received at Site. As such Caltex is restricted from bringing asbestos wastes to the Site from off-site.

Community Question	Caltex Response
What type of asbestos would be disposed of in the containment cell?	Only ACSs would be placed within the containment cell. **Section 3.12** provides additional detail about the acceptance criteria that would be implemented to ensure that other asbestos wastes including sheeting or asbestos insulation is not placed within the containment cell. Caltex has already removed a large amount of asbestos sheets, lagging etc from the Site as part of the demolition works and would continue to do so as these works progress.
Caltex should provide proactive consultation with the community. It was recognised by the community that a lack of communication prior to the SEE going on exhibition resulted in confusion within the community as to the actual intentions of Caltex under this modification request.	Caltex acknowledged that additional community should have been provided to the community prior to the SEE going on exhibition and the letter box drop which followed. Community consultation during the ACS Modification works would be undertaken in accordance with the existing management and mitigation measures in the DEMP. In addition to these requirements **Section 9.2.1** of this report proposes an additional Management and Mitigation Measure A13 to commit to community consultation during the ACS Modification works.
How is the containment cell designed?	The containment cell would be constructed and operated in general accordance with the requirements for a restricted solid waste cell as per *NSW Solid Waste Landfill Guidelines 2016*. These guidelines require that the proposed cell includes a double (composite) liner system, whereby if the primary liner fails there is a secondary liner to prevent contamination of groundwater. The proposed containment cell liner and leachate system is discussed in more detail in Chapter 4 of the SEE.
Would the containment cell impact on groundwater?	The ACS containment cell has been designed as an aboveground cell so that it avoids contact with the groundwater. The liner system, discussed above, is primarily in place to protect the groundwater from residual hydrocarbons that may be present within the ACSs. Asbestos tends to bind to soils and does not leach into the groundwater. Therefore if the liner were to leak the asbestos within the cell would not leach into the groundwater and the presence of the liner system would mean that there is no chance of it mobilising through the ground beyond the cell. In addition controls would be implemented during excavation and operation of the containment cell. These are discussed in more detail in **Section 7.2**.
How will leachate from the containment cell be managed?	Chapter 10 of the SEE provides a detailed discussion on the management and mitigation of surface water, including leachate from the ACS Modification works. In summary surface water which is captured by the containment cell leachate management system would be directed to a dedicated leachate storage tank. This tank is connected to the Site's OWSS and would be treated at the Site's WWTP prior to discharge off-site in accordance with EPL 837.

Community Question	Caltex Response
Is it an environmentally a better option?	ACSs in the pipeways are currently being managed in situ under an Exemption Order to Section 419 of the *Work, Health and Safety Regulation 2011*. In order to remove the ongoing health and safety risks to the workers in the pipeways and to remove the associated operational constraints the ACS Modification works have been proposed.
Has the long term management of the containment cell been considered when determining the most appropriate option?	Chapter 1 of the SEE identifies the alternative options for management of ACS at the Site, including disposal off-site. Based on an assessment of options available the containment cell was determined to be the preferred option based on health, safety and environment impacts and financial considerations. In addition, Caltex have been operating the Site since 1956 and are in the process of converting the Site to a major import terminal of finished products (gasoline, jet fuel and diesel). The Site is the hub of Caltex's operations for NSW and the ACT and therefore Caltex has no intentions of leaving the Site. As discussed in **Section 3.4** of this report, appropriate controls would be implemented to ensure that the long term management of the containment cell is addressed.
The community raised a concern about the controls in place to ensure that Caltex carry out activities in accordance with the approval, based on negative perceptions of other industry in the area. In particular the concern about being waste from off-site was raised. The community wished to know if the penalties in place would be significant enough to deter a non-compliance with this requirement.	Caltex is regulated by several government agencies, predominately DPE and the NSW EPA, to ensure that the Site is operating in accordance with the Site's development consent (SSD 5544), associated modifications and EPL 837. The Site is restricted from accepting waste from off-site under EPL 837; as such it would be an offence under clause 64 of the *Protection of the Environment Operations Act 1997* to accept waste from off-site. Should this condition be contravened Caltex may face a maximum penalty of $1 million and in the case of a continuing offence, a further penalty of $120,000 for each day the offence continues. In addition failure to meet the requirements of the Site's development consent or EPL would result in reputational damage to Caltex.
More information should be provided about the how the ACSs would be managed to reduce the potential impacts to the community from airborne asbestos fibres.	Potential impacts from asbestos would be managed throughout the ACS Modification works, in line with SafeWork requirements. As demonstrated in **Chapter 11** of this report a number of management and mitigation measures would be implemented.
NSW EPA Questions	
The NSW EPA raised that they would require that controls would be in place to detect failure of the leachate collection system which may result in impacts to groundwater.	The NSW EPA discussed the monitoring requirements which would be required under the EPL revision, and built into the current groundwater monitoring program. These controls are consistent with the management and mitigation measures proposed in Chapter 16 of the SEE.

2.2 Summary of the Submissions

A total of 36 submissions were received by DPE during and immediately following exhibition of the SEE. Of the submissions received, four submissions from NSW Department of Industry – Geological Survey of NSW, the Office of Environment and Heritage, Safe Work NSW and Sydney Water stated they had no concerns regarding the ACS Modification works. 26 submissions were received from members of the public, including one form letter which accounts for seven public submissions.

Submissions from statutory agencies which required a response included the following:

- NSW Environment Protection Authority (NSW EPA);
- NSW Health
- NSW Department of Primary Industries (NSW DPI)

Submissions were also received from Sutherland Shire Council and the Kurnell Progress and Precinct Resident's Association. A response to these submissions has also been provided.

Appendix A provides a copy of the submissions from public bodies received in full.

Appendix B includes a summary of the issues raised by the public submissions.

Chapters 3 – 7 of this report provide a response to the issues raised by each of the public bodies listed above and the Kurnell Progress and Precinct Resident's Association. The form letter is responded to in **Chapter 8** and public submissions are responded to in **Chapter 9**.

3.0 NSW EPA

Introduction

A submission was received from the NSW Environment Protection Authority (NSW EPA) dated 2 November 2016. Following Caltex's response to that submission and additional discussions and correspondence occurred between the NSW EPA and Caltex. These discussions resulted in two additional submissions being issued by the NSW EPA dated 3 February 2017 and 16 May 2017.

The NSW EPA submissions discussed a number of aspects of the ACS Modification works that require further explanation beyond the information provided in the SEE. Predominantly the comments in the first two submissions focused on the biopiling process. This part of the ACS Modification works has now been removed.

Nevertheless, all of the EPA's comments from the three submissions have been presented below for completeness and responded to where appropriate. Where comments are no longer relevant (e.g. because a part of the ACS Modification works is now longer being proposed), this has been stated.

In their submissions the EPA also refers to Caltex's environmental obligations under the *Protection of the Environment Operations Act 1997* (POEO Act), *Protection of the Environment Operations (Waste) Regulations 2014* (Waste Regulations), and the Environment Protection Licence No. 837 (EPL 837) for the Site. Caltex are aware of these obligations and are committed to complying with them. The issues raised in the NSW EPA submission are outlined below.

3.1 Issue 1 – Licence variation

The NSW EPA noted that if the modification is approved, Caltex would need to vary the EPL for the Site to include any scheduled activities that may be required that are not currently listed.

Response

Pending and following approval, Caltex would review the proposed activities and, if necessary, would apply to vary the EPL for the Site.

3.2 Issue 2 – General Obligations under the POEO Act

The NSW EPA submission noted that "*consistent with provisions under Part 9.4 of the Protection of the Environment Operations Act 1997 ("the POEO Act"), the EPA may require the provision of a financial assurance for the site. The amount and form of the assurance would be determined by the EPA and required as a condition of the licence"*. Further they note that "*consistent with Section 74 of the POEO Act, the EPA may require the proponent to enter into or arrange for a positive covenant under Section 88E of the Conveyancing Act 1919*".

Response

As Caltex and the NSW EPA have previously discussed, there is no specific NSW guidance on how to develop financial assurance for these works. Therefore if a financial assurance is required, an approach regarding this matter would be agreed with the NSW EPA if the works are consented.

Regarding the requirement for a positive covenant, Caltex expect that the land where the containment cell is located may require a positive covenant. This will be discussed further as the modification is assessed.

3.3 Issue 3 – Containment Cell Management Plan

The NSW EPA identified that the proposed additional sub-plan to the DEMP, the Containment Cell Management Plan, must be developed in consultation with the NSW EPA.

Response

As stated in the SEE, Caltex would develop a Containment Cell Management Plan. This commitment is presented in Management and Mitigation Measures H27 and H28 respectively. These measures have been updated to include a requirement to prepare these plans in consultation with the EPA as provided in **Chapter 11** of this report.

3.4 Issue 4 - Long Term Environmental Management Plan

The EPA proposed that Caltex develop and implement *"a Long Term Environmental Management Plan (LTEMP) in order to maintain capping and drainage, prevent any activities which could damage the capping or liner layers and undertake groundwater monitoring (including groundwater quality and levels). Restrictions on surface development including buildings/confined spaces and an exclusion zone around the barrier wall should also be included in the plan. The Plan must also detail any ongoing land use restrictions that will apply to the containment cell and be listed on the Section 149 (5) Certificates issued in relation to the site"*.

Response

A LTEMP (or Containment Cell Long Term Environmental Management Plan (CCLTEMP)) which identifies ongoing land use restrictions that will apply to the containment cell would be prepared. Caltex proposed to attach the CCLTEMP as a sub plan to the Operational Environmental Management Plan (OEMP) for the Site. This plan would also be listed on the Section 149 (5) certificate for the relevant lot (Lot 25 DP776328). As such the text provided below would be included as an additional Management and Mitigation Measure A12 (new text in bold and italics):

> ***A Containment Cell Long Term Environmental Management Plan (CCLTEMP) would be prepared in consultation with the EPA prior to the closure of the containment cell. The CCLTEMP would detail the ongoing environmental management of containment cell, including maintenance of the capping and drainage, groundwater monitoring (including groundwater quality and levels), and land use restrictions that will apply to the containment cell. The CCLTEMP would be attached to the positive covenant for the land where the containment cell is located, if required.***

It is noted that a barrier wall is not required for the ACS Modifications works and is a typographical error.

3.5 Issue 5 – Environmental Performance Outcomes

The NSW EPA noted that underpinning the environmental plans for the ACS Modification must be clear environmental performance outcomes…"*the proposed actions must support the delivery of these outcomes. This is not clear from the SEE. The environmental outcomes are defined in the EPL, the POEO Act and existing project approval (SSD 5544 MOD1) for the site. For example, these outcomes include no offensive odours beyond the boundary of the premises, air pollution (including dust/asbestos emissions) to be prevented/minimised and prevention of land or water pollution (except in accordance with licence requirements)*".

Response

Section 16.2.2 of the SEE states that the ACS Modification works would be completed in line with the DEMP which was developed with the environmental outcomes for the Site in mind. Chapter 16 of the SEE also contains a large number of specific management and mitigation measures which once implemented would also support environmental outcomes/obligations for the Site during the ACS Modification works.

The environmental outcomes for the Site currently include the following as presented in the application documentation for SSD 5544 MOD1:

- compliance with the requirements of the POEO Act 1997 and its associated regulations;
- compliance with EPL 837;
- emissions will not cause adverse impacts upon human health or the environment;

- no offensive odours will be caused or permitted from the premises;
- emissions of dust from the premises will be prevented or minimised;
- all relevant guidelines in regards to ambient air quality will be satisfied;
- no pollution of waters (including surface and groundwater) except in accordance with licence conditions;
- wastewater will continue to be collected and treated;
- impacts due to noise will be minimised and comply with the licence and SSD 5544 conditions;
- all waste will be managed in accordance with the principles of the waste hierarchy and cleaner production as outlined in the Site's Integrated Waste Management Strategy; and
- the handling, processing and storage of all materials used at the premises will not have negative environmental or amenity impacts.

The measures within the DEMP support these outcomes. The DEMP also include links to the EPL, the POEO Act, the conditions of consent for SSD 5544, and the conditions of consent for SSD 5544 MOD1.

Caltex is aware of its obligations under both the POEO Act and the EPL for the Site and is committed to meeting these obligations. Caltex agrees that the Conditions of Consent for SSD 5544 MOD1 contain relevant measures that can support the environmental outcomes for the ACS Modification works.

3.6 Issue 6 – Air Quality/Asbestos Management

The NSW EPA "*recommended that all works involving the excavation and disturbance of ACS include the following as a minimum:*

a. a defined exclusion zone around the work area within which only staff who have been appropriately inducted in relation to the site procedures are permitted entry

b. wetting of soils during excavation works to minimise the generation of dust

c. an occupational health and safety plan for site operators which identifies appropriate procedures for personal protective equipment; staff induction and decontamination of equipment

d. *further detail on the 'dust and aerosol monitoring' (Section 4.4.2) in the form of an asbestos monitoring and management plan. This should include monitoring in all areas of the site where asbestos in soil has been identified or is suspected to occur (including the pipeways) together with monitoring and analysis methods, exposure and control criteria and contingencies that will be implemented in the event specific exposure control criteria are exceeded.*"

Further the EPA note that "*Caltex must comply with conditions specified in its EPL and project approval including the measures identified in the Asbestos Management Plan prepared for the demolition activities. Where no specific asbestos related conditions are outlined in this licence or project approval, Caltex must comply with the POEO (Waste) Regulation 2014. Caltex should also implement an appropriate asbestos monitoring plan during all works associated with the excavation, removal, handling and management of asbestos materials*"

Response

Management and Mitigation Measure A3 states that "*Caltex would ensure that the Project contractor prepares and implements... a Demolition Environmental Management Plan (DEMP) for the demolition works (inclusive of the ACS Modification works) to manage any Project impacts*". As such, where relevant, the existing measures within the DEMP and associated subplans would be implemented during the ACS Modification works. Management of the potential impacts can be divided into two activities, the excavation of the pipeways, and the containment cell works.

As discussed in Chapter 12.7 of the SEE the excavation of the pipeways is consistent with the activities already undertaken and approved as part of the demolition works. The pipeway excavations would be managed in accordance with existing management strategies which include the Demolition

Air Quality Management Plan and the Site's Asbestos Management Plan (*Management of Asbestos, Asbestos Containing Materials and Synthetic Mineral Fibres*). These plans are also applicable to the containment cell works, however to address additional requirements for these activities a Containment Cell Management Plan would be prepared which would include additional measures not previously considered for the demolition works (refer to Management and Mitigation Measures H27, H28 and H29 in **Chapter 11** of this report).

Measures within the Site's Asbestos Management Plan include but are not limited to:

- All asbestos removal work commissioned is carried out by a licensed asbestos removalist;
- An Asbestos Removal Control Plan being developed for the removal of any asbestos or ACM. The asbestos control plan shall cover the items detailed in Appendix A of the *Code of Practice: How to Safely Remove Asbestos*, including*:*
  - Asbestos removal boundaries, including the type and extent of isolation required and the location of signs and barriers
  - Personal Protective Equipment
  - Air monitoring program
  - Waste storage and disposal program
  - Method for removing the asbestos (including wet methods)
  - Decontamination procedures
  - Consultation with any people who may be affected by the removal work including neighbours
- For all work requiring a Class A asbestos removal licence (i.e. removal of friable asbestos) an independent licensed asbestos assessor must undertake air monitoring of the asbestos removal area in accordance with the requirements details within Section 8.8 of the Model Work and Safety Regulations.

Measures within the Demolition Air Quality Management Plan include but are not limited to:

- Limiting potentially dust generating activities during high wind events (i.e. >8m/s hourly average or in severe wind gust conditions) using methods including wetting down soils (as per Management and Mitigation Measure H16 of SSD 5544 MOD1);
- Excavation of contaminated soils will not commence prior to 8am nor after 4pm as weather conditions are these times are generally conducive to adverse odour air quality situations from fugitive emissions.
- During excavations the disturbance area will be monitored continuously for asbestos (one upwind and three downwind).

In addition Management and Mitigation Measure C22 states that "*All ACSs to be removed from the pipeways would be wetted down prior to excavation, loading and transport."*

In order to capture the recommended requirements for air quality monitoring the text provided below provides an additional Management and Mitigation Measure H29 (new text in bold and italics):

> ***The DEMP and relevant sub plans (e.g. Asbestos Management Plan and Containment Cell Management Plan) would be revised to include the following measures:***
>
> - ***a defined exclusion zone around the work area within which only staff who have been appropriately inducted in relation to the site procedures are permitted entry***
> - ***wetting of soils during excavation and disturbance works to minimise the generation of dust***
> - ***an Asbestos Removal Control Plan which identifies appropriate procedures for personal protective equipment; staff induction and decontamination of equipment***
> - ***preparation of an asbestos monitoring and management plan to account for the activities that may liberate asbestos into the atmosphere. Dust and aerosol***

monitoring would occur in areas of the Site where asbestos in soil has been identified or is suspected to occur (including the pipeways) together with monitoring and analysis methods, exposure and control criteria and contingencies that will be implemented in the event specific exposure control criteria are exceeded.

As noted above in **Section 3.2**, Caltex is aware of its obligations under both the POEO Act and the EPL for the Site and is committed to meeting these obligations.

3.7 Issue 7 – Biopiling and Homogenisation

The EPA requested additional information on the biopiling process.

Response

Following consultation with the EPA, the ACS biopiling scope has been removed from the ACS Modification works under SSD 5544 MOD 2 (refer to **Section 1.3**). Therefore this issue is no longer relevant.

To address the change, the previous Management and Mitigation Measure H28 has been removed.

3.8 Issue 8 – Asbestos Contamination

The EPA noted that "a*ny waste contaminated with asbestos will need to be disposed of as Special Waste in accordance with the Waste Classification guidelines*."

Response

Following consultation with the EPA, the requirement to transport ACS offsite as part of the ACS Modification works (SSD 5544 MOD 2) has been removed (refer to **Section 1.3**). Nevertheless Caltex notes this requirement.

3.9 Issue 9 – Caltex Soil Remediation Facility

The EPA reminds Caltex that the "*Caltex Treated Soil Order 2016*" issued for the sustainable soil regeneration facility at Kurnell does not permit asbestos contaminated soils to be received.

Response

As noted in Section 9.4 of the SEE "*The Caltex Soil Remediation Facility… does not accept waste contaminated with asbestos, and therefore would not be used for treatment of ACS from the pipeways*".

3.10 Issue 10 – Dust and Aerosol Monitoring

The EPA requested additional information on the proposed dust and aerosol monitoring for the biopiling process.

Response

Following consultation with the EPA, the ACS biopiling scope has been removed from the ACS Modification works under SSD 5544 MOD 2 (refer to **Section 1.3**). Therefore this issue is no longer relevant.

3.11 Issue 11 – Decontamination and Waste Management

The EPA requested that information is provided on how equipment will be decontaminated after excavation, transport and placement of the ACS has taken place, and describe how the resulting waste will be managed.

The NSW EPA requested information be provided on decontamination procedures and management of waste resulting from the decontamination process.

We have addressed these issues separately:

a. **Decontamination Procedures** - the NSW EPA noted that the draft RTS Report "*states that the ACS modification works would be completed in line with the Demolition Environmental Management Plan (DEMP) and Asbestos Management Plan (AMP) for the demolition works and the decontamination procedures would be consistent with this pre agreed management approach. Neither the DEMP nor AMP appears to include any information on appropriate decontamination procedures for this particular activity. Caltex must ensure that appropriate decontamination procedures are developed to adequately manage the ACS*".

b. **Decontamination Waste Management** - the NSW EPA stated that "*the decontamination and waste management process should consider the types of asbestos contaminated wastes likely to be generated as part of the decontamination activities. This includes the hydrocarbon impacted soils that are classified as hazardous, restricted or general solid waste*".

Response

3.11.1 Issue 11a – Decontamination Procedures

As stated in Section 16.2.2 of the SEE, the ACS Modification works would be completed in line with the DEMP and Asbestos Management Plan (AMP) for the demolition works. The decontamination procedures would be consistent with this pre agreed management approach.

The Site's AMP was prepared in accordance with SafeWork Australia's *How to Safely Remove Asbestos Code of Practice, April 2016 (the Code)*. The AMP is an overarching plan for the Site and includes triggers for preparation for activity specific plans, referred to as Asbestos Removal Control Plans (required under the WHS Regulation).

The ACS Modification works would be considered works requiring a Class A asbestos removal licence, therefore a licensed asbestos removalist would be commissioned to undertaken the ACS Modification works. Section 6.7.1 of the AMP states:

> *All asbestos removal work commissioned is carried out by a licensed asbestos removalist.*

Caltex engaged Giovenco Industries (AUST.) Pty Limited (Giovenco) to conduct the removal of asbestos lagging from the pipes within the pipeways and the removal and storage of contaminated soil, under SSD 5544 MOD1. Giovenco prepared the following documents to undertake these works in accordance with the WHS Regulations:

- Method Statement for the Asbestos & Insulation Removal
- Asbestos Removal Control Plan (ARCP)

These plans have been included as **Appendix D** as an example of the plans which would be prepared by the Class A licensed contractor prior to commencement of the ACS Modification works. The ARCP would cover the items detailed in the *Code*, including decontamination procedures for each unit of equipment. Section 3.8 of the Code requires that:

> *"When carrying out licensed asbestos removal work, the licensed asbestos removalist must ensure decontamination facilities are available for the asbestos removal work area, any plant used in that area and workers carrying out the asbestos removal work."*

As described in the Code the two methods for decontamination of plant and equipment include:

1. 'Wet decontamination' – this involves the use of damp rags to wipe down contaminated areas. Rags should only be used once, although they may be refolded to expose a clean surface. The rags should be used flat and should not be wadded. If a bucket of water is used, the rags should not be re-wetted in the bucket as this will contaminate the water. If the water is contaminated, it must be treated as asbestos waste. Care should be taken to avoid any potential electrical hazards when using this procedure.
2. 'Dry decontamination' - involves carefully rolling or folding up and sealing plastic sheeting and/or vacuuming the asbestos removal area with an asbestos vacuum cleaner. Dry decontamination should only be used where the wet method is not suitable or poses a risk because of other hazards such as electricity or slipping.

Contaminated items including tools, plant, equipment and clothing would not be removed from the ACS works areas unless it has been decontaminated or contained. All tools used during the ACS Modification works would be fully dismantled (where appropriate), cleaned under controlled conditions and decontaminated using either the wet or dry decontamination procedures described above before they are removed from the work area.

Specific details on the decontamination procedures for each type of equipment have not been assessed but would be undertaken during the development of the ARCP by the licensed asbestos contractor. An example of the decontamination procedures implemented by Giovenco for the demolition works are provided in **Appendix D**.

These controls would be appropriate for the ACS Modification works in addition to specific decontamination methods for individual items of equipment.

It is also noted that under **Section 3.6** of this report, Management and Mitigation Measure H29 has been modified to specify that an ARCP which identifies appropriate procedures for personal protective equipment, staff induction, and decontaminated equipment would be prepared. This plan would be an appendix to the Containment Cell Management Plan.

Asbestos contaminated waste will be disposed of in accordance with the Demolition Waste and Resource Recovery Waste Plan and the Asbestos Management Plan. These are currently being implemented and require that:

- All asbestos waste is contained and labelled in accordance with the GHS (Globally Harmonised System of Classification and Labelling of Chemicals) as detailed within the Model Cost of Practice: How to Safely Remove Asbestos;
- All asbestos waste must be disposed of at a licensed asbestos waste disposal site;
- A copy of the disposal certificate must be obtained from the licensed asbestos removalist. A copy shall be sent to the Caltex Hazmat Administrator for upload into the Caltex online HazHat Management System.
- The Caltex Asbestos Removal Checklist must be used to ensure that all critical steps and information have been obtained and recorded.
- Asbestos removal activities shall be audited periodically.

3.11.2 Issue 11b – Decontamination Waste Management

Asbestos waste would be managed in accordance with the *Code of Practice: How to Safely Remove Asbestos*. For example, these requirements include the use of appropriate plastic bags (double bagging) or polyethylene sheeting, drums and bins, labelling and storage.

The appropriate technique for bagging of asbestos waste would be determined based on the waste type and the decontamination procedure (wet/dry/not applicable). It is anticipated that the following asbestos contaminated wastes would be generated during the decontamination processes:

Table 3-1 Options for Asbestos Contaminated Waste Management

Waste	Decontamination	Disposal Method
Used PPE	Not required for disposal of PPE	Plastic bagged (double bagged), goose-necked, placed in drum or skip, labelled. Dispose to licensed facility.
Air filters	-	Plastic bagged (double bagged), goose-necked, placed in drum or skip, labelled. Dispose to licensed facility.
Waste water generated during the wet decontamination of equipment and from the temporary wheel wash	By-product of decontamination	As required collected in a waste water drum and disposed off-site to appropriate facility. Or directed to the Site's OWSS and processed at the WWTP.
Other waste soils (minimal volumes expected as general and restricted level soils may be placed in the containment cell)	-	Small volumes of soils collected during the decontamination process would be bagged (double bagged), goose-necked, placed in drum or skip, labelled. Dispose to licensed facility.

In accordance with Management and Mitigation Measure E19, "*new waste streams would be addressed as they arise and assessed to determine the most suitable management measures to use when handling, storing, transporting and disposing of the waste*".

In addition, SSD 5544 MOD 1 includes a number of Management and Mitigation Measures which address management for asbestos waste, including the following:

> **E12** – The Site's existing Asbestos Waste Register would be amended as appropriate, implemented and maintained to track asbestos wastes generated during the works.
>
> **E13** - If stored on-site, asbestos wastes would be located away from operational areas and properly sealed and contained to minimise human exposure and clearly labelled. Signage and barriers/fencing would be installed to ensure all employees, contractors and visitors would keep away from the area at all times.
>
> **E14** - The removal and disposal of asbestos wastes would be undertaken by a licenced asbestos contractor.
>
> **E15** - A Decontamination Area would be provided on-site for all authorised personnel handling asbestos.
>
> **E16** - Wastes (both liquid and non-liquid) generated from the works would be assessed, classified and managed. Wastes would be disposed of at an appropriately licenced facility.

The following additional Management and Mitigation Measure has also been included for the ACS Modification works:

> ***H29 - The DEMP and relevant sub plans (e.g. Asbestos Management Plan and Containment Cell Management Plan) would be revised to include the following measures:***
>
> - ***a defined exclusion zone around the work area within which only staff who have been appropriately inducted in relation to the site procedures are permitted entry***
> - ***wetting of soils during excavation and disturbance works to minimise the generation of dust***
> - ***an Asbestos Removal Control Plan which identifies appropriate procedures for personal protective equipment; staff induction and decontamination of equipment***

- ***preparation of an asbestos monitoring and management plan to account for the activities that may liberate asbestos into the atmosphere. Dust and aerosol monitoring would occur in areas of the Site where asbestos in soil has been identified or is suspected to occur (including the pipeways) together with monitoring and analysis methods, exposure and control criteria and contingencies that will be implemented in the event specific exposure control criteria are exceeded.***

3.12 Issue 12 – Containment Cell Acceptance Criteria

The NSW EPA noted that Section 4.2 of the SEE had noted that ACSs from other parts of the Site could also be placed into the containment cell if there is available capacity following disposal of the pipeway ACSs. As such the NSW EPA suggested that "*all material likely to be place in the cell should be assessed as part of this application. Once the material has been placed in the containment cell and capped, the cell should not be disturbed*".

Response

Caltex do not believe that assessment of all ACSs from across the Site as part of this application is required. Caltex are proposing to agree a 'soil acceptance criteria' for the containment cell similar to the approach used for the Permanent Sustainable Soil Regeneration Facility. Soils placed within the containment cell would need to meet these criteria. These criteria would be detailed within the Containment Cell Management Plan.

The acceptance criteria would require that:

- Only soil contaminated with airborne asbestos[1] (referred to in the ACS Modification works as ACS) from the Site (as defined by Figure 1-2 in the SEE) would be accepted into the containment cell
- Soils entering the containment cell from the Site but outside of the pipeways must be classified in accordance with the NSW EPA Waste Classification Guidelines 2014, as either special general solid waste or special restricted solid waste.
- All soils, regardless of their classification under the NSW EPA Waste Classification Guidelines 2014 from the pipeways on the Site (as shown on Figure 1.2 of this report) would be disposed of in the containment cell.
- The total volume of ACS would be limited by the design specifications final landform.

As such the text provided below expands on Management and Mitigation Measure H28 (new text in bold and italics):

The Containment Cell Management Plan would ***be prepared in consultation with the NSW EPA and include the following mitigation measures:***

- ***A Soil Acceptance Criteria which includes:***
  - ***Only soil contaminated with airborne asbestos[1] (referred to in the ACS Modification works as ACS) from the Site (as defined by Figure 1-2 in the SEE) would be accepted into the containment cell***
  - ***Soils entering the containment cell from the Site but outside of the pipeways must be classified in accordance with the NSW EPA Waste Classification Guidelines 2014, as either special general solid waste or special restricted solid waste.***
  - ***All soils, regardless of their classification under the NSW EPA Waste Classification Guidelines 2014 from the pipeways on the Site (as shown on Figure 1.2 of the SEE) would be disposed of in the containment cell.***

---

[1] *Airborne asbestos* means any fibres of asbestos small enough to be made airborne (Safe Work Australia, April 2016, Code of Practice: How to Safely Remove Asbestos)

- ***The total volume of ACS would be limited by the design specifications final landform.***

- Soil moisture content will be managed in order to minimise potential particulate matter and asbestos emissions to the maximum extent practicable.
- Directed water sprays will be used when required throughout ACS handling operations.
- Plastic sheeting would be placed over ACS in the containment cell to minimise the generation of dust. Prior to the placement of the next load of ACS and at the start of each day, the plastic sheeting would be stripped back to allow filling operations to continue.
- Stockpiles will be maintained in a moist condition, and covered if not in use or left overnight.
- Completed areas of the works area will be revegetated with native grasses as soon as is practicable.

3.13 Issue 13 – Containment Cell Daily Cover

The NSW EPA noted that in Section 4.4.4 of the SEE *"that Caltex would use rigid plastic sheeting to temporarily cover the ASC after it is placed in the containment cell. This plastic would be stripped back to allowing filling operations to continue. The SEE does not provide any details on whether there will be any potential emissions from the stripping back process and how these will be managed. Additional information should be provided in regards to the assessment of all potential emissions likely to occur from the containment cell operations and the control measures proposed to be implemented to manage these emissions. Once this information has been assessed, it should form part of the Containment Cell Management Plan*".

The NSW EPA identified that under the *NSW Protection of the Environment Operations (Waste) Regulation 2014* (the Waste Regulations), "*asbestos must be covered with VENM or other material as approved in the environment protection licence*".

Response

Following discussions with the NSW EPA on 17 February 2017, Caltex proposed an alternative biodegradable spray for daily and intermediate cover, given the concerns raised by the NSW EPA in relation to potential dust emissions associated with the use of a rigid plastic cover.

There are several alternative daily cover products available in the local market. For example the "BioCover" product sold in Australia by DURAveg is a spray on cover manufactured primarily from refined wood fibres and is marketed as 100% biodegradable and non-toxic. BioCover meets the ASTM International's standard guide for evaluation and selection of alternative daily covers for sanitary landfills (ASTM 6523-00).

A BioCover product information sheet is provided in **Appendix E**. BioCover is only one potential option which would be considered. Other potential products include ProGuard / ConCover from OCS Environmental. The final cover selected would achieve similar or better outcomes as covering by soil, namely:

- Minimise generation of dust.
- Limit rainfall infiltration into the waste material.

The cover would be applied either following the placement of asbestos contaminated soils within the containment cell or at the end of each day.

The cover selected and process adopted for application would be described in the Containment Cell Management Plan. The daily cover material would be agreed with the NSW EPA during the variation of the EPL for the Site.

To ensure that the cover activities are appropriately managed the text provided below amends Management and Mitigation Measure H28:

The Containment Cell Management Plan ***would be prepared and include the following mitigation measures:***

- ***A Soil Acceptance Criteria which identifies:***
  - ***Only soil contaminated with airborne asbestos***[1] ***(referred to in the ACS Modification works as ACS) from the Site (as defined by Figure 1-2 in the SEE) would be accepted into the containment cell***
  - ***Soils entering the containment cell from the Site but outside of the pipeways must be classified in accordance with the NSW EPA Waste Classification Guidelines 2014, as either special general solid waste or special restricted solid waste.***
  - ***All soils, regardless of their classification under the NSW EPA Waste Classification Guidelines 2014 from the pipeways on the Site (as shown on Figure 1.2 of the SEE) would be disposed of in the containment cell.***
  - ***The total volume of ACS would be limited by the design specifications final landform.***
- ***Prior to the commencement of filling activities dust and aerosol monitoring stations would be placed at a minimum of six locations around the working area with the objective of monitoring prevalent upwind and downwind locations.***
- Soil moisture content will be managed ***to ensure that it is greater than 15%*** in order to minimise potential particulate matter and asbestos ***[fibre]*** emissions to the maximum extent practicable ***by wetting of soils during filling of cell to minimise the generation of dust.***
- Directed water sprays will be used when required throughout ACS handling operations.
- ***A biodegradable cover would be sprayed over*** ACS in the containment cell to minimise the generation of dust. ***The cover would be applied following the placement of ACS within the containment cell, and at the end of each day.***
- ***Limiting potentially dust generating activities during high wind events (i.e. >8m/s hourly average or in severe wind gust conditions)***
- Stockpiles will be maintained in a moist condition ***when not covered***, and ***be*** covered if not in use or left overnight.
- Completed areas of the works area will be revegetated with native grasses as soon as is practicable.

3.14 Issue 14 – Stormwater

The NSW EPA noted that "*for all (stormwater) discharges from the premises, Caltex must comply with EPL 837 requirements at all times*".

Response

Caltex is aware of its obligations under EPL 837 and intends to comply with the requirements of this licence.

3.15 Issue 15 – Wastewater

The NSW EPA noted that Caltex must ensure that "*any future requirements for wastewater treatment at the site take into consideration stormwater and leachate quality (including asbestos) and quantity that may be generated from the operation of the containment cell*".

Response

Caltex is currently reviewing a number of options regarding the future of the Waste Water Treatment Plant (WWTP). The study takes into consideration the quality and quantity of the predicted wastewater inputs from the ACS Modification works into the oily water sewer system (which leads to the WWTP).

3.16 Issue 16 – Waste Water Treatment Plant Capacity

The NSW EPA noted that "*the excavation of ACS from the pipeways has the potential to disturb sediments which may affect the quality of the water directed to the wastewater treatment plant [WWTP] during rainfall events"*. The EPA requested that Caltex confirm that the WWTP is capable of managing any significant changes in water quality as a result of the excavation works.

Response

Run-off from the pipeways during excavation works will be directed to the existing WWTP. The WWTP has been managing flows from the refinery process areas during the demolition works this year. It has sufficient capacity to handle any changes in water quality resulting from the ACS Modification works.

Caltex is currently reviewing options regarding the future of the WWTP. While the ACS Modification works are expected to be completed prior to any new plant being commissioned, to allow for any potential delays, the study takes into consideration the quality and quantity of stormwater generated from potential disturbance of sediments during the pipeway excavation works. This includes provision for suitable sediment removal systems in the new WWTP design. It is noted that following the excavation works the pipeways will be rehabilitated to minimise sediment run-off into the WWTP.

3.17 Issue 17 – Verification

The NSW EPA noted that where there is potential for other areas of the Site to become contaminated with asbestos fibres (for example, biopiling area) an independent asbestos inspector should also be required to verify that any asbestos fibres from these areas have also been successfully removed as part of the clean up activities.

Response

Following consultation with the EPA, the ACS biopiling scope has been removed from the ACS Modification works under SSD 5544 MOD 2 (refer to Section 1.3). Therefore this issue is no longer relevant.

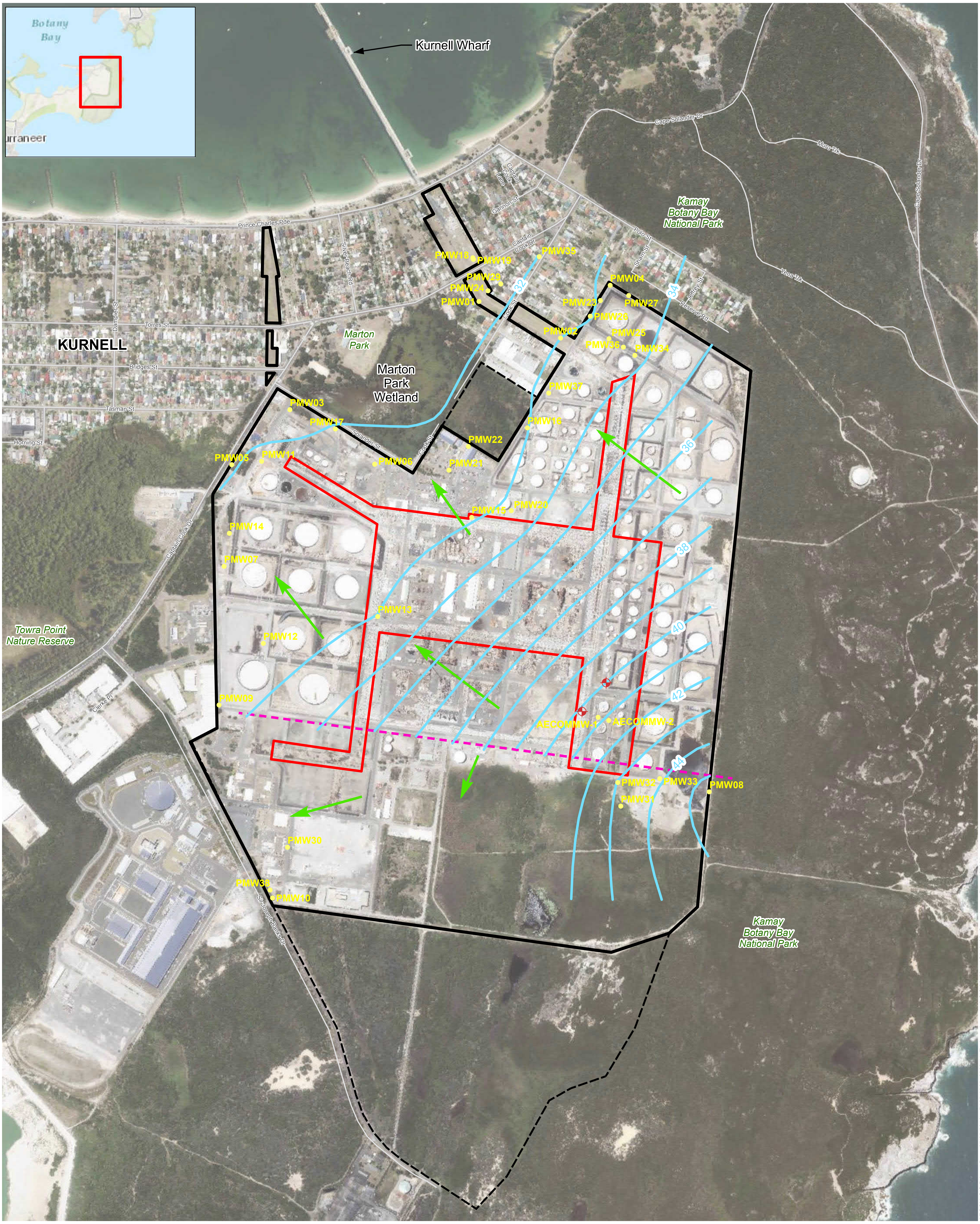
3.18 Issue 18 – Groundwater Monitoring

The NSW EPA noted that Chapter 8 the SEE states that Caltex proposed to install two groundwater monitoring bores at the north and west of the containment cell to undertake quarterly monitoring during construction, filling and closure of the cell. The EPA request that additional information about these proposed wells is provided including justification of the location and monitoring parameters.

Response

The two monitoring bores will be located immediately down-gradient of the proposed cell location, on the north side and the north-western side, to act as early warning bores to monitor for potential leakage. An extensive network of monitoring bores is located up hydraulic gradient of the cell to characterise the groundwater prior to it moving under the cell area, these existing bores will allow comparison with the two proposed bores. There is also a greater network of monitoring bores down hydraulic gradient that will also serve to monitor the groundwater as it moves offsite towards Botany Bay.

Figure 3-1 shows the indicative locations of the proposed wells. The new bores will be sampled for benzene, toluene, ethylbenzene, xylenes, naphthalene (BTEXN), total recoverable hydrocarbons (TRH), Polycyclic aromatic hydrocarbons (PAHs), and mercury as these are the contaminants of potential concern (COPC) identified in soil in the *Kurnell Pipeways Asbestos Classification Report* (AECOM, 2016a). In the unlikely event of a leak in both of the cell liners, it is these COPC that have the potential to leach out of impacted soil into the groundwater.



KEY

- The Site
- Caltex Land Ownership
- ACS Modification Works Area
- Interpreted groundwater level contours (mAOR)
- Interpreted groundwater flow direction
- Approximate location of bedrock ridge (Groundwater divide)
- Permanent Monitoring Well
- Proposed GW Monitoring Bore

0 50 100 200 m

Disclaimer Spatial data used under licence from Land and Property Management Authority, NSW © 2015.

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CONFIDENTIAL SKETCH

SCALE 1:9,000	SIZE A3
SHEET 01 of 01	COORDINATE SYSTEM GDA 1994 MGA Zone 56
TITLE **FIGURE 3-1** - COFFEY (2007) GROUNDWATER FLOW DIRECTION AND MONITORING WELLS	
PROJECT KURNELL ACS MODIFICATION	
CLIENT CALTEX PETROLEUM AUSTRALIA PTY LTD	

DRAWN	DATE	MAP #	REV	Project
MJB	27/09/2016			
CHECK WM	DATE 30/09/2016	G010	02	60488804

AECOM GIS Printed:Date: 27/09/2016 P:\604X\60488804\4. Tech work area\4.6 GIS\02_Maps\G010_02_Groundwater_Flow_160927.mxd

3.19 Issue 19 – Remediation Action Plan

The NSW EPA have proposed that a RAP should be developed that addresses the proposed onsite containment of the ACS. The NSW EPA have requested that in developing the RAP, Caltex consider "*how the plan will integrate with the requirements of other management plans such as the Demolition Environmental Management Plan and associated sub plans including but not limited to:*

- *Containment Cell Management Plan*
- *Asbestos Management Plan*
- *Asbestos Removal Control Plan*
- *Air Quality Management Plan*
- *Long Term Environmental Management Plan*

These plans must be developed in consultation with the EPA. The plans should include but not be limited to the following:

- *dust, asbestos and groundwater monitoring requirements*
- *appropriate procedures to verify that the friable asbestos has been removed from the pipeways and contamination of other areas has been prevented '*
- *appropriate procedures for reviewing and improving the requirements of each plan to allow for adaptive management and to address any contingencies that may arise over the life of the project.*"

Response

Following consultation with the DPE and the NSW EPA Caltex will prepare a RAP for ACS Modification works. The RAP would be prepared in accordance with the NSW EPA *1997 Guidelines for Consultants Reporting on Contaminated Sites*.

The purpose of this RAP would be to:

- Support the modification application (reference SSD 5544 MOD2) for the placement of the ACS into a purpose built containment cell at the Site.
- Remove the Exemption Order from the pipeways under Section 419 of the *Work, Health and Safety Regulation 2011*
- Remove potential human health risk posed by the asbestos.
- Address the requirements of the NSW EPA, under the *Contaminated Land Management Act 1997* which includes preparation of a long term management plan, removing or containing the contamination of the land (i.e. the ACS) and eliminating any hazard arising from the contamination of the land (i.e. the ACS).
- Address the requirements of State Environmental Planning Policy 55 (SEPP 55) where applicable.

The objectives of the ACS Modification works RAP would be to:

- Identify approvals and licences required by regulatory authorities to undertake the works.
- Set remediation goals to ensure the pipeways pose no unacceptable risk from asbestos to human health.
- Document the procedures and plans to be implemented to reduce risks to acceptable levels.
- Establish the environmental management required to complete the remediation works (i.e. the removal of the ACS.

A Draft RAP has been provided in **Appendix F**. The RAP will be discussed with the EPA prior to it being finalised.

3.20 Issue 20 – Containment Cell Design Requests

The NSW EPA noted in the submission dated 16 May 2017 the following comments which relate to the design and management of the containment cell:

1. Construction of drains to alleviate areas of ponding or high infiltration with all stormwater systems and sewer systems (including subsoil drains, pumping stations, sumps and other infrastructure or equipment) to be isolated from ingress of groundwater.
2. Re-contouring to reduce groundwater recharge through infiltration. All areas except building slabs should be constructed so that no undrained ponding of surface water occurs.
3. Capping to an appropriate maximum permeability (on sites with similar materials the capping has been 10^{-9} m/s to 10^{-11} m/s and minimum thickness of 0.5 m however the permeability and thickness should be based on site specific modelling/assessment). The cap must prevent as far as practicable the ingress of water to any part of the site that may be contaminated and, thereby in turn, prevent as far as practicable, the mobilisation and migration of contaminants in surface water or groundwater. The cap must have a design life of without substantial maintenance or repair for at least 50 years under the conditions anticipated at the site. The cap is to be constructed from materials which are non-dispersive, resistant to erosion, low shrink swell potential, and be free of acidic leachates.
4. Management of excavated material in order to characterise the material for placement within the containment cell, so that the more highly impacted material may be able to be placed into and contained and isolated in emplacement areas within the area of the works. Please note that on other sites the more hazardous material has been required to have a minimum cover of at least 500 mm plus the surface cap.
5. The cell must be capped and permanently sealed as per the containment cell design within one month after it has been validated that all ACS from the pipeways has been removed.
6. The design of the containment cell must include identification of any proposed physical markers, marker layer, notices or other precautions, to warn people if they are about to excavate within an emplacement area onto contaminated materials.
7. Prior to the commencement of works, a Construction Quality Assurance Plan must be prepared by a suitably qualified and experienced person to describe the capping materials, thicknesses and jointing methods and to prescribe an inspection and maintenance schedule. Consideration should be given to the design load in order to ensure there will not be any adverse effect on the surrounding ground and that the design of the structures takes account of ground movements predicted by the Construction Quality Assurance Officer.

Response

A response has been provided below for each points outlined above:

1. The containment cell and associated infrastructure have been designed so that they do not intercept the groundwater at the Site. The containment cell and leachate collection system would be designed so not to allow the ingress of groundwater. Any leachate from the cell would be directed to the Oily Water Sewer System (OWSS) and on to the Site's Waste Water Treatment Plant (WWTP). Construction of the cell would involve installation of the basal liners, leak detection system and leachate collection system. These elements of the design would be installed before the cell is filled. As such stormwater falling on the cell as it is being filled would be directed to the OWSS and WWTP.

   Once the cell is full it would be capped. The proposed design of the capping for the cell is presented in Section 4.9 of the Concept Design Report, Appendix B of the Statement of Environmental Effects (SEE). The cap consists of 1.6 m of soil and aggregate layers and two layers of geosynthetic material. The top of the cap would have a gradient of greater than 5% to facilitate runoff and minimise ponding. Surface water runoff from the cell once it is capped would be directed to Site's stormwater system.
2. All surface water during filling would be directed towards the OWSS. As discussed in the SEE (section 4.4.5), the bottom of the containment cell (sub-grade) is designed at 3% grade toward

the leachate collection valleys which grades up to the east at 2% longitudinal direction. These grades are in general accordance with the NSW EPA Solid Waste Landfill Guidelines (the 'Landfill Guidelines') (EPA, 2016).

The containment cell cap design proposes High-density polyethylene (HDPE) and Geosynthetic Clay Liner (GCL) barrier layers, an aggregate drain layer and overlying soils. Stormwater infiltration into the cell is not expected to occur. If leakage does occur it would be captured by the leachate collection system. As discussed in the Concept Design for the containment cell (Appendix B of the SEE), the cap will have a minimum surface grade of 5% and a maximum surface grade of 20%.

Following closure, all surface water would be directed to existing stormwater system at the Site as shown in drawings CV-004 and CV-005, in Appendix A of the Concept Design Report, (refer to Appendix B of the SEE).

3. As per the Concept Design Report, Table 17, the containment cell cap design proposes high-density polyethylene (HDPE) and Geosynthetic Clay Liner (GCL) barrier layers with a hydraulic conductivity of less than 5 x 10-11 m/s.

   The cap has been designed to prevent the ingress of water into the containment cell, however if water was to make it into the containment cell, the containment cell has a leachate collection layer above the barrier liner. This leachate collection system would direct leachate to the Site's OWSS and combined with the low permeability composite leachate barrier would prevent leachate migrating to groundwater.

   In addition the materials used during the construction of the cell have a 50 year lifespan and are non-dispersive (emersion class 3), the cell would be vegetated with a maximum grade of 20% to minimise erosion, have a low shirk swell potential (weighted plasticity index (WPI) < 1,200 and Plasticity index (%) ≥ 7) and use VENM for the capping material.

4. The material in the pipeways has already been characterised. No further characterisation of this material is necessary. ACS from other parts of the Site would need to be characterised prior to being placed in the cell.

   Given the volume of hazardous ACS is approximately 30% of the total ACS which would be placed in the cell, the filling plan, included in the CCMP, would include a requirement to place hazardous ACS with a minimum cover of 500 mm of restricted or general ACS. This requirement has been made an additional management and mitigation measure (refer to management and mitigation measure A14 below).

5. The cell would be closed when:

   - It has been validated that the pipeways are clear of ACS; and
   - Any spare capacity in the cell had been used to contain appropriately classified ACS from other parts of the Site.

   Caltex confirm that the containment cell would be capped and permanently sealed as per the containment cell design, within one month after it has been validated that all ACS from the pipeways has been removed. This request has been made an additional management and mitigation measure (refer to management and mitigation measure A15 below).

6. The CCMP and the CCLTEMP would contain details of the necessary measures (e.g. signage) to warn people if they are about to excavate. As discussed in the Concept Design Report (Section 4.9) and the SEE (Section 4.4.5) a marker layer would be included in the cap as a separation geotextile to warn people that they are about to excavate within an emplacement area and to reduce the risk of the cap being removed.

7. In accordance with the Landfill Guidelines, a Construction Quality Assurance (CQA) Plan would be developed for the containment cell to ensure the quality of construction of the basal liner, leachate collection system and capping of the containment cell. The CQA plan includes Design Drawings and Technical Specifications. The CQA Plan comprises:

   - Roles and responsibilities

- Testing and survey program, including the minimum test frequencies to be employed during construction;
- Construction hold points
- Documentation requirements for materials brought on site; and
- As built documentation requirements for construction activities.

The management and mitigation measures provided above would be including in the Containment Cell Management Plan and CCLTEMP as required.

The additional management and mitigation measures noted above would be as follows:

A14 – ACS from the pipeways classified as hazardous waste under the NSW EPA Waste Classification Guidelines would have a minimum cover of at least 500 mm plus the surface cap.

A15 - Within one month after it has been validated that all ACS from the pipeways has been removed, the containment cell would be capped and permanently sealed as per the containment cell design.

3.21 Issue 21 – Containment Cell Closure Reporting

The NSW EPA requested that "*a final report be prepared and submitted to the EPA at the completion and closure of the containment cell. The report must include a summary of the waste classification and environmental monitoring data conducted in accordance with the Environmental Management Plans (and associated Sub Plans). Monitoring data should include but not necessarily be limited to:*

i. *Waste Characterisation and Tracking*

ii. *Air Quality monitoring (including dust and asbestos)*

iii. *Groundwater Monitoring*."

Response

Caltex agree to prepare a ACS Works Completion Report at the completion and closure of the containment cell. As such the text provided below would be included as an additional Management and Mitigation Measure A16 (new text in bold and italics):

Caltex would prepare an ACS Modification Works Completion Report following the completion and closure of the containment cell. The report would include a summary of the waste classification and environmental monitoring data conducted in accordance with the Environmental Management Plans (and associated Sub Plans). Monitoring data should include but not necessarily be limited to:

i. ***Waste Characterisation and Tracking***

ii. ***Air Quality monitoring (including dust and asbestos)***

iii. ***Groundwater Monitoring."***

3.22 Issue 22 – Waste Management

The NSW EPA noted that a waste register must be prepared, used and maintained by the proponent to track wastes generated from the ACS modification works and used to record and report the types, volumes and management measures for all waste and resources arising from/used for the works.

Response

As per Management and Mitigation Measure E8 Caltex currently have a Waste Register which is maintained by the Demolition Contractor to track all waste generated from the demolition works. This register is also used to track all materials reused at the premises including the location, types of waste and classification.

As per Chapter 16 of the SEE, Caltex have proposed to modify Management and Mitigation Measure E8 to include the ACS Modification works in the Waste Register for the Site. The waste register would track all waste generated from the ACS Modification works and would be used to record and report the types, volumes and management measures for all waste and resources arising from /used for the works.

3.23 Issue 23 – Independent Accredited Site Auditor

An independent accredited site auditor under the CLM Act should be engaged to review the RAP and associated management plans (for example, Long Term Environmental Management Plan (LTEMP)) to assess the suitability of the proposed remediation strategy.

Response

This requirement is being discussed with DPE and the NSW EPA. If necessary, following approval of the modification application for the ACS Modification works, the draft RAP will be finalised with the agreed conditions of consent and can then be reviewed by an independent accredited site auditor.

4.0 NSW Health

Introduction

A submission was received from NSW Health dated 31 October 2016. The submission outlined a number of comments on the SEE on a range of topics. Responses to these comments are outlined below.

4.1 Issue 1 – Asbestos Management

The submission noted that to minimise the release of asbestos into the air, work should be undertaken in accordance with the *Worksafe National Code of Practice* and Guidance on asbestos removals and disposal.

Response

Caltex note this request. Caltex is proposing to implement a number of management and mitigation measures to ensure the ACS Modification works are completed in line with relevant legislation and guidance. These measures are detailed in Section 12.7 and Chapter 16 of the SEE. Management and Mitigation Measure C20 states that "*An Asbestos Management Plan would be developed in accordance with the relevant guidelines*". The Asbestos Management Plan was prepared as part of the demolition works in accordance with the following:

- National Model Work Health and Safety Regulations; and
- associated Model Codes of Practice including:
  - How to Safely Remove Asbestos
  - How to Manage and Control Asbestos in the Workplace
- National Code of Practice for the Safe Use of Synthetic Mineral Fibres.

Should the ACS Modification works be consented, the DEMP and AMP would be updated to include relevant mitigation and management measures from **Chapter 11** of this report as well as any relevant conditions of consent. At this time, Caltex would also update the AMP (and other plans as necessary) with the recent 2016 Code of Practice, How to Safely Remove Asbestos.

4.2 Issue 2 – Air Quality and Noise

NSW Health noted that the ACS Modification works must "*comply with the EPA Guidelines for Environmental Management On-Site Remediation, Appendix C for odour and gaseous (volatile) emission, air quality dust (particulate) emission and Appendix D for noise issues*".

Response

Caltex note this request. Caltex is proposing to implement a number of management and mitigation measures to ensure the ACS Modification works are completed in line with relevant legislation and guidance. In order to incorporate the requirements of the *EPA Guidelines for Environmental Management On-Site Remediation,* the text provided below expands on Management and Mitigation Measure H27 (new text in bold and italics):

> The DEMP would include ***a*** ~~**two new**~~ subplan**s**: ***the*** Containment Cell Management Plan~~**; and a** ***ACS Biopile Management Plan***~~. With regards to air quality, ***this*** ~~**these**~~ subplan**s** would include:
>
> - A brief overview of the ***containment cell*** ~~**site**~~ operations relevant to potential air emission sources.
> - Identification of mitigation measures for each respective emission source including those measures outlined in the DEMP for the Site (where relevant to operations within ***the containment cell*** area ~~**each works**~~).

- Details of proposed monitoring and recordkeeping procedures.

During the production of this plan the NSW EPA Guidelines for Environmental Management On-Site Remediation, would be reviewed and if necessary relevant measures incorporated.

4.3 Issue 3 – Monitoring Sensitive Receivers

NSW Health noted that appropriate mitigation measures, dust monitors and monitoring stations should be placed along the north-west of the site, near the village of Kurnell as per the Australian/New Zealand Standard 3580.1.1:207 - Guide to sitting air monitoring equipment.

In addition NSW Health asked for visual and continuance monitoring for noise, odour and air monitoring asbestos dust emissions along the sensitive receives.

Response

The noise impact assessment in Chapter 11 of the SEE demonstrated that the ACS Modification works would not impact the residences in Kurnell therefore no additional noise measures are proposed in response to this comment.

Dust deposition monitoring is already being undertaken in accordance with AS/NZS 3580 as part of the demolition works. This includes monitoring points in appropriate locations on the Site boundary and in Kurnell. The precise locations are dependent on weather and works being undertaken on the Site. This monitoring is presented in Management and Mitigation Measure H24 and would continue during the ACS Modification works and demolition works. In addition visual monitoring of dust emissions is also undertaken (refer to Management and Mitigation Measure H21).

Odour monitoring is already undertaken in as part of the demolition works. This includes visual and olfactory monitoring and the use of monitoring equipment during excavation activities where potential hydrocarbon contamination is present. Contractors notify the Caltex Environment Specialist of any significant odours. This monitoring is presented in Management and Mitigation Measures H11 and H12 and would continue during the ACS Modification works and demolition works.

As discussed in **Chapter 3** of this report a number of Management and Mitigation Measures have been developed in order to stop asbestos fibres from becoming airborne and to monitor the success of these measures.

4.4 Issue 4 – Remediation Action Plan

NSW Health requests a copy of the "Remediation Action Plan” (RAP) be provided prior to the commencement of remedial works in 2018.

Response

Caltex have noted this request.

5.0 NSW DPI

Introduction

Two submissions were received from NSW DPI dated 1 November 2016 and 3 February 2017. A response to these submissions is outlined below.

5.1 Issue 1 – Positive

DPI reviewed the SEE and had no objections in relation to the proposal. DPI provided one comment for consideration with respect to the management of potential impacts to groundwater resources:

"*DPI Water considers that the investigatory, construction and monitoring processes outlined in the SEE for the new asbestos contaminated soil containment cell are satisfactory. Existing conditions of consent with respect to environmental performance and management Schedule C) are considered adequate*".

Response

No response required.

5.2 Issue 2 – Crown Lands Adjoining the Project

DPI submitted a second submission, dated the 3 February 2017, which stated "*While not raised in earlier submissions, Crown lands adjoining the project site comprising Lots 1125 and 1118 DP 752064 are Crown land held under Special Leases in perpetuity by Continental Carbon Australia Pty Ltd and are currently under rehabilitation. Any pipeline(s) and services traversing the Caltex Kurnell Terminal site which service Lots 1125 and 1118 DP 752064 should be protected as they may be required for future use*".

Response

The ACS Modification works would not be undertaken on Lots 1125 and 1118 DP 752064 and would not involve disruption of services.

6.0 Sutherland Shire Council

Introduction

Two submissions were received from Sutherland Shire Council (SSC) dated the 11 November 2016 and 8 February 2017. Responses to the comments made are outlined below.

6.1 Issue 1 – Flood Mapping

Sutherland Shire Council requested that the flood study required under SSD MOD1 be completed prior to the approval of ACS Modification works.

Response

Following discussions with Sutherland Shire Council, their concern with regards to the flood modelling management and mitigation measure (F7) from SSD 5544 is based on the lack of confirmed timescales for the modelling to be completed. This measure states:

> *Caltex undertakes a flood study, commencing within 3 months of completion of demolition works that assesses potential flood risks from the Site to the Kurnell township, with a particular emphasis on the impacts from surface water entering the Site from land to the east and south of the Site and whether current diversion methods are appropriate.*
>
> *Caltex to remain in consultation with Sutherland Shire Council throughout the flooding investigation works to identify a mutually acceptable solution to potential flood risks along the north eastern boundary of the Site. The timing and form of consultation is to be mutually agreed by both parties (Caltex and Sutherland Shire Council) and outlined within a written document to be produced by Caltex prior to commencement of the flood study. It shall include regular reporting updates and milestone meetings, for example, at the Scope of Works, concept design, at the issuing of the draft report to discuss results and recommendations as a result of the study.*

The original plan (as presented in the SEE for SSD 5544 MOD1) was that the demolition works would be complete by the end of 2017. At present these works may extend into the first part of 2018. Caltex do not expect the demolition works to go beyond the end of March 2018.

As discussed, the sub surface infrastructure at the Site is being removed this year. Where sub surface infrastructure is being removed the land will need to be brought back to grade and shaped so that surface water does not pool. Caltex are expecting to finish this work early next year, possibly before March.

In order to capture the recommended requirements for the flood study, Management and Mitigation Measure F7 has been amended as follows (bold and italics denotes a change from the SEE):

> *Caltex undertakes a flood study, commencing **~~within 3 months of completion of demolition works~~ in March 2018** that assesses potential flood risks from the Site to the Kurnell township, with a particular emphasis on the impacts from surface water entering the Site from land to the east and south of the Site and whether current diversion methods are appropriate. **The flood study would consider the Sutherland Shire Council's Draft Sea Level Rise Policy (May 2016), or a latest revision**.*
>
> *Caltex to remain in consultation with Sutherland Shire Council throughout the flooding investigation works to identify a mutually acceptable solution to potential flood risks along the north eastern boundary of the Site. The timing and form of consultation is to be mutually agreed by both parties (Caltex and Sutherland Shire Council) and outlined within a written document to be produced by Caltex prior to **~~commencement of the flood study~~ March 2018**. It shall include regular reporting updates and milestone meetings, for example, at the Scope of Works, concept design, at the issuing of the draft report to discuss results and recommendations as a result of the study.*

6.2 Issue 2 – Biopile Asbestos Management

The Sutherland Shire Council noted that they agreed with comments raised by the NSW EPA on proposed biopiling processes.

Response

Following consultation with the EPA, the ACS biopiling scope has been removed from the ACS Modification works under SSD 5544 MOD 2 (refer to **Section 1.3**). Therefore this issue is no longer relevant.

6.3 Issue 3 – Wastewater

The Sutherland Shire Council noted that "*with respect to the proposed leachate collection and treatment via the existing wastewater treatment plan, and specifically management of asbestos fibres, Council concurs with the comments and requirements presented by the NSW Environment Protection Authority in their correspondence dated 2 November 2016*".

Response

Caltex have provided a response to the EPA's comments on Wastewater in **Section 3.15** of this report.

7.0 Kurnell Progress and Precinct Residents' Association

Introduction

A submission was received from the Kurnell Progress & Precinct Residents' Association dated the 3 November 2016. The submission outlined two questions regarding whether asbestos will be bought from other sites to be stored at the Caltex site and the effect of the storage of asbestos on the aquifer in Kurnell. Responses to these comments are provided below.

7.1 Issue 1 – Storage of ACS from other sites

The Association was concerned that the ACS Modification works would result in asbestos containing materials from other sites being bought to the Site for storage.

"*We understand what the proposal to store asbestos material on the Caltex site entails, but will it provide an opportunity to bring asbestos material from other sites for storage? There is a concern in the community that more noxious materials might be stored at Kurnell."*

Response

Chapter 4 of the SEE states that all soils that would be placed within the containment cell o would be sourced from the Site. No material from offsite would be accepted in the containment cell. Also, no asbestos containing material besides ACS would be stored in the containment cell.

In addition, as per EPL 837 condition L4.1 Caltex "*must not cause, permit or allow any waste to be received at the premises*", except the waste expressly referred to in the EPL. The EPL does not permit asbestos to be received at Site.

7.2 Issue 2 – Groundwater Contamination

This submission asks if the ACS Modification works would in any way affect groundwater at Kurnell.

"Will the storage of the asbestos on the Caltex site, in any way, affect the aquifer at Kurnell? Is there any chance that asbestos will leech into the local water table? The water table in any suburb is very important but at Kurnell, the water level is not very far below the surface. Is there a chance that the storage, or an accident during the transfer process, could allow dangerous material to enter the aquifer?"

Response

The ACS containment cell has been designed so that it avoids contact with the groundwater. Caltex are proposing to construct the cell above the groundwater level to avoid potential interaction. Also the containment cell would be constructed and operated in general accordance with the requirements for a restricted solid waste cell as per NSW *Solid Waste Landfill Guidelines 2016*. These guidelines require that the proposed cell includes a double (composite) liner system, whereby if the primary liner fails there is a secondary liner to prevent contamination of groundwater. The proposed containment cell liner and leachate system is discussed in more detail in Chapter 4 of the SEE.

However this liner system is primarily in place to protect the groundwater from residual hydrocarbons that may be present within the ACSs. Asbestos tends to bind to soils and does not leach into the groundwater. Therefore the asbestos within the cell would not leach into the groundwater, and the presence of the liner system would mean that there is no chance of it mobilising through the ground beyond the cell.

In addition the following management and mitigation measures would be implemented during excavation:

- All ACSs to be removed from the pipeways would be wetted down prior to excavation, loading or transport.
- Excavation of the pipeways would be staged to allow placement of excavated ACS directly into the containment cell and minimise the need to stockpile ACS.
- All vehicle tyres would be cleaned before exiting the containment cell area.
- Stormwater from within excavated areas of the pipeways would be sent to the Wastewater Treatment Plan (WWTP) unless it is tested and is of suitable quality to be directed to stormwater, as per normal operation of the pipeways.
- Stormwater within the containment cell works area would be directed to the oily water sewer system (OWSS) and treated at the WWTP.

The Site's Operational Environment Management Plan would be updated to include management and monitoring of the containment cell. Measures would include:

- Quarterly groundwater monitoring for two years for the two installed monitoring wells. Following this time, annual groundwater monitoring would be undertaken to provide ongoing demonstration that the containment cell liner is operating effectively
- Measures to ensure that the cover of contaminant cell remains as low growing plant species and does not develop larger tree and shrub species that may puncture the liners in the cover.

8.0 Form Letters

Introduction

One form letter was submitted from a number of people from Kurnell and surrounding suburbs. This section responds to the issues that were raised within the letter.

The signatories of the form letter included David Zuaharija, Lisa Caldwell and five other members of the public who withheld their names.

This form letter raised a number of issues including:

- Proximity to residential areas
- Risk to the community
- Adequacy of the consultation effort
- Caltex record
- Storage of ACS from other sites
- Air Quality monitoring
- Noise monitoring
- Permanent nature of the proposal
- Impact on house prices
- Visual Amenity

These issues are responded to below.

8.1 Issue 1 – Proximity to Residential Areas

This submission was concerned that the ACS Modification works would be highly disruptive.

"Works associated with proposed new cell are likely to be highly disruptive"

Response

The proposed location of the containment cell is approximately 930 metres from the nearest residential properties. The source of the ACS and the containment cell are both located within the Site.

Potential impacts that may result from the ACS Modification works were assessed throughout the SEE and the following was concluded:

- No cumulative noise increase is anticipated as a result of the ACS Modification works during the demolition works period. Also, noise due to traffic generation by the ACS Modification works would be negligible to residences (refer to Chapter 11 of the SEE).
- Traffic related impacts as a result of the ACS Modification works are highly unlikely. Nevertheless, mitigation and management measures were identified in Chapter 13 of the SEE to ensure that the ACS Modification works are managed with consideration of other activities at the Site.
- A qualitative analysis identified that potential air quality impacts, including odour, would be low with mitigation measures in place. Mitigation measures to manage potential air quality impacts are provided in Chapter 12 of the SEE.

As demonstrated in the SEE, it is unlikely that the ACS Modification works would be disruptive to local residents in Kurnell or Sutherland Shire.

8.2 Issue 2 – Risk to community

This submission was concerned that the ACS Modification works are likely to be *"a health risk to local residents and ecosystem".*

Response

Chapters 8 – 15 of the SEE provide an assessment of the potential impacts that could result from the ACS Modification works. A number of these chapters include assessments that discuss the potential impact of the works on the community. These assessments provide various measures to avoid or mitigate these potential impacts. These mitigation measures are provided in full in Chapter 16 of the SEE and they build on the extensive list of management and mitigation measures that were agreed for the demolition works (SSD 5544 MOD1). Where necessary, these measures have been further revised in response to the submissions noted within this document. This revised list is provided in **Chapter 11** of this report.

The management and mitigation measures include air quality controls to avoid dust, contamination and asbestos being mobilised from the works and monitoring requirements to allow Caltex to change or cease works if impacts could occur. A number of these measures are already approved and in place for the demolition works.

8.3 Issue 3 – Consultation

This submission stated that *"the Kurnell community has not been adequately consulted"*.

Response

The consultation effort up to exhibition is explained in detail within Chapter 6 of the SEE. The SEE was placed on public exhibition between 19 October 2016 and 2 November 2016 and members of the public, statutory agencies and other stakeholders were invited to comment on the ACS Modification works via a submission to the DPE.

During and after exhibition the following consultation has taken place with the local community:

1. Two letter box drops; and
2. Quarterly Kurnell Community Meeting on 6 December 2016 and 28 March 2017

A summary of the issues discussed relevant to the ACS Modification works are presented alongside a response in **Section 2.1** of this report.

Caltex engages on a regular basis with the residents of Kurnell through a number of approaches. As noted above this includes:

- Kurnell Community Meeting (quarterly);
- Kurnell Progress Residents Association (monthly) Meeting; and
- printed reports in Kurnell Village News (bi-monthly).

Caltex also has a 24 hour hotline and complaints register and procedure for identifying and responding to concerns from the local community.

Ongoing community consultation during the ACS Modification works would be undertaken in accordance with the existing management and mitigation measures in the DEMP. In addition to these requirements the text provided below would be included as an additional Management and Mitigation Measure A13 (new text in bold and italics):

> ***From development consent of SSD 5544 MOD2 until the quarterly community meeting after the containment cell is closed, Caltex will provide an update on the progress of the ACS Modification works, including issues faced or complaints received, at each of the quarterly community meetings.***

8.4 Issue 4 – Caltex Record

This submission was concerned that mitigation measures to manage health and safety risks associated with the ACS Modification works would not be implemented once the works are approved.

"Once approved, there is low confidence that all health and safety risk mitigation strategies will be followed".

Response

The management and mitigation measures presented in this document and the conditions of consent should the ACS Modification works be consented, would be implemented as and when necessary. Evidence of compliance with these measures and conditions is required by the DPE as part of their independent audit process.

8.5 Issue 5 – Storage of ACS from other sites

This submission believed that Kurnell *"should not be considered an ACS dumping ground"* and that the ACS Modification works would create precedence for asbestos from future projects to be stored on the Site.

Response

Chapter 4 of the SEE states that all soils that would be placed within the containment cell would be sourced from the Site. No material from offsite would be accepted in the containment cell. Also, no asbestos containing material besides ACS will be stored in the containment cell. **Section 3.12** of this document presents the proposed soil acceptance criteria for the containment cell.

8.6 Issue 6 – Air Quality and Noise

This submission claimed that correct monitoring procedures for dust and noise are not in place.

Response

The ACS Modification works have not yet commenced. Therefore potentially this comment relates to existing operations at the Site. However, assuming it relates to the ACS Modification works, the SEE provides an assessment of potential impacts related to both air quality (refer to Chapter 12) and noise (refer to Chapter 11).

Management and Mitigation Measure A3 states that "Caltex would ensure that the Project contractor prepares and implements... a *Demolition Environmental Management Plan (DEMP) for the demolition works (inclusive of the ACS Modification works) to manage any Project impacts*". As such the existing measures within the DEMP and associated subplans would be implemented during the ACS Modification works. Management of the potential impacts can be divided into two activities, the excavation of the pipeways and the containment cell works.

As discussed in Section 12.7 of the SEE the excavation of the pipeways is consistent with the activities already undertaken as part of the demolition works, as such it is recommended that pipeway excavations be managed in accordance with existing management strategies which include the Demolition Air Quality Management Plan and the Site's Asbestos Management Plan (*Management of Asbestos, Asbestos Containing Materials and Synthetic Mineral Fibres*). These plans are also applicable to the containment cell works, however to address additional requirements for these activities a Containment Cell Management Plan would be prepared which includes additional measures not previously considered for the demolition works (refer to Management and Mitigation Measures H27, H28 and H29).

A summary of the air quality monitoring data for the ACS Modification works would be provided to the community during Caltex's quarterly community meetings. Further discussion on air quality monitoring is provided in **Section 3.6, 3.10**, **4.2** and **4.3** of this report.

With regards to noise, no significant impacts related to the ACS Modification works were identified. As the works would be conducted in accordance with the conditions previously set out in SSD 5544 MOD1, no additional noise mitigation measures are considered warranted for the ACS Modification works. Even so, Management and Mitigation Measures G2-G8, G12, G13 are included in the DEMP and would be applied to the ACS Modification works.

8.7 Issue 7 – Permanent nature of proposal

This submission was concerned that the future of Kurnell was not considered in the ACS Modification works because *“once the ACS [containment] cell is built it will stay for good”*.

Response

Caltex have been operating the Site since 1956 and are in the process of converting the Site to a major import terminal of finished products (gasoline, jet fuel and diesel). The Site is the hub of Caltex’s operations for NSW and the ACT and therefore Caltex has no intentions of leaving the Site. As discussed in **Section 3.4** of this report, appropriate controls would be implemented to ensure that the long term management of the containment cell is addressed.

8.8 Issue 8 – Impact on house prices

This submission claimed that the ACS Modification works would have *“the potential to negatively influence property prices in Kurnell”.*

Response

Property prices in any area are governed by a number of factors. While public perception of the area is undoubtedly one of these factors it is only one of the many complicated interactions that drive the market-set prices of housing stock.

Caltex has been operating at the Site for over 50 years and Caltex and the residents in the area have developed together over this time. Even with first the refinery and now the terminal operating at the Site, Kurnell has remained a desirable suburb.

It is unlikely that the containment cell would negatively influence property prices. The cell is located approximately 930 m from the nearest residential property and has been designed in general accordance with the *NSW EPA Environmental Guidelines: Solid Waste Landfills, second edition 2016*. The cell would only contain ACSs from the Site; a material that is already present at the Site and is not adversely affecting the year on year increase in property prices in Kurnell (approximately 5.7% annual increase as of December 2016 compared to a national average of 4.3%).

8.9 Issue 9 - Visual Amenity

This submission was concerned that the ACS containment cell would be visible and aesthetically unpleasant.

Response

The proposed containment cell is proposed to be located within the existing Caltex Terminal, approximately 930 metres away from residential dwellings and 540 metres from commercial offices. The proposed containment cell would be revegetated with native grasses as soon as practicable following the works. It is almost impossible to view the proposed location of the containment cell from off-site locations due to the topography of the area and the numerous tanks across the Site. Therefore it is highly unlikely that the ACS Modification works would have a negative impact on visual amenity.

9.0 Public Submissions

Introduction

During and after exhibition of the SEE, 20 unique submissions were received from members of the public. These submissions consisted of modified versions of the form letter and original compositions (19 letters).

This section identifies the issues raised within the original compositions. As many of these submissions raised the same issues, they have been responded to here thematically. Examples from the submissions that raised the issues are also provided to provide a sense of how these were expressed.

A list and summary of the public submissions can be found in **Appendix B**, the original submissions can be located on the DPE website.

9.1 Project Description, Location, Need and Alternatives

The following issues were raised by members of the public under this category.

9.1.1 Proximity to Residential Areas

A number of submissions were concerned that the ACS Modification works would negatively impact the health and safety of residents due to the proximity of the works to residential areas. This concern was identified by the following authors: **David Keirle, Heather Bourne, Kristy Craft, Michelle Myers, Kerry Ward, Ashleigh Hudson, Naomi Iredale, Name withheld (1), Name withheld (2), Name withheld (3)** and **Name withheld (5)**.

Response

ACSs in the pipeways are currently being managed in situ under an Exemption Order to Section 419 of the *Work, Health and Safety Regulation 2011*.

As per Chapter 1.3.3 of the SEE, the presence of ACSs at the Site was discussed in both the development application for the conversion works (SSD 5544) and the modification application for the demolition works (SSD 5544 MOD1). In the SEE for SSD 5544 MOD1, Chapter 9.7.1 noted three potential options for managing asbestos; managing asbestos in situ; containment on-site; and removal of contaminated material from the Site. Following an assessment of these options, containment of the ACS on site was identified as the best option.

In order to locate the containment cell one of the key criteria was distance from residential areas. As such the proposed containment cell is being located approximately 930 meters from residential dwellings.

As discussed in Chapter 8 – 15 of the SEE, the potential impacts from the ACS Modification works, including potential impacts to the community, have been assessed and management and mitigation measures have been developed. These measures are provided in Chapter 16 of the SEE. Based on consultation with regulatory agencies and the community, the management and mitigation measures have been modified and a revised list is provided in **Chapter 11** of this report. These measures build on the measures that were agreed for the conversion (SSD 5544) and demolition works (SSD 5544 MOD1).

The management and mitigation measures include air quality controls to reduce the likelihood of asbestos becoming airborne and monitoring requirements to allow Caltex to confirm the effectiveness of these measures and to stop work if necessary.

Given the extensive controls in place for the demolition works and provided for the ACS Modification works, the health and safety of the local residents is highly unlikely to be affected.

9.1.2 Alternative Locations

A number of submissions suggested the ACS be removed from Site and disposed of in a licensed facility off-site. This suggestion was received from the following authors: **David Keirle, Michelle Myers, Greg Denaro, Name withheld (5)** and **Name withheld (8).**

Response

As discussed in **Section 9.1.1** above, the SEE for the ACS Modification works identified three potential options for managing ACS. A multi-criteria analysis was carried out to identify the most appropriate long-term solution (refer to Section 1.3 of the SEE). Two of these options included:

- Containing the ACS on-site; and
- Removing ACS from the Site.

The multi-criteria analysis concluded that containing the material on-site would remove the potential health impacts for workers on site associated with the presence of the ACS, whilst also removing the risks associated with transporting a large volume of the soils across metropolitan Sydney. The Site would also continue to be managed and staffed by Caltex and so the containment cell would be managed as part of the wider operation at the Site. ACS would be classified in accordance with the *NSW EPA Waste Classification Guidelines* prior to placement in the containment cell as discussed in **Section 3.12** of this report.

Removing the ACS from the Site would require approximately 820 trucks (or 1,640 truck movements)[2], based on 30 tonne loads. This would result in potential off-site health and safety impacts due to the risk of a vehicle accident. In addition, potential noise, traffic and greenhouse gas impacts would be expected due to the large number of truckloads.

Therefore, placing the ACS in an on-site containment cell was identified as the most appropriate option and a safe and reliable method for management of ACSs.

9.1.3 Financial Motivation

A submission from **Michelle Myers** stated that the proposal to store ACS in an on-site containment cell was based on finance.

Response

As outlined above, a multi-criteria analysis was carried out to identify the most appropriate long term solution for managing ACS on Site. Whilst, financial viability of the proposal was a consideration when assessing potential options, the following considerations were also reviewed:

- Acceptability to community
- Potential on-site health and safety impacts
- Potential off-site health and safety impacts
- Potential environmental impacts
- Technical feasibility
- Acceptability to regulatory authorities including EPA, Safe Work Australia and permitting / licence requirements
- Ability of approach to meet Caltex's objective to remove the hygiene risk of ACS in the pipeways

The multi-criteria analysis identified containment on-site as the preferred long term option when considering all of the factors listed above and financial viability. The findings of the multi-criteria analysis for each option are discussed in Chapter 1.3.3 of the SEE.

[2] A truck movement is equal to travelling to Site or from Site as such the truck movements are double the number of trucks.

9.1.4 Project Description

A submission from **Michelle Myers** objects to the proposal to "*demolish and convert the Kurnell oil refinery into a housing facility for asbestos contaminated material*".

Response

Caltex have received development consent to convert the Kurnell Refinery into a finished product terminal. This conversion involves the management of ACS present on the Site. The ACS Modification works do not propose to convert the oil refinery into a housing facility for asbestos containing material. Instead the ASC Modification works propose to manage the existing ACS by removing them from the pipeways (and potentially other parts of the Site) and securing them in a closed containment cell on-site. This will remove the potential health risk to those working on parts of the Site where the ACS is present. No ACS or other asbestos material will be brought to the Site if the ASC Modification works are consented.

9.1.5 Storage of ACS from Other Locations

A number of submissions were concerned that the ACS Modification works would result in asbestos and ACS from other locations being stored on-site. Further to this, some submissions were particularly concerned that Kurnell would be considered an *"asbestos dumping ground".*

This concern was received from the following submissions: **Heather Bourne, Karen Shanley, Michelle Myers, Ashleigh Hudson, Yvonne Banks, Name withheld (5), Name withheld (7)** and **Name withheld (8).**

In addition a submission from **Greg Danero** questioned if material brought to Site for the treatment in the Caltex Soil Remediation Facility was contaminated with asbestos.

Response

Chapter 4 of the SEE states that all soils that would be placed within the containment cell would be sourced from the Site. No material from off-site would be accepted in the containment cell. No asbestos containing material besides ACS will be stored in the containment cell.

In addition, as per EPL 837 condition L4.1 Caltex "*must not cause, permit or allow any waste to be received at the premises*", except the waste expressly referred to in the EPL. The EPL does not permit asbestos to be received at Site. As such neither the existing Caltex Soil Remediation Facility or the ACS Modification works would accept asbestos contaminated waste from offsite.

9.1.6 On-site Treatment of Hazardous Materials

A submission received from **Michelle Myers** claimed that the ACS Modification works sets "*precedence for the treatment of hazardous materials for the site".*

Response

As noted above and in Chapter 4 of the SEE, all soils that would be placed within the containment cell would be sourced from the Site. No material from off-site would be accepted in the containment cell or treated as part of the ACS Modification works.

9.1.7 Permanent Nature of the Proposal

Submissions from **Michelle Myers and Greg Denaro** objected to the permanent nature of the ACS Modification works. The submissions suggested that ACS should not be housed on the Site permanently.

Response

Caltex have been operating the Site since 1956 and are in the process of converting the Site to a major import terminal of finished products (gasoline, jet fuel and diesel). The Site is the hub of Caltex's operations for NSW and the ACT and therefore Caltex has no intention of leaving the Site. As discussed in **Section 3.4** of this report, appropriate controls would be implemented to ensure that the containment cell is managed in the long term.

9.2 Consultation

The following issues were raised by members of the public under this category.

9.2.1 Adequacy of Consultation Effort

Two submissions were received from the public which identified that "*the local community [has] not been informed adequately, or consulted*" and suggest that the community is informed prior to the works commencing.

This suggestion was received from the following submissions: **Michelle Myers** and **Name Withheld (4)**.

Response

Refer to **Section 8.3** of this report for a detailed response to this issue. Provided below is a short summary of that discussion.

Following the exhibition period, Caltex conducted two letter box drops (27 October 2016 and 30 November 2016) and held a community information session (as part of the quarterly community briefing) to allow members of the community to speak directly to the Project team. This session was held at the terminal on 6 December 2016 from 6:00 pm to 8:00 pm. A range of issues were discussed. Those relevant to the ACS Modification works are presented alongside a response in **Section 2.1** of this report.

In addition to the quarterly Kurnell Community Meeting, Caltex also engages with the local Kurnell community through:

- Kurnell Progress Residents Association (monthly) Meeting; and
- printed reports in Kurnell Village News (bi-monthly).

Caltex will use these consultation opportunities to discuss the proposed modification with the local community in the future.

Ongoing community consultation during the ACS Modification works would be undertaken in accordance with the existing management and mitigation measures in the DEMP. In addition to these requirements the text provided below would be included as an additional Management and Mitigation Measure A13 (new text in bold and italics):

> ***From development consent of SSD 5544 MOD2 until the quarterly community meeting after the containment cell is closed, Caltex will provide an update on the progress of the ACS Modification works, including issues faced or complaints received, at each of the quarterly community meetings.***

9.3 Hazard and Risk

The following issues were raised by members of the public under this category.

9.3.1 Risk to the Community

Submissions were received from: **Kristy Craft, Ashleigh Hudson, Yvonne Banks, Name withheld (4), Name withheld (6)** and **Name withheld (8).** These submissions objected to the ACS Modification works, on the grounds of a perceived health and safety risk to the community associated with the ACS Modification works.

Response

As discussed in **Section 8.2** of this report, the potential impacts from the ACS Modification works are identified in Chapters 8 – 15 of the SEE, including potential impacts to the community. These assessments provide various measures to avoid or mitigate these potential impacts. These mitigation measures are provided in full in Chapter 16 of the SEE and they build on the extensive list of management and mitigation measures that were agreed for the demolition works (SSD 5544 MOD1). Where necessary, these measures have been further revised in response to the submissions noted within this document. This revised list is provided in **Chapter 11** of this report.

The management and mitigation measures include air quality controls to avoid dust, contamination and asbestos being mobilised from the works and monitoring requirements to allow Caltex to change or cease works if impacts could occur. A number of these measures are already approved and in place for the demolition works.

9.4 Air Quality

9.4.1 Dust and Particulate Matter

Submissions from **Karen Shanley, Kristy Craft, Michelle Myers, Greg Danaro** and **Name withheld (4)** raised concerns about the ACS Modification works disturbing contaminated soils, resulting in asbestos fibres being distributed in the air and amongst the community.

Response

Potential air emissions due to the ACS Modification works and the associated management and mitigation measures are discussed in detail in **Sections 3.6, 3.10, 3.13, 4.2** and **4.3** of this report. As discussed in these sections, the potential for the ACS Modification works to generate adverse air quality impacts is considered low and manageable with the implementation of appropriate mitigation measures. These mitigation measures are consistent with those applied as part of the demolition works, but with specific allowances for the containment cell works. Management and mitigation measures to be included for the ACS Modification works, in addition to those agreed for the demolition works are provided in **Chapter 11** of this report.

9.4.2 Monitoring of Air Quality

A submission from **Michelle Myers** requested that "*air monitoring undertaken and published on a daily basis to ensure local residents are not exposed to deadly asbestos fibres*".

Response

The handling of ACSs would be undertaken in accordance with the *SafeWork's Code of Practice: How to Safely Remove Asbestos*. The Code includes requirements to conduct consultation with people who may be affected by the removal work including neighbours. Should the Site boundary monitoring report an exceedance of the SafeWork Australia time weighted average (TWA) exposure limit of 0.1 fibres/mL Caltex would notify the regulator and appropriate management measures implemented.

Environmental monitoring required under EPL 837 would be published within 14 days of obtaining the monitoring data on the Caltex website as per clause 66 of the *Protection of the Environment Operations Act 1997*. Monitoring undertaken in addition to that specified in EPL 837 would be reported to the community at the quarterly consultation meeting.

9.5 Noise and Vibration

A submission from **Name withheld (2)** was concerned that the ACS Modification works would result in increased noise levels impacting residents. **Michelle Myers** requested that noise consideration and restrictions be agreed upon with the community.

Response

A noise assessment for the construction noise issues during the ACS Modification works did not identify any further predicted exceedances beyond those previously reported for the demolition works. As the works would be conducted in accordance with the conditions previously set out in the Development Consent for SSD 5544 MOD1, no additional noise mitigation measures are considered warranted for the ACS Modification works. Even so, the following mitigation measure for monitoring noise was included in the ACS Modification works SEE and therefore would be implemented during the ACS Modification works:

- Noise monitoring would be undertaken when necessary to ensure compliance with demolition noise criteria.

The operation of the ACS Modification works involves the ongoing management of the closed containment cell. As such, an operational noise assessment is not necessary.

9.6 Asbestos Management

The following issues were raised by members of the public under this category.

9.6.1 Surface Waters and Soil

The submission from **Michelle Myers** and **Name withheld (2)** raised a concern that the ACS Modification works may contaminate the Site, including surrounding soils and waterways.

Response

The SEE provides an assessment of the potential impacts of the ACS Modification works to the environment. The SEE identified that if the management and mitigation measures provided in Chapter 10 of the SEE are implemented, impacts to the environment would be unlikely. For example these include, but are not limited to:

- Management and Mitigation Measure C27 - The containment cell area would remain bunded to prevent water flowing out of the respective areas except via the Oily Water Sewer System (OWS) before being treated at the Waste Water Treatment Plant (WWTP).
- Management and Mitigation Measure F2 -
  - Silt fencing and/or alternate sediment control measures would be installed around soil stockpiles and disturbed areas or areas where dust suppression is being undertaken;
  - Regular inspection of excavation areas and containment cell works areas, including following rainfall events;
  - During the demolition works and ACS Modification works, following notable but prolonged rainfall events (over three days) or following heavy rainfall events over a shorter timescale, water sampling would be completed at the stormwater retention basin to ensure that the quality of the water is of an appropriate standard to be discharged from the Site. Water that is not of an appropriate quality would be either treated in situ or directed to the WWTP.
- Management and Mitigation Measure F3 - Caltex would continue to implement the measures within the Stormwater Management Plan (SMP) for the Site. This plan has been produced in response to Environment Protection Licence No. 837, PRP U24.1: Stormwater Catchment and Management Plan.
- Management and Mitigation Measure F9 - Excavation of the pipeways would be staged, effectively minimising the area of disturbance at one time. The ACS Modification works would be undertaken in a manner to minimise the potential for soil erosion and sedimentation.

To ensure that these management and mitigation measures are implemented Caltex would conduct the ACS Modification works in accordance with an updated DEMP and associated subplans. To address specific aspects of the ACS Modifications works Caltex would also prepare two additional management plans in consultation with DPE and NSW EPA, a Containment Cell Management Plan and Remediation Action Plan. These new subplans would reference other parts of the DEMP as necessary but would also include specific measures for the excavation and containment cell.

9.7 Transport and Access

A submission from **Kerry Ward** was concerned that the ACS Modification works would result in an undesirable increase in the number of trucks travelling on Captain Cook Drive.

Response

As discussed in **Chapter 13 Transport and Access** of the SEE, heavy vehicle movements for the ACS Modification works can be accommodated within the maximum heavy vehicle movements for the demolition works. Therefore, it is considered unlikely that these works would have an adverse impact on the local road network.

Nevertheless, mitigation and management measures were identified to ensure that the ACS Modification works are managed in line with other activities at the Site. These include ensuring that heavy vehicle movements from the demolition works and ACS Modification works would be coordinated to ensure that off-site heavy vehicle movements do not exceed 60 movements a day.

9.8 Environmental Monitoring

A submission from **Michelle Myers** questioned how the proposed containment cell and biopile structure would be inspected and monitored for release of contaminants, during construction and operation.

Response

The SEE detailed a number of monitoring procedures that would be implemented for the ACS Modification works, in addition to those included in the DEMP. Additional testing and monitoring measures to be implemented before and during construction include:

- Management and Mitigation Measure C21- Additional sampling of the pipeways to ensure that the area of soil disturbance is restricted as far as practicable to asbestos impacted areas only.
- Management and Mitigation Measure C29 - Installation of two groundwater monitoring bores to the north and west of the containment cell. Quarterly monitoring would be undertaken during construction, filling and closure of the cell.

Additional contaminant monitoring measures to the DEMP to be implemented during operation include:

- Quarterly groundwater monitoring for two years for the two installed monitoring wells. Following this time, annual groundwater monitoring would be undertaken to provide ongoing demonstration that the containment cell liner is operating effectively. Monitoring of these bores would occur in accordance with the existing groundwater monitoring program for the Site.
- Regular inspections of the containment cell to monitor the effectiveness of the erosion and sediment control measures (refer to Figure 4-6 of the SEE) incorporated into the design of the containment cell, in line with the Site's existing Inspection Checklist and following heavy rain events.

Following consultation with the EPA, the ACS biopiling scope has been removed from the ACS Modification works under SSD 5544 MOD 2 (refer to **Section 1.3**). Therefore this issue is no longer relevant.

9.9 Other Issues

The following additional issues were raised by members of the public.

9.9.1 Regulatory Requirements

A submission from **Michelle Myers** claimed that the Site is not licensed to store ACS and suggested that the ACS should be disposed of in accordance with the *Protection of the Environment Operations (Waste) Regulation 2014*.

Response

Caltex is seeking approval to place ACS from the Site within a containment cell constructed and operated in general accordance with the NSW EPA Solid Waste Landfill Guidelines. Caltex is not permitted to bring waste from 'off-site'. As stated in EPL 837 condition L4.1 Caltex "*must not cause, permit or allow any waste to be received at the premises*", except the waste expressly referred to in the EPL.

9.9.2 Land Zoning

A submission from **Michelle Myers** claimed that the zoning of the Site is '*E4 Environmental Living'* and therefore is not suitable for ACS storage.

Response

The Site is zoned as IN3 Heavy Industrial under the *Sutherland Shire LEP 2015*.

9.9.3 Caltex Record

Submissions form **Kristy Craft, Greg Denaro** and **Name withheld (4)** raised concerns about previous Caltex environmental non-compliance and safety record. **Kristy Craft** stated: *"Caltex are regularly non-compliant with their fuel, noting numerous fuel spills into Botany Bay and leaking pipes that can be smelt after rainfall*".

Response

The management and mitigation measures presented in this document and the conditions of consent should the ACS Modification works be consented, would be implemented when necessary. Evidence of compliance with these measures and the conditions of consent is required by the DPE as part of their independent audit process.

9.9.4 Remediation of the Site

Submissions from **Michelle Myers, Greg Denaro,** and **Name withheld (5)** proposed that the Site should be remediated.

Response

Caltex is currently undertaking works to convert the refinery to a terminal. Following completion of demolition works the Site will be characterised and if necessary remediated. The remediation strategy for the Site would be discussed with the NSW EPA and other regulators as required. Remediation of the Site is not including under the scope of the ACS Modification works.

9.9.5 Impact on House Prices

Submissions from **Michelle Myers, Ashleigh Hudson** and **Name withheld (4)** raised concerns that the ACS Modification works would negatively impact the value of properties in the Kurnell area.

Response

As discussed in detail in **Section 8.8** of this report, it is unlikely that the containment cell would negatively influence property prices given its distance from residential areas and that the containment cell has been designed in general accordance with the EPA guidance. While public perception of an area is undoubtedly one factor that influences house prices, it is only one of the many complicated interactions that drive the market-set prices of housing stock.

9.9.6 Impact of Extreme Weather Events

A submission from **Yvonne Banks** and **Heather Bourne** raised concerns about how impacts would be managed if the ACS were disturbed and spread amongst the community, noting the clean-up required after the tornado in Kurnell in December 2015.

Response

The ACS is already present on Site. The ACS Modification works propose to remove the ACSs from the pipeways and other parts of the Site and contain them within the ASC containment cell, thus reducing the potential of the community being exposed to asbestos fibres during extreme weather events.

9.9.7 SafeWork NSW

A submission from **Yvonne Banks** suggested that the ACS should be removed safely from the Site *"under the watchful eye of WorkCover"*, due to the size of the Site and its exposure to the environment.

Response:

The Site is classified as a major hazard facility (MHF). Any works to or modifications of a MHF need to be discussed with SafeWork NSW as the administrators of the *Work Health and Safety Act 2011*. Caltex have consulted with SafeWork NSW regarding the ACS Modification works (refer to Chapter 6 Consultation of the SEE) and will continue to do so moving forward. However as the ACS Modification works would not modify the MHF, consent and approval of WorkCover NSW is not required.

10.0 Project Scope Modification

10.1 Background

Section 1.3 of this report outlines a number of discussions with the EPA and a proposed change to the scope of the ACS Modification works as presented in the SEE. This change involves removing the biopiling activity from the ACS Modification works and instead placing ACS classified as hazardous waste under the NSW EPA Waste Classification Guidelines directly into the containment cell.

Following NSW EPA's recommendation to contain all of the ACS from the pipeways within the containment cell, Caltex reviewed the design of the containment cell to ensure that it was suitable to contain this additional material (i.e. the hazardous ACS). This review predominantly looked at the proposed liners and leachate collection system for the containment cell to ensure that these elements would not be affected by the hazardous ACS. The conclusions of this review confirmed that the design and materials recommended in the concept design report for the containment cell were suitable to contain all ACS from the pipeways. As such no design changes to the containment cell are required.

Therefore the only change to the description presented in Chapter 4 of the SEE is the removal of the biopiling works and the potential need to transport the ACS off-site.

This chapter assesses whether not this proposed change is likely to result in increased or new impacts.

10.2 Supplementary Assessment

A short supplementary assessment is presented below that examines the proposed change against each of the environmental aspects presented in the SEE. This assessment is documented in **Table 10-1**.

Table 10-1 Supplementary Assessment

Aspect	Supplementary assessment	Impact summary
Soil, Groundwater and Contamination	The removal of the ACS biopiling works would reduce the area of the Site required to complete the ACS Modification works. Removal of these works would also mean that the ACS is handled and transported less and that the biopile works area is no longer required. This change would mean that the risk of spilling or spreading the ACS across the Site is reduced, which in turn would mean that there is a lower likelihood that the ACS could contaminate the soil or groundwater at other parts of the Site. The risk of other parts of the Site being contaminated by ACS as it is being handled, stored or managed is reduced as a result of this scope modification.	No different or additional soil, groundwater and contamination impacts are anticipated as a result of the scope modification, however the chance of an impact occurring is significantly reduced.
Waste Management	The removal of the ACS biopiling works would remove the associated waste streams. The key sources of waste associated with the ACS biopile works include the following: • minor grading works; • installation of the biopile cell lining system; • wastewater management; and • general municipal waste and sewage generated by on-site staff/contractors. Removal of the of the ACS biopiling works would reduce the volumes of waste associated with the ACS Modification works.	The scope modification would reduce potential waste management impacts associated with the ACS Modification works.

Aspect	Supplementary assessment	Impact summary
Surface Water, Wastewater and Flooding	The removal of the ACS biopiling works would mean that the biopile works area is no longer required. Surface water flows from this area are already captured in the Oily Water Sewer System (OWSS) and directed to the Waste Water Treatment Plant (WWTP). This would have occurred with or without the ACS biopiling works. Removal of the ACS biopiling works would mean that there is less chance that contaminated surface water could enter other parts of the Site, but the likelihood of this occurring was already low. Potentially the ACS biopiling works would have had a wastewater/leachate flow that would have been sent to the OWSS and WWTP. Removal of the ACS biopiling works would remove this wastewater stream. The ability of the Site to accommodate high rainfall events and/or broader flooding events would not significantly change as a result of the design modification.	No different or additional surface water, wastewater or flooding impacts are anticipated as a result of the proposed scope modification.
Noise	The removal of the ACS biopiling works would mean that the ACS Modification works would involve one less component which in turn would mean less construction activity at the Site. This reduction in activity combined with the fact that that the biopile works area was closer to the township of Kurnell than the containment cell works area means that any potential noise impacts are likely to be further reduced. However, even with the ACS biopiling works, the predicted noise levels for the construction of the ACS Modification works complied with the noise criteria at all identified receiver locations, and therefore no noise impacts are expected.	The scope modification would reduce potential noise impacts associated with the ACS Modification works.
Air Quality and Odour	Removal of the ACS biopiling works would mean that the ACS is handled and transported less. The homogenisation process is no longer required and the ACS would not need to be moved from the biopile works area to the containment cell. Whilst the likelihood of asbestos or dust being released into the air as a result of the ACS Modification works was low, the removal of the ACS biopiling works would further reduce the likelihood of adverse air quality impacts occurring.	The scope modification would reduce potential air quality impacts associated with the ACS Modification works.
Transport and Access	Removal of the ACS biopiling works would not require different or additional personnel or equipment onsite to that described in the ACS Management Project SEE. As such traffic related impacts on the surrounding public road network as a result of the proposed scope modification would not occur. Indeed as all of the ACS from the pipeways is now proposed to be placed in the containment cell, any potential traffic impacts that may result from taking it offsite would also be avoided.	The scope modification would reduce potential traffic impacts associated with the ACS Modification works.

Aspect	Supplementary assessment	Impact summary
Heritage	All works would continue to be contained within previously disturbed areas within the Site boundary; as such no impacts to Aboriginal or Historic heritage values are expected.	No different or new heritage impacts are anticipated as a result of the proposed scope modification.
Ecology	Removal of the ACS biopiling works would not result in any new or additional ecological impacts. The ACS Modification works would remain within a highly modified and disturbed landscape with a low likelihood of threatened biota and/or Threatened Ecological Communities. In addition, the works would not involve the removal or modification of any remnant native vegetation. The potential ecological impacts from the works are unlikely to be different or additional to that described in the ACS Management Project SEE.	No different or ecology impacts are anticipated as a result of the proposed scope modification.
Hazards and Risks	The biopiling part of the ACS Modification works would store a range of potentially hazardous materials used in the bioremediation of contaminated soils. Removal of the ACS biopiling works would mean that these materials would no longer be required. However the small qualities of materials involved mean that any reduction is risk would be minor.	No different or hazards and risk impacts are anticipated as a result of the proposed scope modification.

10.3 Conclusion

A supplementary assessment has been completed as part of this Report. This was undertaken to assess whether or not the proposed scope modification of removing the ACS biopiling works and placing all of the ACS from the pipeways within the containment cell is likely to result in increased or new impacts compared to the assessment within the SEE for the ACS Modification works.

The conclusion of the supplementary assessment presented in **Table 10-1** confirms that the scope modification would not increase the magnitude of the impacts that have been identified in the SEE and would not introduce new significant impacts. Indeed for noise, air quality, traffic and waste management the potential impacts are likely to be reduced when compared to the assessments within the SEE for the ACS Modification works. As such, the scope modification is likely to reduce the overall environmental impact of the ACS Modification works as presented in the SEE.

11.0 Revised Management and Mitigation Measure

11.1 Introduction

The majority of the management and mitigation measures detailed with Section 16.1 of the SEE remain relevant to the ACS Modification works. The following section outlines where certain measures have been revised and where additional measures have been agreed following exhibition of the SEE. These changes are in response to the submissions received as well as discussions with various organisations. Based on the project scope modification described in Chapter 10, the management and mitigation measures which applied to the biopile works have been either removed or amended.

Table 16-1 of the SEE contained a consolidated set of mitigation and management measures for the whole Project (i.e. the conversion works, the demolition works and the ACS Modification works), and confirms the stage at which each measure would be implemented. This table includes:

- Measures that only apply to the conversion works and therefore remain the same as presented in the development consent for SSD 5544;
- Measures that only apply to the demolition works and therefore remain the same as presented in the development consent for SSD 5544 MOD1;
- Measures that apply to the conversion works, the demolition works and the ACS Modification works therefore have been amended from those presented within Appendix C of the development consent for SSD 5544 MOD1 (any changes from the mitigation measures as they were presented in SSD 5544 MOD1 are shown in bold in the table below); and
- Measures that only apply to the ACS Modification works (shown in bold).

This approach has been used for the tables below to ensure consistency.

In the tables below the following acronyms have been used to describe each stage:

- CD – Conversion Design;
- Conv – Conversion;
- Op – Operation;
- DD – Demolition Design;
- Dem – Demolition; and
- Con – Construction

The original management and mitigation measures from the SEE are provided in **Appendix C** of this document. The proposed amended measures, revised following the review of submissions, are presented in **Table 11-1.** Additional management and mitigation measures, proposed following review of the submissions, are presented in **Table 11-2.** The final consolidated management and mitigation measures for the Project, including the amended and additional measures, are provided in **Table 11-3**.

11.2 Amended Management and Mitigation Measures

The following measures have been revised following review of the submissions. **Table 11-1** provides the amended measures. The proposed amendments in **Table 11-1** are underlined.

Table 11-1 Amended Measures

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
~~C23~~	~~ACS classified as hazardous under the Waste Classification Guidelines would be transported to the ACS biopile for processing prior to placement in the containment cell. Hazardous soils would not be placed into the containment cell.~~						~~✓~~	
C26	All vehicle tyres would be cleaned before exiting the containment cell works area ~~and the biopile works area~~ via a temporary truck wash system.						✓	
C27	The containment cell area ~~and biopile works area~~ would remain bunded to prevent water flowing out of the respective areas except via the OWSS and WWTP.						✓	✓
C28	Stormwater within the containment cell works area ~~and biopile works area~~ would be directed to the OWSS and treated at the WWTP.						✓	
E21	Additional sampling will be undertaken in the pipeways to further delineate the areas classified as asbestos contaminated in order to minimise the volume of soil classified as Special Waste and disposed of in the containment cell. ~~In addition soils currently classified as hazardous waste will have additional sampling undertaken to ensure only hazardous soil is being processed at the ACS biopile.~~						✓	
~~E23~~	~~Hazardous waste removed from the site would be tracked using the NSW EPA online waste tracker and each delivery would be provided with a consignment authorisation and transport certificates which would be provided to Caltex;~~						~~✓~~	
~~E24~~	~~Special waste removed from the site would be transported in accordance to Part 7 Transportation and Management of Asbestos Waste of the POEO (Waste) Regulation 2014. This outlines the requirements for waste transporters to record and monitor the movement of more than 100 kilograms of asbestos waste or more than 10 m² of asbestos sheeting from the Site of generation to the final disposal point using the NSW EPA online system called WasteLocate. The removal and disposal of asbestos wastes would be undertaken by a licenced asbestos contractor.~~						~~✓~~	

Item	**Management and Mitigation Measure**	**Conversion**		**Demolition**			**ACS Works**	
		CD	**Conv**	**Op**	**DD**	**Dem**	**Con**	**Op**
F2	A Soils and Water Management Plan would be developed as a sub plan to the DEMP. Measures to be included in the plan and implemented during the demolition works to protect stormwater quality would include: • Stormwater or groundwater ponded in excavations would be sent to the WWTP, unless it is tested and is of suitable quality to be directed to stormwater; • Stormwater that is captured in the bunds around the contaminated soil stockpiles would be collected and sent to the WWTP; • Silt fencing and/or alternate sediment control measures would be installed around soil stockpiles and disturbed areas or areas where dust suppression is being undertaken; • Regular inspection would be undertaken of soil stockpiles/excavation areas, including following rainfall events; • **Regular inspection of excavation areas~~,~~ *and* containment cell ~~and biopile works~~ area~~s~~, including following rainfall events;** • Regular inspections would be undertaken of stormwater drains down hydraulic gradient of disturbed areas; • **Stormwater management measures incorporated into the design of the containment cell would be regularly inspected during operation in line with the Site's existing Inspection Checklist and following heavy rain events;** • If stormwater quality is impacted during the demolition works **and ACS Modification works** in areas that have been disturbed, water would be diverted to the intermediate sewer system; and During the demolition works **and ACS Modification works**, following notable but prolonged rainfall events (over three days) or following heavy rainfall events over a shorter timescale, water sampling would be completed at the stormwater retention basin to ensure that the quality of the water is of an appropriate standard to be discharged from the Site. Water that is not of an appropriate quality would be either treated in situ or directed to the WWTP.					✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
F7	Caltex undertakes a flood study, commencing ***~~within 3 months of completion of demolition works~~ in March 2018*** that assesses potential flood risks from the Site to the Kurnell township, with a particular emphasis on the impacts from surface water entering the Site from land to the east and south of the Site and whether current diversion methods are appropriate. ***The flood study would consider the Sutherland Shire Council's Draft Sea Level Rise Policy (May 2016), or a latest revision.*** Caltex to remain in consultation with Sutherland Shire Council throughout the flooding investigation works to identify a mutually acceptable solution to potential flood risks along the north eastern boundary of the Site. The timing and form of consultation is to be mutually agreed by both parties (Caltex and Sutherland Shire Council) and outlined within a written document to be produced by Caltex prior to ***~~commencement of the flood study~~*** *March 2018*. It shall include regular reporting updates and milestone meetings, for example, at the Scope of Works, concept design, at the issuing of the draft report to discuss results and recommendations as a result of the study.			✓		✓		✓
H12	VOC and Odour Monitoring would be undertaken by demolition workers ***or ACS Modification workers*** (i.e. visual and olfactory monitoring) and monitoring equipment during excavation activities where potential hydrocarbon contamination is present. Contractors would notify the Caltex Environment Specialist of any significant odours identified during demolition.					✓	✓	
H27	**The DEMP would include *a* ~~two new~~ subplan~~s~~: the Containment Cell Management Plan; ~~and a *ACS Biopile Management Plan*~~. With regards to air quality, *this* ~~these~~ subplan~~s~~ would include:** • **A brief overview of the *containment cell* ~~site~~ operations relevant to potential air emission sources.** • **Identification of mitigation measures for each respective emission source including those measures outlined in the DEMP for the Site (where relevant to operations within *the containment cell* ~~each works~~ area).** • **Details of proposed monitoring and recordkeeping procedures.** ***During the production of this plan the NSW EPA Guidelines for Environmental Management On-Site Remediation, would be reviewed and if necessary relevant measures incorporated.***						✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op

~~H28~~	**~~The ACS Biopile Management Plan would include the following specific air quality control measures:~~**
	• **~~Bucket crusher operation for the homogenisation process will be conducted so as to minimise potential dust emissions, including the use of:~~**
	  - **~~directed water sprays throughout operation.~~**
	  - **~~localised wind breaks within the soil screening area.~~**
	  - **~~cessation of works during high winds (as defined within the DEMP).~~**
	• **~~Aeration system emission vents will be monitored for VOCs using a Photo-Ionisation Detector (PID) on a weekly basis.~~**
	• **~~The aeration system design will give consideration to potential asbestos emissions, and include emission monitoring for asbestos fibres prior to the commencement of continuous operations.~~**
	• **~~Soil moisture content will be managed in order to minimise potential particulate matter and asbestos emissions to the maximum extent practicable.~~**
	~~Provisions for management of odorous material, including notifications from the pipeway excavation operations in the case that odorous material is encountered. These odour controls would be consistent with the measures contained within the DEMP.~~
							~~✓~~	

~~H29~~
<u>H28</u>
	The Containment Cell Management Plan *<u>would be prepared and include the following mitigation measures:</u>*
	• ***<u>A Soil Acceptance Criteria which identifies:</u>***
	  - ***<u>Only soil contaminated with airborne asbestos* (referred to in the ACS Modification works as ACS) from the Site (as defined by Figure 1-2 in the SEE) would be accepted into the containment cell</u>***
	  - ***<u>Soils entering the containment cell from the Site but outside of the pipeways must be classified in accordance with the NSW EPA Waste Classification Guidelines 2014, as either special general solid waste or special restricted solid waste.</u>***
	  - ***<u>All soils, regardless of their classification under the NSW EPA Waste Classification Guidelines 2014 from the pipeways on the Site (as shown on Figure 1.2 of the SEE) would be disposed of in the containment cell.</u>***
	  - ***<u>The total volume of ACS would be limited by the design specifications final</u>***
							✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
	landform. • ***Prior to the commencement of filling activities dust and aerosol monitoring stations would be placed at a minimum of six locations around the working area with the objective of monitoring prevalent upwind and downwind locations.*** • **Soil moisture content will be managed *to ensure that it is greater than 15%* in order to minimise potential particulate matter and asbestos *[fibre]* emissions to the maximum extent practicable *by wetting of soils during filling of cell to minimise the generation of dust.*** • **Directed water sprays will be used when required throughout ACS handling operations.** • ***A biodegradable cover would be sprayed over* ACS in the containment cell to minimise the generation of dust. *The cover would be applied following the placement of ACS within the containment cell, and at the end of each day.*** • ***Limiting potentially dust generating activities during high wind events (i.e. >8m/s hourly average or in severe wind gust conditions)*** • **Stockpiles will be maintained in a moist condition *when not covered*, and *be* covered if not in use or left overnight.** • **Completed areas of the works area will be revegetated with native grasses as soon as is practicable.** ****Note - Airborne asbestos means any fibres of asbestos small enough to be made airborne (Safe Work Australia, April 2016, Code of Practice: How to Safely Remove Asbestos)***							

11.3 Additional Management and Mitigation Measures

A number of management and mitigation measures have been proposed following review of the submissions. These are presented in **Table 11-2** below.

Table 11-2 Additional Management and Mitigation Measures

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
A12	***A Containment Cell Long Term Environmental Management Plan (CCLTEMP) would be prepared in consultation with the EPA prior to the closure of the containment cell. The CCLTEMP would detail the ongoing environmental management of containment cell, including maintenance of the capping and drainage, groundwater monitoring (including groundwater quality and levels), and land use restrictions that will apply to the containment cell. The CCLTEMP would be attached to the positive covenant for the land where the containment cell is located, if required.***						✓	
A13	***From development consent of SSD 5544 MOD2 until the quarterly community meeting after the containment cell is closed, Caltex will provide an update on the progress of the ACS Modification works, including issues faced or complaints received, at each of the quarterly community meetings.***						✓	✓
A14	***ACS from the pipeways classified as hazardous waste under the NSW EPA Waste Classification Guidelines would have a minimum cover of at least 500 mm plus the surface cap.***						✓	
A15	***Within one month after it has been validated that all ACS from the pipeways has been removed, the containment cell would be capped and permanently sealed as per the containment cell design.***						✓	
A16	***Caltex would prepare an ACS Modification Works Completion Report following the completion and closure of the containment cell. The report would include a summary of the waste classification and environmental monitoring data conducted in accordance with the Environmental Management Plans (and associated Sub Plans). Monitoring data should include but not necessarily be limited to:*** ***i. Waste Characterisation and Tracking*** ***ii. Air Quality monitoring (including dust and asbestos)*** ***iii. Groundwater Monitoring.***						✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
H29	***The DEMP and relevant sub plans (e.g. Asbestos Management Plan and Containment Cell Management Plan) would be revised to include the following measures:*** • ***a defined exclusion zone around the work area within which only staff who have been appropriately inducted in relation to the site procedures are permitted entry*** • ***wetting of soils during excavation and disturbance works to minimise the generation of dust*** • ***an Asbestos Removal Control Plan which identifies appropriate procedures for personal protective equipment; staff induction and decontamination of equipment*** • ***preparation of an asbestos monitoring and management plan to account for the activities that may liberate asbestos into the atmosphere. Dust and aerosol monitoring would occur in areas of the Site where asbestos in soil has been identified or is suspected to occur (including the pipeways) together with monitoring and analysis methods, exposure and control criteria and contingencies that will be implemented in the event specific exposure control criteria are exceeded.***						✓	

11.4 Revised Consolidated Management and Mitigation Measures for the ACS Modification Works SEE

Table 11-3 outlines the revised consolidated management and mitigation measures.

Table 11-3 Revised Consolidated Management and Mitigation Measures

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
General								
A1	Caltex would carry out the proposed works in accordance with the EIS, the SEE**s** and the approval conditions.	✓	✓	✓	✓	✓	✓	✓
A2	Caltex would implement reasonable and practicable measures to avoid, or minimise impacts to the environment that may arise as a result of the Project.	✓	✓	✓	✓	✓	✓	✓
A3	Caltex would ensure that the Project contractor prepares and implements a Construction Environmental Management Plan (CEMP) for the conversion works and a Demolition Environmental Management Plan (DEMP) for the demolition works **(inclusive of the ACS Modification works)** to manage any Project impacts. This would be reviewed and approved by a Caltex Environmental Management Representative (EMR). Elements of these plans may be shared as required.		✓			✓	✓	
A4	Caltex would appoint an EMR to monitor the implementation of all required environmental mitigation and management measures. The EMR would ensure that all measures were being effectively applied during the proposed works and that the work would be carried out in accordance with the CEMP, the DEMP and all environmental approvals and legislative conditions.		✓			✓	✓	
A5	Caltex and the various works' contractor personnel would undergo training in accordance with the CEMP, the DEMP and currently implemented environmental and safety measures agreed as part of the Project approval.		✓			✓	✓	
A6	Caltex would provide Sutherland Shire Council the opportunity to review and comment on the CEMP prior to the commencement of conversion works.		✓					

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
A7	Prior to the demolition works commencing for a particular structure or group of structures, Caltex would develop a specific demolition management plan (DMP) for each structure or group of structures to be demolished. The DMPs would be made available to the appropriate regulators prior to being implemented if requested. The DMPs for the two concrete stacks (power plant and common stacks) and for the tall complex structures (two catalytic cracker units (plants 4 and 34)) would be provided to the EPA for comment ahead of the demolition works for these structures taking place.					✓		
A8	Caltex would provide a draft of the DEMP and SWMP to NSW DPI for review and comment prior to finalising.				✓			
A9	Caltex would provide NSW Health with a copy of the DEMP and Asbestos Management Plan (AMP) for review and comment prior to finalising.				✓			
A10	Caltex would provide NSW OEH with a copy of the Biodiversity and Weed Management Plan (BWMP) for review and comment prior to finalising.				✓			
A11	**Following the ACS Modification works, Caltex will update the Asbestos Management Plan for the Site and Asbestos Register.**							✓
A12	***A Containment Cell Long Term Environmental Management Plan (CCLTEMP) would be prepared in consultation with the EPA prior to the closure of the containment cell. The CCLTEMP would detail the ongoing environmental management of containment cell, including maintenance of the capping and drainage, groundwater monitoring (including groundwater quality and levels), and land use restrictions that will apply to the containment cell. The CCLTEMP would be attached to the positive covenant for the land where the containment cell is located, if required.***							✓
A13	***From development consent of SSD 5544 MOD2 until the quarterly community meeting after the containment cell is closed, Caltex will provide an update on the progress of the ACS Modification works, including issues faced or complaints received, at each of the quarterly community meetings.***						✓	✓
A14	***ACS from the pipeways classified as hazardous waste under the NSW EPA Waste Classification Guidelines would have a minimum cover of at least 500 mm plus the surface cap.***						✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
<u>A15</u>	***<u>Within one month after it has been validated that all ACS from the pipeways has been removed, the containment cell would be capped and permanently sealed as per the containment cell design.</u>***						✓	
<u>A16</u>	***<u>Caltex would prepare an ACS Modification Works Completion Report following the completion and closure of the containment cell. The report would include a summary of the waste classification and environmental monitoring data conducted in accordance with the Environmental Management Plans (and associated Sub Plans). Monitoring data should include but not necessarily be limited to:</u>*** ***<u>i. Waste Characterisation and Tracking</u>*** ***<u>ii. Air Quality monitoring (including dust and asbestos)</u>*** ***<u>iii. Groundwater Monitoring.</u>***						✓	
Hazards and Risk								
B1	A program of routine testing, inspection and maintenance would be developed for each new piece of equipment or function of instrumentation to be added to the preventative maintenance program already established for existing plant and equipment.		✓	✓				
B2	The recommendations of the Fire Safety Study would be implemented for the design and operation of the terminal.	✓	✓					
B3	The Process Hazard Analysis Recommendations would be implemented for the design and operation of the terminal.	✓	✓					
B4	The spill response plan for the Site would be updated for the proposed terminal.		✓					
B5	Caltex would review hardware protection in place and proposed to ensure the risk of filling low flash point material into tanks designed for high flash point usage is minimised. Particular attention to human factors issues at manifolds.	✓	✓					
B6	Caltex would determine need for additional means of communication, e.g. for lone worker on the proposed terminal.		✓					
B7	Caltex would review the procedures used for potentially hazardous manual operation to ensure they are appropriate and sufficient for any increased frequency of use.		✓					

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
B8	The bullet pointed measures listed in Section 8.7 of the SEE would be implemented to ensure that the conclusions of Appendix C Hazards and Risks Assessment of the SEE remain valid.				✓	✓		
B9	**Personnel required to work with hazardous/flammable/contaminated materials would be trained in safe use and handling and would be provided with all relevant safety equipment.**						✓	
B10	**Procedures are currently in place to manage incidents and injuries at the Site. This includes an established incident reporting and response process. These processes would be implemented for the ACS Modification works.**						✓	✓
Soils, Groundwater and Contamination								
C1	A Soils and Erosion Management Plan would be developed as part of the Construction Environmental Management Plan (CEMP) to manage the excavation, testing, stockpiling, reuse and rehabilitation of soils. This plan would outline: • the areas where soil disturbance is likely; • soil testing procedures; • soil handling procedures; • locations where soil would be stockpiled on-site for either removal, treatment or reuse; • procedures to reduce erosion and the spread of dust; • restricting traffic to defined roads or tracks where necessary; and • the rehabilitation of bare soil following completion of the construction works.		✓					

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C2	All materials would be stockpiled in accordance with 'The Blue Book' *Managing Urban Stormwater - Soils and Construction Volume 1 and 2* (Landcom, 2004). Principal controls would include the following: • silt fences would be installed around stockpiles to reduce erosion and protect vegetation or Site infrastructure as necessary; • silt and sediment traps would be installed across stormwater drains in proximity to excavation areas; • stockpiles would be restricted to cleared areas and not impact any vegetation; • stockpiles would be placed on impermeable sheeting; • stockpiles would be covered and wetted down in order to reduce dust creation; • stockpiles would not be located in close proximity to any stormwater drainage systems; • Caltex would not stockpile in areas that are prone to flooding as identified in Figure 4-10 of Appendix D of the SEE; and • Stockpile locations and erosion and sediment control requirements associated with the Project would be reviewed by a suitably qualified person to ensure that the recommended measures achieve the environmental outcomes for the Site.		✓			✓	✓	
C3	The Soils and Erosion Management Plan would also outline the inspection program for any erosion control structures and bunded areas.		✓					
C4	Excavated soils would be tested for both contaminants and odour using standard practices (e.g. soil vapour and soil sampling etc.)		✓					
C5	Clean materials would be separated from contaminated materials for reuse as backfill where required.		✓					
C6	A Contamination Management Plan would form part of the CEMP for the Project. This plan would outline measures for testing, classifying, handling, storing and managing contaminated soils and contaminated groundwater.		✓					
C7	Suspected contaminated materials would be assessed and classified in accordance with EPL requirements and NSW (2009) *Waste Classification Guidelines: Part 1: Classifying Waste*, batched, further tested (where required) and disposed by a licenced contractor.		✓					

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C8	Disposal of any contaminated soils or groundwater would be in accordance with EPL requirements and NSW DECCW's *Waste Classification Guidelines* and the Contamination Management Plan (CMP) for the Project. Contaminated materials would be sent to appropriately licensed facilities in accordance with the *Contaminated Land Management Act 1997*.		✓					
C9	If Acid Sulfate Soils (ASS) are encountered during construction **or the ACS Modification works**, an ASS Management Plan would be prepared in accordance with the ASS Manual (ASS Management Advisory Committee 1998).		✓			✓	✓	
C10	A Groundwater Management Plan (GWMP) would be developed and included within the CEMP. This plan would outline the measures that would be used to manage the testing, dewatering, storage, movement and treatment of any groundwater intercepted during the construction phase. Measures would include: • the use of appropriate drip trays and interception techniques for any construction specific liquids stored on the Site; • bunding of any fuel or chemical storage area at the construction Site; • regular inspection of construction equipment to ensure any leaks are minimised and rectified; • management of vehicles leaving the Site to reduce soil on roads, production of dust and the introduction of contamination to the groundwater and/or stormwater system; • appropriate and timely disposal of any contaminated soil, water or waste generated during construction; • regular inspection of erosion control structures and bunded areas; and • regular inspection and testing of containment areas, drainage lines and process pipe work.		✓					
C11	Any runoff that may accumulate in excavations would be periodically tested for elevated levels of contamination. Water that is found to have elevated levels of contaminants would be collected and sent to the on-site Wastewater Treatment Plant in accordance with the established refinery wastewater management procedures.		✓					
C12	Runoff entering any excavations would be limited by using bunds or similar structures as required.		✓			✓		
C13	Construction/demolition workers would be instructed in appropriate health and safety and handling protocols for minimising human contact with contaminated soils and groundwater.		✓			✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C14	During the cleaning of the crude and finished fuel tanks, measures would be implemented in line with Caltex's existing Turnaround and Inspection process to contain and collect any potentially contaminating material for appropriate disposal to the on-site wastewater treatment plant, landfarm or appropriate off-site disposal facilities. This process would be detailed within the CEMP.		✓					
C15	Permits would be required to work in the areas where potential soil and groundwater contamination exists. The work permit includes requirements such as monitoring and PPE. No unauthorised entry into these areas is permitted, without a permit.		✓			✓	✓	
C16	Appropriate inspection, assessment, maintenance and repair programmes that would be implemented as part of the operation of the Project. These safeguards would be incorporated into the updated management plans for the proposed terminal. The Project would be appropriately licenced under the *Protection of the Environment Operations Act 1997* and would be managed in accordance with EPL requirements.		✓	✓				✓
C17	A Contamination Management Plan would be developed to outline measures for monitoring, handling, storing and managing contaminated soils and contaminated groundwater. It would include the following: • During excavation visual and olfactory indicators of impact would be monitored. Where there is potential for volatile organic contaminants (based on known ground conditions) or where hydrocarbons are seen or smelt during excavations, soils would be inspected for hydrocarbon impacts using a PID and/or testing. Excavated soils would not be used for backfill if they are impacted at levels exceeding commercial/industrial as defined by Schedule B1 Guidelines, *Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013*. • All excavations would be sampled for asbestos. Asbestos assessment would be undertaken in accordance with Schedule B1 Guidelines, *Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013.* • Asbestos impacted soil **not found in the pipeways** would be **disposed of at the ACS containment cell or** removed from the Site as soon as practicable **if excavated**. If these soils need to be temporarily stockpiled they would be stored at a defined location at the former CLOR site, covered and labelled as asbestos waste. Asbestos impacted soil would					✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
	be classified in accordance with NSW EPA guidelines for transport and disposal at **either the ACS containment cell or** a licensed landfill (and in accordance with the Site waste management system and the Demolition Waste and Resource Management Plan (DWRMP) for the demolition works. The excavation, transport and disposal of asbestos impacted soil would be undertaken by a licenced contractor and comply with NSW WorkCover requirements. • Hydrocarbon impacted soil would not be temporarily stockpiled adjacent to the excavation. If these soils need to be temporarily stockpiled they would be stored at a defined location at the former CLOR site. • Excavated soils would be separated into stockpiles according to odours, staining and other environmental indicators. Soils that are potentially contaminated (following visual and olfactory inspection and or use of monitoring equipment) would be placed on impermeable sheeting into uniquely identified stockpiles and appropriately bunded and managed. The bunds would be impermeable and of sufficient capacity to ensure that runoff from these stockpiles is contained prior to being sent to the WWTP. • Where no contamination issues are identified, excavated material would be used as backfill to bring the excavated area back to grade as soon as practicable. If required, certified VENM, ENM or appropriated remediated material would be used to provide additional backfill material. • If excavated material cannot be re-used or managed on-site then it would be removed off-site as waste to an appropriately licensed facility. • Further, excavated material; would be classified in accordance with EPL condition O5.1 which requires “any liquid and/or non-liquid waste generated and/or stored [at the Site] is assessed and classified in accordance with the NSW (2009) *Waste Classification Guidelines: Part 1: Classifying Waste*, batched and further tested (where required, for example Toxicity Characteristics Leaching Procedure (TCLP) testing)”. • The method of disposal or reuse would be in line with the materials’ classification in accordance with specifications set out in a DWRMP. • Where soils are reused on Site (i.e. are not considered to be impacted at levels exceeding commercial/industrial as defined by *Schedule B1 Guidelines, Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013)* a record would be kept (in the Waste Management Database) of where these soils are reused, the volumes reused; the type and levels of contaminants present in the soils and the soil classification.							

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C18	The Soil and Water Management Plan would outline management measures for any soils that are excavated or stored on-site during the demolition works **and ACS Modification works** and water management requirements. It would identify: • the areas where soil disturbance is likely; • how excavations would be staged so that the length of time that excavations are left open and temporary stockpiles are required is minimised; • locations where soil would be stockpiled on-site for either removal, treatment or reuse; • that if additional backfill material is required, only certified VENM, ENM or appropriated remediated material would be used; • procedures to reduce erosion and the spread of dust; • restricting traffic to defined roads or tracks where necessary; • measures to protect excavations from increased stormwater runoff (e.g. by using bunds or similar structures where required); • measures to manage the storage of demolition **and ACS Modification works** specific liquids at the Site and the appropriate bunding or containment of demolition related fuel or chemical storage areas; • demolition **and ACS Modification works** equipment is maintained and operated in a proper and efficient condition to reduce the likelihood of spills or leaks; • measures to manage vehicles leaving the Site to reduce soil on roads, production of dust and the introduction of contamination to the groundwater and/or stormwater system; • measures for the dewatering, storage, movement and treatment of groundwater encountered in excavations. Dewatered groundwater would be collected and sent to the on-site Wastewater Treatment Plant in accordance with the established Site wastewater management procedures, unless it is tested and is of suitable quality to be directed to stormwater; • procedures for dewatering, including the need to liaise with NOW to ensure the necessary water licences are obtained, if required; and • how the rehabilitation of bare soil would be managed across the Site once areas are returned to grade.					✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C19	The Soil and Water Management Plan would also: • be developed in accordance with *'The Blue Book' Managing Urban Stormwater – Soils and Construction Volume 1 and 2* (Landcom, 2004); • outline the inspection program for erosion control structures and bunded areas; • continue the existing groundwater monitoring program; and • include a plan for corrective action should an unexpected increase in COPC be observed in the groundwater monitoring					✓	✓	
C20	An Asbestos Management Plan would be developed in accordance with the relevant guidelines. Caltex would utilise existing registers, procedures and plans in place for the Site for the preparation of an Asbestos Management Plan.					✓	✓	
C21	**Additional sampling would be undertaken to ensure that the area of soil disturbance is restricted as far as practicable to asbestos impacted areas only.**						✓	
C22	**ACS in the pipeways would be wetted down prior to excavation, loading and transport.**						✓	
C23	**ACS classified as general or restricted under the Waste Classification Guidelines would be transported directly to the containment cell. Excavation works would be staged to allow placement of ACS directly into the containment cell to minimise the need to stockpile ACS.**						✓	
C24	**Where hazardous ACS cannot be appropriately managed on-site, it would be taken off-site for treatment and disposal at an appropriately licensed facility.**						✓	
C25	**All vehicle tyres would be cleaned before exiting the containment cell works area a temporary truck wash system.**						✓	
C26	**During the works, the containment cell area would remain bunded to prevent water flowing out of the respective areas except via the OWSS and WWTP.**						✓	✓
C27	**During the works, stormwater within the containment cell works area would be directed to the OWSS and treated at the WWTP.**						✓	
C28	**Stormwater from within excavated areas of the pipeways would be sent to the WWTP unless it is tested and is of suitable quality to be directed to stormwater, as per normal operation of the pipeways.**						✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C29	**Two groundwater monitoring bores would be installed at the north and west of the containment cell. Quarterly monitoring would be undertaken during construction, filling and closure of the cell.**						✓	✓
C30	**A marker layer would be installed during the final capping of the containment cell to identify the presence of asbestos as a safeguard for potential future use.**						✓	
C31	**Following excavation of ACS, an independent licenced asbestos inspector would be employed to verify that the friable asbestos has been removed from the pipeways and that the Exemption Order under Section 419 of the Work, Health and Safety Regulation 2011 is no longer required.**						✓	
C32	**The OEMP for the Site would be updated to include the following measures:** • **Quarterly groundwater monitoring for two years for the two installed monitoring wells. Following this time, annual groundwater monitoring would be undertaken to provide ongoing demonstration that the containment cell liner is operating effectively. Monitoring of these bores would occur in accordance with the existing groundwater monitoring program for the Site.** • **Regular inspections of the containment cell to monitor the effectiveness of the erosion and sediment control measures incorporated into the design of the containment cell, in line with the Site's existing Inspection Checklist and following heavy rain events.**							✓
Human Health and Ecological Risk								
D1	Construction/demolition personnel would be made aware of the potential presence of Non Aqueous Phase Liquids (NAPL) and would be shown how to identify its presence. The CEMP/DEMP would include management measures to appropriately deal with any NAPL found on Site.		✓		✓		✓	
D2	Construction/demolition staff would be inducted and provided with training prior to working with potentially contaminated soil as part of the Project, to prevent unnecessary disturbance (e.g. dust generation, asbestos fibre liberation, contaminant mobility and volatilisation).		✓		✓		✓	
D3	The location of potentially contaminated areas would be noted in the CEMP/DEMP and provided to construction/demolition personnel involved in soil excavation and handling. The CEMP/DEMP would also identify the type of contamination found in each area. Where necessary, safety training and appropriate PPE would be provided.		✓	✓	✓	✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
D4	Caltex would continue to monitor groundwater quality in areas that are known to contain impacts to ensure that significant mobilisation of COPC from groundwater to surface water is not occurring.		✓	✓	✓	✓		
Waste Management								
E1	The Project would be integrated into existing resource efficiency, waste management and handling, emergency response and preparedness plans for the existing Site.	✓	✓	✓	✓	✓	✓	✓
E2	Construction and Operation Waste and Resource Management Plans (WRMP) and Demolition Waste and Resource Management Plans (DWRMP) would be compiled prior to the each phase commencing. **The DWRMP would be updated to include reference to management of waste generated by the ACS Modification works prior to construction works commencing.**	✓			✓		✓	
E3	The WRMPs and DWRMP would: • identify requirements consistent with the waste and resource hierarchy; • ensure resourcing efficiency is delivered through the design and responsible construction, demolition and operational practices; • **ensure procurement of pre-fabricated materials to eliminate off-cuts on-site, and the re-use of materials where possible;** • provide consistent clear direction on waste and resource handling, storage, stockpiling, use and reuse management measures (consistent with current management practices relating to Caltex's Kurnell Waste Management System); • **provide separate waste containers/skips to ensure waste material segregation and maximise the opportunities for re-use and recycling;** • identify disposal and management routes consistent with current management practices as adapted for the Project; • set out clear requirements for meeting legislative and regulatory requirements; • **ensure safe storage and disposal of waste ensuring least amount of harm to surrounding environment;** • define requirements to support Caltex's sustainable procurement objectives through effective, design, construction, operation and procurement; and • set out processes for disposal, including on-site transfer, management and the necessary associated approvals.	✓	✓	✓	✓	✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
E4	The WRMP and DWRMP would incorporate the requirements of the waste and resource hierarchy and cleaner production initiatives.	✓	✓	✓	✓	✓	✓	
E5	The WRMP and DWRMP would include a process for auditing, monitoring and reporting, which would include regular inspections off-site activities and the waste management area(s). The WRMP and DWRMP would be subject to regular auditing and a system would be used to record and report the types, volumes and management measures for all waste and resource arising from/used for the works.	✓	✓	✓	✓	✓	✓	
E6	Project-generated waste would be segregated at the source and stored in accordance with current Site practices. Site management practices would potentially need adapting to consider additional storage requirements. Regardless, all waste would be stored in suitable containers and designated waste management areas.		✓	✓		✓	✓	
E7	Caltex's existing procedures for the disposal of sewage, greywater, hazardous materials, general waste and recyclable materials would be adopted for the Project (and modified if required). This would include using licensed contractors to remove and transport waste from the Site.						✓	✓
E8	A Waste Register would be prepared, used and maintained by the Demolition Contractor to track all wastes generated from demolition works. The Demolition Contractor would retain waste receipts to indicate evidence of waste disposal. The database would also be used to track all materials reused at the premises including its reuse location, type of waste and classification. **A Waste Register would be prepared, used and maintained by the Contractor to track all wastes generated from the ACS Modification works and used to record and report the types, volumes and management measures for all waste and resources arising from/used for the works. This would be subject to regular auditing.**				✓	✓	✓	
E9	Stockpiled wastes would be: • appropriately segregated to avoid mixing and contamination; • clearly labelled; • contained in bunded areas and if necessary on an appropriate lining; • less than 5m in height; and • located >40m away from any sensitive receivers, heritage, ecological areas and watercourses.				✓	✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
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E10	Materials to be re-used would be analysed to ensure material is not contaminated and re-use is appropriate.				✓	✓	✓	
E11	An Asbestos Management Plan would be prepared and implemented in accordance with relevant legislative and other requirements. This plan would outline proposed methods of managing asbestos waste by the contractor. **The Asbestos Management Plan would be updated to include the ACS Modification works.**				✓	✓	✓	
E12	The Site's existing Asbestos Waste Register would be amended as appropriate, implemented and maintained to track asbestos wastes generated during the works.				✓	✓	✓	✓
E13	If stored on-site, asbestos wastes would be located away from operational areas and properly sealed and contained to minimise human exposure and clearly labelled. Signage and barriers/fencing would be installed to ensure all employees, contractors and visitors would keep away from the area at all times.					✓	✓	
E14	The removal and disposal of asbestos wastes would be undertaken by a licenced asbestos contractor.					✓	✓	
E15	A Decontamination Area would be provided on-site for all authorised personnel handling asbestos.				✓	✓	✓	
E16	Wastes (both liquid and non-liquid) generated from the works would be assessed, classified and managed. Wastes would be disposed of at an appropriately licenced facility.					✓	✓	
E17	**Recyclable wastes would be stored in suitable containers and designated waste management areas, to be transferred by a licensed waste contractor to an appropriate recycling facility where possible.**						✓	
E18	**Treated soils from the CSRF would be used where possible for the containment cell construction works in accordance with the conditions of the Caltex treated soil exemption 2016.**						✓	
E19	**New waste streams would be addressed as they arise and assessed to determine the most suitable management measures to use when handling, storing, transporting and disposing of the waste.**						✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
E20	**Unidentifiable waste streams would be analysed and sent for testing in an accredited laboratory to assess the risks associated with handling and disposal of the waste.**						✓	
E21	**Additional sampling will be undertaken in the pipeways to further delineate the areas classified as asbestos contaminated in order to minimise the volume of soil classified as Special Waste and disposed of in the containment cell.**						✓	
E22	**Caltex would complete inspections following periods of extended heavy rainfall to confirm that pumps within the containment cell sumps are directing leachate to the Site's WWTP.**						✓	✓
Surface Water, Wastewater and Flooding								
F1	The Construction Environmental Management Plan (CEMP) for the Project would include a Soil and Erosion Management Plan. This plan would include the following measures: • All materials would be stockpiled in accordance with '*The Blue Book' Managing Urban Stormwater – Soils and Construction Volume 1 and 2* (Landcom, 2004); • Silt fences would be installed around stockpiles to reduce erosion and the movement of suspended solids as necessary; • Soil stockpiles and any polluted materials would be stored in designated areas which are not in close proximity to any stormwater drainage systems; • Erosion control structures, bunded areas, containment areas, drainage lines and interception measures would be subject to regular inspection; • Clean materials would be separated from contaminated materials; and • Soil erosion and sedimentation devices would remain in place until the disturbed ground surface is restored. These devices would also capture any gross pollutants.		✓					

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
F2	A Soils and Water Management Plan would be developed as a sub plan to the DEMP. Measures to be included in the plan and implemented during the demolition works to protect stormwater quality would include: • Stormwater or groundwater ponded in excavations would be sent to the WWTP, unless it is tested and is of suitable quality to be directed to stormwater; • Stormwater that is captured in the bunds around the contaminated soil stockpiles would be collected and sent to the WWTP; • Silt fencing and/or alternate sediment control measures would be installed around soil stockpiles and disturbed areas or areas where dust suppression is being undertaken; • Regular inspection would be undertaken of soil stockpiles/excavation areas, including following rainfall events; • **Regular inspection of excavation areas *and* containment cell area, including following rainfall events;** • Regular inspections would be undertaken of stormwater drains down hydraulic gradient of disturbed areas; • **Stormwater management measures incorporated into the design of the containment cell would be regularly inspected during operation in line with the Site's existing Inspection Checklist and following heavy rain events;** • If stormwater quality is impacted during the demolition works **and ACS Modification works** in areas that have been disturbed, water would be diverted to the intermediate sewer system; and • During the demolition works **and ACS Modification works**, following notable but prolonged rainfall events (over three days) or following heavy rainfall events over a shorter timescale, water sampling would be completed at the stormwater retention basin to ensure that the quality of the water is of an appropriate standard to be discharged from the Site. Water that is not of an appropriate quality would be either treated in situ or directed to the WWTP.					✓	✓	

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F3	Caltex would continue to implement the measures within the Stormwater Management Plan (SMP) for the Site. This plan has been produced in response to Environment Protection Licence No. 837, PRP U24.1: Stormwater Catchment and Management Plan. The SMP has committed Caltex to implementing a Stormwater Management Strategy and completing a number of stormwater management measures in a staged manner. Measures include: • Ongoing maintenance of the existing stormwater system; • Implementation of a number of projects to improve the infrastructure, reduce the potential for the refinery to flood, and prevent contaminated stormwater leaving the refinery premises; • Working with the NSW Office of Environment and Heritage (OEH), NSW EPA and Sutherland Shire Council to divert to flow of stormwater from the National Park away from the Site's stormwater system to the Sutherland Shire Council's stormwater infrastructure; • Carrying out stormwater flow monitoring; and • Updating the Site's stormwater system performance model to account for the changes to the stormwater system infrastructure that can then be used as a tool to assess future modifications, as necessary. This work would be completed in consultation with NSW EPA.	✓	✓	✓	✓	✓	✓	✓
F4	Discharges from the Wastewater Treatment Plant would be within existing EPL limits during demolition, construction and operation. Any required change to this Oily Water Management System would be discussed and agreed with NSW EPA.	✓	✓			✓	✓	✓
F5	The measures and processes currently in place at the Site to prevent any loss of contaminant would be maintained throughout the demolition, construction and operation phases of the Project. All bunds on tanks which are retained in service would meet the capacity requirements of *Australian Standard AS1940* during the operation of the Project.	✓	✓			✓	✓	✓

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F6	Improvements to monitoring would be initiated to ensure that if a loss of containment into a bund occurs it is detected early and contingency actions can be taken promptly. The measures for tanks containing low flash materials include: • explosive vapour detectors within the bunds; • triple infrared scanners on tank roofs; and • CCTV in conjunction with infrared cameras as a confirmation for alarms. All tanks on-site would be subject to: • an automated high level shut off system; and • continuance of a comprehensive inspection/repair program.			✓				
F7	Caltex undertakes a flood study, commencing ***in March 2018*** that assesses potential flood risks from the Site to the Kurnell township, with a particular emphasis on the impacts from surface water entering the Site from land to the east and south of the Site and whether current diversion methods are appropriate. ***The flood study would consider the Sutherland Shire Council's Draft Sea Level Rise Policy (May 2016), or a latest revision.*** Caltex to remain in consultation with Sutherland Shire Council throughout the flooding investigation works to identify a mutually acceptable solution to potential flood risks along the north eastern boundary of the Site. The timing and form of consultation is to be mutually agreed by both parties (Caltex and Sutherland Shire Council) and outlined within a written document to be produced by Caltex prior to ***March 2018***. It shall include regular reporting updates and milestone meetings, for example, at the Scope of Works, concept design, at the issuing of the draft report to discuss results and recommendations as a result of the study.			✓		✓		✓

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
F8	The following measures would be employed during and following the demolition of the refinery process units and associated infrastructure: • Appropriate bunding and controls would be put in place to prevent stormwater runoff from the demolition works area entering the stormwater system. • Following the completion of the demolition works and removal of redundant infrastructure, the former refinery process area would be regraded. The regrading would aim to ensure that water does not pool in this area. • As part of the regrading works, the surface material in this area would meet the commercial/industrial criteria as defined by Schedule B1 Guidelines, *Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013*. A crushed aggregate made from clean concrete and asphalt from the demolition works would also be spread across the surface to help reduce soil erosion. • Stormwater runoff collected in the stormwater system would be subject to the controls within this system (such as the oily water separators) prior to being discharged.					✓		
F9	**Excavation of the pipeways would be staged, effectively minimising the area of disturbance at one time. The ACS Modification works would be undertaken in a manner to minimise the potential for soil erosion and sedimentation.**						✓	
F10	**Local weather patterns would be monitored to ensure that workers completing the ACS Modification works at the Site were aware of predicted heavy rainfalls so that work could be stopped in the pipeways prior to them containing surface water flows.**						✓	
F11	**The OEMP for the Site would be updated to include the following measures:** • **the new stormwater management infrastructure for the containment cell would be regularly maintained to ensure that stormwater flows are properly conveyed to the wider catchment; and** • **the leachate collection system including the tank would be regularly inspected to ensure that it is operating effectively and that no leaks have occurred.**							✓

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		CD	Conv	Op	DD	Dem	Con	Op
Noise and Vibration								
G1	The CEMP/DEMP for the Project would include a Noise and Vibration Management Plan (NVMP). The NVMP would outline: • The locations of noise sensitive receptors; • Construction noise monitoring procedures; and • Construction equipment maintenance to ensure good working order.		✓			✓		
G2	Low-noise plant and equipment would be selected, where practicable, in order to minimise potential for noise and vibration. All equipment would be regularly checked to ensure that the mufflers and other noise reduction equipment are working correctly.		✓			✓	✓	
G3	Community consultation with local residents would be undertaken to assist in the alleviation of community concerns. Prior to the proposed demolition works commencing within the Eastern and Western Right of Ways, at Silver Beach, on the Wharf or prior to particularly loud demolition works occurring on the main terminal site, potentially affected residents within Kurnell would be notified in advance. Should complaints be received, the complaints register would continue to be maintained and managed in line with the existing feedback process at the Site.		✓	✓		✓	✓	
G4	Any noise complaint(s) would be investigated immediately. Reasonable and feasible measures would to be implemented to reduce noise impacts.		✓	✓		✓	✓	✓
G5	Construction/demolition equipment would be located to reduce noise emission to sensitive receptors, where practicable.		✓			✓	✓	
G6	The majority of the conversion works for the Project would typically be completed between 7.00am to 10.00pm seven days a week. Some works consistent with Caltex's existing day-to-day operational and maintenance procedures would occur over a 24 hour period as regulated by the Environmental Protection Licence (No. 837) (EPL) for the Site.		✓			✓	✓	
G7	Construction/Demolition staff and contractors would undergo training in environmental noise issues including: • minimising the use of horn signals and maintaining a low volume. Alternative methods of communication should be considered; • avoiding any unnecessary noise when carrying out manual operations and when operating plant; and • switching off any equipment not in use for extended periods during construction work. • ensuring works occur within approved hours.		✓			✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
G8	Should any unexpected construction activities occur which could potentially generate significant noise not described in this report, monitoring would be undertaken to ensure construction noise emission levels do not exceed EPL limits.		✓				✓	
G9	Pipeline removal works would be confined to 7.00 am to 6.00 pm Monday to Saturday as per Condition C19 (for SSD 5544).					✓	✓	
G10	Demolition works near 30D Cook Street (i.e. within 500m) would be confined to 7.00am to 6.00 pm Monday to Saturday as per Condition C19.					✓		
G11	Demolition noise monitoring would be undertaken when necessary to ensure compliance with demolition noise criteria.					✓	✓	
G12	Caltex would ensure that the noise generated by the demolition works does not exceed the criteria defined in Table 2 (from Condition of Consent C16 of SSD 5544) unless the reasonable and feasible noise mitigation strategies outlined within the DNVMP have been implemented. Reasonable and feasible noise mitigation strategies would include appropriate respite periods during particularly noisy or prolonged activities.					✓		
G13	The DNVMP would describe where demolition noise limits from Table 2 (from Condition of Consent C16 of SSD 5544) are likely to be exceeded and what reasonable and feasible noise mitigation would be employed to minimise noise.					✓		
G14	To help ensure that the structures on Site that are to be retained with high or medium heritage significance are protected from potential vibration impacts, the DNVMP would also • Utilise Appendix H Heritage Impact Assessment to identify the medium to high heritage significance buildings to be retained; • Identify where works to demolish redundant structures are occurring within 20 m of a medium to high significance heritage building and the requirement to undertake vibration monitoring and management for these buildings to protect their integrity; and • Outline general monitoring and management measures to monitor vibration and manage buildings.				✓			

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Air Quality and Odour								
H1	Dust emissions from the construction phase of the Project and during the demolition works would be monitored by construction/demolition staff. Visual inspections would be completed by demolition staff during the works. Demolition staff would also complete dust deposition monitoring during the demolition works (as per AS/NZS 3580) in appropriate locations on the Site boundary and in Kurnell. Staff would also monitor dust (PM_{10}) levels using the on site real time ambient air quality monitoring station. When required, during activities likely to cause high dust levels or adverse weather conditions etc., a designated worker would continuously monitor downwind emissions to the community or local residents, using the methods described above, and call a halt to activities if sensitive receptors are likely to be affected by airborne particulate matter. Should significant impacts be likely, appropriate measures would be taken to mitigate adverse air quality impacts.		✓			✓	✓	
H2	Within the refinery, vehicles would only travel on designated roads where possible and would be limited to a maximum speed of 10 km/hr in offroad areas, and 25 km/hr elsewhere.		✓			✓	✓	
H3	Where there is the potential for dust or odour generation from trucks carrying spoil, loads would be covered and all tailgates would be securely fastened. Vehicles would not be loaded higher than the sides and tailboard.		✓			✓	✓	
H4	Construction and potentially dust generating demolition activities would be limited during high wind events if sensitive receivers are likely to be significantly impacted.		✓			✓	✓	
H5	All plant would be maintained and operated in line with the manufacturer's specifications in order to minimise the emission of air pollutants and offensive odours. Plant and construction vehicles would be turned off when not in use.		✓			✓	✓	
H6	Stockpiled material would be assessed for the potential for causing odorous or particulate emissions. If air pollutants and offensive odours are likely, controls would be put into place to manage adverse impacts.		✓			✓		
H7	All concrete cutting and coring would to be undertaken using "wet tools".		✓			✓		
H8	An odour reduction program would be implemented in accordance with the existing EPL.		✓	✓				
H9	The guidepoles on the EFRTs in gasoline service would be fitted with sleeves.		✓	✓				

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H10	Caltex's Leak Detection and Repair (LDAR) Program would continue in accordance with the Environment Protection Licence.		✓	✓				
H11	All reasonable and feasible measures would be implemented to minimise dust and odour emissions during the demolition works					✓	✓	
H12	VOC and Odour Monitoring would be undertaken by demolition workers ***<u>or ACS Modification workers</u>*** (i.e. visual and olfactory monitoring) and monitoring equipment during excavation activities where potential hydrocarbon contamination is present. Contractors would notify the Caltex Environment Specialist of any significant odours identified during demolition.					✓	✓	
H13	Soils or concrete with significant hydrocarbon staining or obvious hydrocarbon odours would be transported to the former CLOR area and stored appropriately. Stockpiles of contaminated soil stored on-site would be managed to prevent odorous VOC emissions and windblown particulate emissions.					✓		
H14	Excavation would be staged to manage potential VOC and odour emissions. Where practical, excavations would not commence prior to 8am nor after 4pm as weather conditions at these times are generally conducive to adverse odour air quality situations from fugitive emissions.					✓	✓	
H15	In unfavourable weather conditions (e.g. dry and windy conditions) or where dust sources are present near sensitive receivers, water sprays would be used to dampen down soils prior to excavation, handling and/or loading/unloading materials. All exposed surfaces (from recent excavations) and stockpiles (of excavated material) would also be watered, sprayed or covered where required, to minimise nuisance dust and odours.					✓	✓	
H16	During adverse meteorological conditions and extraordinary events, such as events where elevated background dust is present, additional mitigation measures would be considered to prevent and minimise air quality impacts from demolition works. These measures would include, but not be limited to implementing the following during high wind events (e.g. > 8m/s hourly average): • Reducing working surface area • Commencing excavation during favourable wind conditions • Increase wetting agents for exposed surfaces • Increase covering of exposed surface areas.					✓	✓	

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H17	Surface disturbance would be minimised. Exposed ground would be rehabilitated as soon as practicable.					✓	✓	
H18	Real-time dust monitoring would be undertaking during the operation of the concrete crusher. Details of this monitoring (and associated response actions) would be incorporated into the AQMP for the demolition works.					✓		
H19	During crushing, a number of dust suppression measures would be implemented. These could include regular watering of stockpiles, dust curtains and other measures as appropriate.					✓		
H20	Where biological matter is present within cooling water inlet pipework, the pipework would be removed be as soon as possible. This would help to minimise the potential for odour issues associated with the degradation and then exposure of the biological matter.					✓		
H21	Where visible dust emissions are observed appropriate management actions would be implemented to prevent impact.					✓		
H22	In the event of an odour complaint, an evaluation would be undertaken to confirm if the demolition works are the source of the odours. If the demolition works are confirmed as a potential ongoing odour source additional mitigation measures would be implemented which could include the use of water sprays to suppress odours and, if necessary, the use of odour suppressants. Off-site olfactory observations and VOC monitoring using equipment would also be undertaken if necessary. In the event of ongoing odour issues, excavation activities would be stopped and if necessary the excavation covered or backfilled.					✓	✓	
H23	In line with Caltex's existing procedure, following a complaint and its subsequent investigation, feedback regarding the source and nature of the complaint would be provided to the affected community members.					✓	✓	
H24	Dust deposition monitoring would be undertaken during the demolition works (as per AS/NZS 3580). This would include monitoring points in appropriate locations on the Site boundary and in Kurnell.					✓		
H25	The on-site real time ambient air quality monitoring station would continue to operate throughout the demolition works. This station continuously monitors for PM_{10}, wind direction and speed, temperature and humidity and rainfall.					✓	✓	
H26	A summary of the air quality monitoring data for the demolition works would be provided to the community during Caltex's quarterly community meeting.					✓	✓	

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H27	**The DEMP would include <u>a</u> subplan: the Containment Cell Management Plan. With regards to air quality, <u>*this*</u> subplan would include:** • A brief overview of the <u>***containment cell***</u> operations relevant to potential air emission sources. • Identification of mitigation measures for each respective emission source including those measures outlined in the DEMP for the Site (where relevant to operations within <u>***the containment cell***</u> area). • Details of proposed monitoring and recordkeeping procedures. <u>***During the production of this plan the NSW EPA Guidelines for Environmental Management On-Site Remediation, would be reviewed and if necessary relevant measures incorporated.***</u>						✓	
<u>***H28***</u>	**The Containment Cell Management Plan <u>*would be prepared and include the following mitigation measures:*</u>** • <u>***A Soil Acceptance Criteria which identifies:***</u> - <u>***Only soil contaminated with airborne asbestos* (referred to in the ACS Modification works as ACS) from the Site (as defined by Figure 1-2 in the SEE) would be accepted into the containment cell.***</u> - <u>***Soils entering the containment cell from the Site but outside of the pipeways must be classified in accordance with the NSW EPA Waste Classification Guidelines 2014, as either special general solid waste or special restricted solid waste.***</u> - <u>***All soils, regardless of their classification under the NSW EPA Waste Classification Guidelines 2014 from the pipeways on the Site (as shown on Figure 1.2 of the SEE) would be disposed of in the containment cell.***</u> - <u>***The total volume of ACS would be limited by the design specifications final landform.***</u> • <u>***Prior to the commencement of filling activities dust and aerosol monitoring stations would be placed at a minimum of six locations around the working area with the objective of monitoring prevalent upwind and downwind locations.***</u> • **Soil moisture content will be managed <u>*to ensure that it is greater than 15%*</u> in order to minimise potential particulate matter and asbestos <u>*[fibre]*</u> emissions to the**						✓	

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	maximum extent practicable *by wetting of soils during filling of cell to minimise the generation of dust.* • Directed water sprays will be used when required throughout ACS handling operations. • *A biodegradable cover would be sprayed over* ACS in the containment cell to minimise the generation of dust. *The cover would be applied following the placement of ACS within the containment cell, and at the end of each day.* • *Limiting potentially dust generating activities during high wind events (i.e. >8m/s hourly average or in severe wind gust conditions)* • Stockpiles will be maintained in a moist condition *when not covered*, and *be* covered if not in use or left overnight. • Completed areas of the works area will be revegetated with native grasses as soon as is practicable. **Note - Airborne asbestos means any fibres of asbestos small enough to be made airborne (Safe Work Australia, April 2016, Code of Practice: How to Safely Remove Asbestos)*							
H29	*The DEMP and relevant sub plans (e.g. Asbestos Management Plan and Containment Cell Management Plan) would be revised to include the following measures:* • *a defined exclusion zone around the work area within which only staff who have been appropriately inducted in relation to the site procedures are permitted entry* • *wetting of soils during excavation and disturbance works to minimise the generation of dust* • *an Asbestos Removal Control Plan which identifies appropriate procedures for personal protective equipment; staff induction and decontamination of equipment* • *preparation of an asbestos monitoring and management plan to account for the activities that may liberate asbestos into the atmosphere. Dust and aerosol monitoring would occur in areas of the Site where asbestos in soil has been identified or is suspected to occur (including the pipeways) together with monitoring and analysis methods, exposure and control criteria and contingencies that will be implemented in the event specific exposure control criteria are exceeded.*						✓	

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Transport and Access								
I1	Local Authorities and Kurnell residents would be informed of any Project related work which would affect the road network.		✓			✓	✓	
I2	A Traffic Management Plan would be developed for the construction/demolition phase. The Traffic Management Plan would comply with all relevant Regulations and By-Laws and in particular address safe access and egress to the public road network. The Transport Management Plan would include: • hours of permitted vehicle activity; • designated routes for construction and demolition traffic and defined access points to the Site and demolition works area; • duration of works; • permitted demolition vehicle types; • designated areas within the Site and demolition works area for truck turning movements, parking, loading and unloading to allow heavy vehicles to enter and leave the Site and demolition works area in a forward direction; • sequence for implementing traffic management measures should these be required; and • procedures and/or principles for construction and demolition vehicle speed limits and the safe operation of construction and demolition vehicles; and • **coordination of off-site heavy vehicle movements from the demolition works and ACS Modification works to ensure that heavy vehicle movements do not exceed 60 movements per day.**		✓			✓	✓	
I3	Works to remove pipelines from under the road reserves in Kurnell would not take place before a road opening application has been approved by Sutherland Shire Council and on the days the following events are taking place: • Australia Day (January); • The Festival of Kites (May); • The Boree Regatta (October). and • Water events for the Australian Scout Jamboree (first two weeks of January 2016).				✓	✓		
I4	**Traffic related to the ACS Modification works would be managed under the Traffic Management Plan that forms a sub-plan to the DEMP**						✓	

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Heritage								
J1	A Heritage Management Strategy would be prepared for the Australian Oil Refinery prior to shut-down of the refinery plant, to provide Caltex with a basic framework for the ongoing management of the Site's heritage during present and future works. The Strategy would include a review of the heritage significance of the overall Site. The review would clarify the extent and relative heritage value of the place by identifying key elements of industrial and built heritage as well as social values of the refinery, and the relative contribution of these elements to the overall significance of the Site. Recommendations would also address the future assessment and management of memorabilia and other significant items of moveable heritage maintained on-site.	✓						
J2	If any further heritage items were discovered throughout the Project, work would cease until an assessment is carried out by a qualified heritage professional.	✓	✓			✓	✓	
J3	An archival photographic record of the existing fabric and operations of the Kurnell Refinery would be prepared while the plant is still operational, and during the decommissioning process. The recording would be undertaken in accordance with the Heritage Council guidelines on *Photographic Recording of Heritage Items Using Film and Digital Capture* (2006). The archival recording would be maintained for the appreciation of present and future generations. To this end, the recording would be lodged with the Sutherland Shire Library and NSW State Library.	✓	✓					
J4	The Heritage Management Strategy (HMS) and the management strategies within it would continue to be implemented.				✓	✓		
J5	Opportunities to adaptively reuse redundant buildings identified in the HMS as having high or moderate heritage significance would continue to be reviewed prior to final demolition works.				✓	✓		
J6	The sculptural panels by Bert Flugelman would be retained and preserved.				✓	✓		
J7	Sandstone blocks from the informal sandstone wall along Silver Beach would be set aside in a secure location prior to works, and reinstated in the same location following removal of the cooling water outlet pipeline.				✓	✓		

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J8	Appropriate mitigation measures would be implemented to reduce the likely damage to the interpretive footpath in front of the driveway entrance to the Kurnell Wharf. Measures would include: • Making a record of the current state of the pavement. • Removing the affected pavement in sections and storing these sections in a secure location. • Reinstating the pavement in the same location following the removal of pipelines; • If this is not practicable, a similar pavement treatment and a matching or compatible interpretative design would be reinstated.				✓	✓		
J9	If historical archaeological relics are unexpectedly found during the demolition works, works in the area of the relics would cease and the Heritage Council of NSW would be notified.					✓	✓	
J10	A Stop Works procedure would be implemented should any Aboriginal Heritage items be found. Works would cease at the vicinity of the item and OEH would be notified as soon as possible					✓	✓	
J11	If any human remains are disturbed, all work in the vicinity of the remains would stop immediately and the remains would not be further disturbed or moved. Works would cease at the vicinity of the item and OEH and NSW Police would be notified as soon as possible.					✓	✓	
J12	Prior to works commencing, all personnel and contractors involved in ground disturbance works would be briefed on the procedures to follow if human remains or unexpected heritage items are found.				✓	✓	✓	
J13	As part of the DEMP, a Heritage Management Section will be developed. This will incorporate previous Management and Mitigation Measures that are not already included in the HMS.				✓	✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
Ecology								
K1	A Biodiversity and Weed Management Plan (BWMP) would be prepared in order to limit and control the spread of noxious weeds within the Site/demolition works area. It would include the following: • wash down procedures to reduce the spread of weeds via vehicles and machinery; • measures to target potential new weed outbreaks including soil stockpiles and any other disturbed areas; • outline monitoring programs for noxious and problematic weeds on site and in the surrounding areas; • measures for strict stockpiling control to help eradicate all noxious weeds as per NSW DPI specifications for Sutherland Shire LGA; • include a list of 'frog-friendly' and 'wetland friendly' herbicides such as Roundup Biactive or Weedmaster DUO for the control of noxious weeds; and ensure that only amphibian friendly herbicides are used; • wash down protocols for construction/demolition vehicles and machinery to prevent the spread of root-rot fungus (*Phytophthora cinnamomi*) and noxious weeds; • all personnel undertaking routine management activities of any noxious weeds should be appropriated trained and all contractors should hold the necessary permits and licenses. Noxious weed information sheets would be provided to demolition contractors to help identification of relevant noxious weeds.	✓	✓	✓	✓	✓		
K2	A BWMP would be prepared in order to limit potential impacts to existing vegetation outside of the area of proposed works, but within the Site. It would include the following: • existing vegetation on Site would be clearly marked on all Site plans and construction diagrams, with clear indications of no-go zones within all vegetated areas; • existing vegetation would be clearly signposted and fenced off prior to the commencement of construction activities, and should remain fenced off until the completion of works (as per the Vegetation Exclusion Zones shown on Figure 17-1); and • absolutely all works would be limited to the defined construction/demolition footprint.	✓	✓	✓	✓	✓		

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
K3	To minimise the potential for impacts to native fauna species, the BWMP would be developed and include following measures: • if any frogs are found within the Project Area, works would cease until frogs have been relocated to areas outside the area of impact; • if any threatened frogs e.g. Green and Golden Bell Frog or Wallum Froglet are identified within the Site, works would cease and active searching should be undertaken by a qualified zoologist experienced in the identification and management of the Green and Golden Bell Frog and Wallum Froglet; • all trenches would be inspected prior to works each morning. Any frogs that become trapped within trenches would be assessed by a suitably qualified ecologist or veterinarian and then released into the nearest suitable habitat if uninjured; • identification sheets would be provided to all construction workers on Site for the two threatened frog species predicted to occur within the Site; • wash down protocols to prevent the spread of Amphibian Chytrid Disease (chytridiomycosis) would be implemented at relevant work areas. Protocols would be consistent with OEH guidelines (DECC, 2008b); • ‘frog-friendly’ and ‘wetland friendly’ herbicides such as Roundup Biactive or Weedmaster DUO would be used for the control of noxious weeds; and • if fauna are found to be utilising the Site, or a nest, den or roost is found, work in the immediate area is to stop and the animals are to be allowed to move off freely, or relocated by an authorised person to an area outside the construction footprint.	✓	✓	✓				

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
K4	To minimise the potential impacts to native fauna during the demolition works the following measures would be included in the BWMP: • demolition workers would be provided with identification sheets relating to the threatened fauna species predicted to occur within the Site. • Stop work procedures would be implemented during the works on the chance encounter of any dispersing threatened frogs or the identification of nesting Pied Oystercatcher, Little Tern, Osprey or White-bellied Sea-eagle to avoid death or injury to frogs dispersing across the study area, or disturbance to nesting threatened birds. • Trenches/holes would be back-filled daily or covered overnight. Where this is not possible, other measures would be considered to prevent and/or mitigate fauna entrapment. Trenches/holes would be inspected prior to works each morning. Injured frogs that become trapped within trenches would be assessed by a veterinarian or ecologist. Uninjured frogs would be captured and released into the nearest suitable habitat to the south of the study area. • If threatened frogs, Green and Golden Bell Frog or Wallum Froglet are identified during demolition works, active searching would be undertaken by a qualified zoologist experienced in the identification and management of the Green and Golden Bell Frog and Wallum Froglet. • When open trenching/digging/excavating, Caltex would ensure that exclusion fencing is erected prior to works commencing each morning. Exclusion fencing shall be maintained during all seasons of the year, given the active season for the Green and Golden Bell Frog extends from September to April and the Wallum Froglet peak activity period occurs during the colder months. • If practicable, works at Silver Beach to remove the cooling water outlet should be completed outside of the known nesting periods for Pied Oystercatcher (August to January) and Little Tern (Spring/Summer). If nesting shorebirds are encountered in the Silver Beach foreshore area in the vicinity of works (within 20 m), works at Silver Beach would cease, a qualified zoologist would be consulted and appropriate actions would be implemented, prior to works recommencing. • If practical, works to remove tall structures on-site should be completed outside of the known nesting periods the threatened bird species (July to September for Osprey and June to January for White-bellied Sea-eagle). If not practical then tall structures would be inspected for active nests prior to commencing the demolition works.				✓	✓		

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
K5	The following recommendations, would be contained in the Cooling Water Outlet Management Plan for managing the potential marine ecology impact and implemented during demolition works: • silt curtains would be installed seaward of the demolition works area but not directly above existing seagrass communities; • all plant and equipment used in the water column would be appropriately prepared, checked and cleaned to avoid potential release of contaminants; • plant and equipment used in the water column would be inspected to ensure fragments of the invasive algae Caulerpa taxifolia are not present; • spill kits would be used to contain and clean up any spills from demolition plant and equipment. Spill kits would be located within 20 m of demolition plant and equipment; and • demolition works at Silver Beach (particularly those located in the water column) would be timed such that they do not coincide with high-tide conditions or during significant wave action.				✓	✓		
K6	Following the removal of the continental carbon pipeline and other infrastructure Caltex would develop a strategy to manage the redundant right of way (CCROW). The strategy would include measures to: • remove fencing, reprofile and allow natural regeneration the southern part of the CCROW (beyond the southern boundary of the Site) to promote consistent and connected vegetative communities across the southern part of Caltex's ownership; • remove and keep out noxious and invasive weeds, especially during the regeneration phase; and • reprofiling of the CCROW could include creating gaps in the raised easement to allow for hydrological exchange and habitat regeneration.					✓		
K7	Caltex would undertake the following prior to excavation along the Continental Carbon Right of Way: • pre-clearing inspections; and • implementing frog exclusion measures to ensure dispersing frogs are not captured and trapped in trenches during pipeline removal (e.g. exclusion fencing).					✓		

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
Coastal Processes								
L1	A Cooling Water Outlet Management Plan would be developed as part of the Demolition Environment Management Plan (DEMP). Rehabilitation works at Silver Beach would be in accordance with this Cooling Water Outlet Management Plan. The following measures would be included:				✓	✓		
L2	A detailed survey of the likely extent of the disturbed area at Silver Beach would be undertaken prior to commencing demolition works to ensure that the pre-existing topography is re-established following the works.					✓		
L3	The affected sand dunes (including the back-beach and sub-aerial beach) would be re-instated using the stockpiled overburden sand and if necessary, additional sand. Additional sand used for reinstating sand dunes would be of similar particle size and composition as the overburden sand.					✓		
L4	The affected sand dunes would be restored to match the previously surveyed topography. A smooth profile from the back-beach area to the dune would be re-established to ensure the aerodynamics are as consistent as possible with the undisturbed areas adjacent to the disturbed area. If necessary, liquid sprays or geotextiles would be used to help stabilise the beach and protect against erosion.					✓		
L5	The affected sand dunes would be re-vegetated using indigenous, native flora. The existing vegetation is limited to grasses, with no woody vegetation. The area would be re-planted with similar grass species in a manner that ensures minimal loss of wind-blown sand from the dune while the area is re-vegetating. All re-vegetated areas would: • contain signage to highlight these areas as rehabilitation zones that prohibit public and vehicular access; • be temporarily fenced, and • be maintained and monitored until vegetation is established using approved dune rehabilitation methods.							✓
L6	Material of a similar sediment size and colour characteristics would be used as back fill material for the trench below the low tide mark. To account for later settling and consolidations, some overfilling would be undertaken to account for later consolidation (approximately 10 % would be recommended).							✓

12.0 References

AECOM (2016a) The Kurnell Pipeways Asbestos Classification Report

AECOM (2016b) Kurnell Terminal ACS Management Project Statement of Environmental Effects, AECOM Australia Pty Ltd, Sydney

Australian/New Zealand Standard 3580.1.1:207 - Guide to sitting air monitoring equipment

Caltex (2015) Management of Asbestos, Asbestos Containing Materials and Synthetic Mineral Fibres Guidance Document

EPA (2014) NSW Environment Protection Authority Waste Classification Guidelines, Part 1: Classifying Waste, November 2014

EPA Guidelines for Environmental Management On-Site Remediation

EPA (2016) NSW EPA Solid Waste Landfill Guidelines

NSW EPA Best Practice Note: Land-farming, April 2014

Safe Work Australia (2011), Model Work Health and Safety Regulations

Sutherland Shire Council (2016), Draft Sea Level Rise Policy

SafeWork Australia (2016), Model Code of Practice: How to Safely Remove Asbestos

SafeWork Australia (2016), Model Code of Practice: How to Manage and Control Asbestos in the Workplace

SafeWork Australia (1990), National Code of Practice for the Safe Use of Synthetic Mineral Fibres

URS (2013) Kurnell Refinery Conversion Environmental Impact Statement, URS Australia Pty Ltd, Sydney

URS (2014) Kurnell Refinery Demolition Statement of Environmental Effects, URS Australia Pty Ltd, Sydney

13.0 Limitations

AECOM Australia Pty Ltd (AECOM) has prepared this Response to Submissions (RTS) in accordance with the usual care and thoroughness and based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this RTS.

This RTS has been produced in accordance with the stipulations in the Environmental Planning and Assessment Act 1979 and the Environmental Planning and Assessment Regulation 2000.

Where this RTS indicates that information has been provided to AECOM by third parties, AECOM has made no independent verification of this information except as expressly stated in the RTS. AECOM assumes no liability for any inaccuracies in or omissions to that information.

This RTS was prepared between 2 November 2016 and 18 January 2017 and is based on the conditions encountered and information reviewed at the time of preparation. AECOM disclaims responsibility for any changes that may have occurred after this time.

This RTS should be read in full. No responsibility is accepted for use of any part of this RTS in any other context or for any other purpose.

To the extent permitted by law, AECOM expressly disclaims and excludes liability for any loss, damage, cost or expenses suffered by any third party relating to or resulting from the use of, or reliance on, any information contained in this RTS. URS does not admit that any action, liability or claim may exist or be available to any third party.

Appendix A

Copies of Submissions from Public Authorities

DOC16/533075-04

Ms Pamela Morales
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Dear Ms Morales

Modification to Caltex Kurnell Refinery Conversion Works (SSD 5544 MOD 2)

I am writing in reply to your letter to the Environment Protection Authority (EPA) dated 19 October 2016 seeking comments on the above modification application and accompanying Statement of Environmental Effects (SEE).

On the basis of a review of the information provided and taking into consideration the existing approval conditions for the conversion project (SSD 5544), the EPA provides its comments on this application in the attachment to this letter **(Attachment A)**. These comments relate to:

- Regulation
- General comments on the SEE
- Waste/Asbestos Management
- Surface water, Wastewater and Flooding
- Soil, Groundwater and Contamination

The EPA may have further comments on receipt and review of any additional information provided.

If you have questions regarding the above, please phone the contact officer on (02) 4224 4100.

Yours sincerely

02/11/16

PETER BLOEM
Manager Illawarra
Environment Protection Authority

Contact officer: CRAIG PATTERSON
(02) 4224 4100

Attachment A

ATTACHMENT A

Regulation

Licence Variation

1. The proposed Asbestos Contaminated Soil (ACS) Modification works will require a variation to Caltex's Environment Protection Licence (EPL) 837 if the modification is approved. Caltex will need to submit a separate licence variation application prior to commencing the proposed works.

Financial Assurance

2. The proponent should be made aware that, consistent with provisions under Part 9.4 of the *Protection of the Environment Operations Act 1997* ("the POEO Act"), the EPA may require the provision of a financial assurance for the site. The amount and form of the assurance would be determined by the EPA and required as a condition of the licence.

   The financial assurance may be linked to licence conditions requiring works or programs related to the environmental performance of the site.

Positive covenant

3. The proponent should be made aware that, consistent with Section 74 of the POEO Act, the EPA may require the proponent to enter into or arrange for a positive covenant under Section 88E of the Conveyancing Act 1919.

General comments on the SEE

4. The SEE indicates that Caltex will rely on the management measures included in the existing Demolition Environmental Management Plan (DEMP) and associated sub-plans for the ACS Modification works. The ACS biopile and containment cell constitute additional activities beyond the scope of works covered within the DEMP. To address these additional activities, Caltex has proposed to develop two additional subplans to the DEMP including a Containment Cell Management Plan and an ACS Biopile Management Plan. These plans must be developed in consultation with the EPA.

   A Long Term Environmental Management Plan (LTEMP) should also be prepared which identifies any ongoing land use restrictions that will apply to the containment cell. The LTEMP should be listed on any Section 149 (5) certificates issued in relation to the site and would be a requirement of a positive covenant as describe above.

   Underpinning these additional management plans must be clear environmental performance outcomes. The proposed actions must support the delivery of these outcomes. This is not clear from the SEE. The environmental outcomes are defined in the EPL, the POEO Act and existing project approval (SSD 5544 MOD 1) for the site. For example, these outcomes include no offensive odours beyond the boundary of the premises, air pollution (including dust/asbestos emissions) to be prevented/minimised and prevention of land or water pollution (except in accordance with licence requirements).

5. Appendix C - Kurnell Pipeways Asbestos Classification Report (electronic copy) did not display correctly and was not readable. A copy of this section of the report should be provided.

Waste/Asbestos Management

6. The report identifies the potential for asbestos fibres to be mobilised during the excavation and transport of the waste from the pipeways. The reference *to 'existing management strategies which include air quality and asbestos management plans'* (Section 12.7) does not provide sufficient detail to assess the proposal.

It is recommended that all works involving the excavation and disturbance of ACS include the following as a minimum:

a) a defined exclusion zone around the work area within which only staff who have been appropriately inducted in relation to the site procedures are permitted entry
b) wetting of soils during excavation works to minimise the generation of dust
c) an occupational health and safety plan for site operators which identifies appropriate procedures for personal protective equipment; staff induction and decontamination of equipment
d) further detail on the *'dust and aerosol monitoring'* (Section 4.4.2) in the form of an asbestos monitoring and management plan. This should include monitoring in all areas of the site where asbestos in soil has been identified or is suspected to occur (including the pipeways) together with monitoring and analysis methods, exposure and control criteria and contingencies that will be implemented in the event specific exposure control criteria are exceeded.

In general, Caltex must comply with conditions specified in its EPL and project approval including the measures identified in the Asbestos Management Plan prepared for the demolition activities. Where no specific asbestos related conditions are outlined in this licence or project approval, Caltex must comply with the POEO (Waste) Regulation 2005. Caltex should also implement an appropriate asbestos monitoring plan during all works associated with the excavation, removal, handling and management of asbestos materials.

7. The proposal to treat asbestos and hydrocarbon impacted soil classified as *'hazardous waste'* through active biopiling onsite (Section 4.4.2) includes a proposal to homogenise the soil waste using a screening bucket. The homogenisation process will include blending soil from the pipeways with elevated hydrocarbons (> 50,000 mg/kg) with soil classified as general solid waste to lower peak hydrocarbon concentrations to promote microbe activity. The proposed biopiling and homogenisation activities have the potential to mobilise asbestos fibres from the soil which would unlikely be removed by the proposed active carbon filtration system.

   Based on the information provided, Caltex has not demonstrated that the proposed biopiling, homogenisation process and mitigation measures are suitable for managing asbestos contamination soil. Caltex must provide additional information to demonstrate that the active biopiling process including control measures and monitoring will be effective in preventing the emission of asbestos fibres from the soil during the biopiling homogenisation, construction, treatment and deconstruction processes. Asbestos contamination of any control measures (for example, granular activated carbon drums) and suitable management/disposal measures should also be considered. Any waste contaminated with asbestos will need to be disposed of as Special Waste in accordance with the Waste Classification guidelines.

   The EPA reminds Caltex that the "*Caltex Treated Soil Order 2016*" issued for the sustainable soil regeneration facility at Kurnell does not permit asbestos contaminated soils to be received.

8. The SEE states that prior to the commencement of excavations for biopiling, dust and aerosol monitoring stations would be placed at a minimum of six locations around the working area with the objective of monitoring prevalent upwind and downwind locations. These stations would be used to monitor for particulate matter being mobilised from the biopile works area including dust and asbestos emissions. The details of this monitoring must be included in the relevant management plan as described above should Caltex satisfactorily demonstrate that the biopiling process is suitable for managing the ACS.

9. Equipment used to excavate, load, transport and place the ACS in the containment cell may be contaminated with asbestos fibres. The SEE does not provide information on how this equipment will be decontaminated after the activity has been completed. Additional information should be provided on this process and describe how the resulting wastes will be managed.

10. In addition to the containment of ACSs from the pipeways, Caltex has also proposed to dispose of ACSs from other parts of the Site if there is available capacity. All material likely to be place in the

cell should be assessed as part of this application. Once the material has been placed in the containment cell and capped, the cell should not be disturbed.

11. Section 4.4.4 proposes that Caltex will use rigid plastic sheeting to temporarily cover the ACS after it is placed in the containment cell. This plastic will be stripped back to allowing filling operations to continue. The SEE does not provide any details on whether there will be any potential emissions from the stripping back process and how these will be managed. Additional information should be provided in regards to the assessment of all potential emissions likely to occur from the containment cell operations and the control measures proposed to be implemented to manage these emissions. Once this information has been assessed, it should form part of the Containment Cell Management Plan.

Surface Water, Wastewater and Flooding

12. Section ES1.10 states that the change in the volume and quality of stormwater discharged from the Site, arising from the ACS Modification works is not expected to be significant. For all discharges from the premises, Caltex must comply with the EPL requirements at all times.

13. Section 4.5 states that the leachate collected from the closed containment cell will be treated by the site's wastewater treatment system. In June 2016 Caltex submitted its wastewater characterisation and risk assessment report as required by PRP U25. The objective of this program was to characterise the wastewater being discharged to Yena Gap during the transition from refinery operations to terminal operations and to help inform future requirements for wastewater treatment. A revised report is due to be submitted by Caltex for this program. Caltex must ensure that any future requirements for wastewater treatment at the site take into consideration stormwater and leachate quality (including asbestos) and quantity that may be generated from the operation of the containment cell.

14. The excavation of ACS from the pipeways has the potential to disturb sediments which may affect the quality of the water directed to the wastewater treatment plant during rainfall events. Caltex must ensure that the WWTP is capable of managing any significant changes in water quality as a result of the excavation works.

Soils, Groundwater and Contamination

15. The SEE states that following excavation of the ACS, an independent licensed asbestos inspector would be employed to verify that the friable asbestos has been removed from the pipeways. Where there is potential for other areas of the site to become contaminated with asbestos fibres (for example, biopiling area) the independent asbestos inspector should also be required to verify that any asbestos fibres from these areas have also been successfully removed as part of the clean up activities.

16. Caltex has proposed to install two groundwater monitoring bores at the north and west of the containment cell to undertake quarterly monitoring during construction, filling and closure of the cell. The location of these additional monitoring wells has not been provided in the SEE. The EPA propose to include this monitoring on Caltex's EPL and request that Caltex provide additional information to justify the selected locations and monitoring parameters.

NSW EPA

DOC17/32484:CP

Pamela Morales
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Dear Ms Morales

Caltex Response to Submissions Report - Asbestos Management Project
<u>Modification to Caltex Kurnell Refinery Conversion Works (SSD 5544 Mod 2)</u>

I am writing in reply to your email to the Environment Protection Authority (EPA) dated 19 January 2017 seeking comments on the above response to submissions report.

During the exhibition of the Statement of Environmental Effects, the EPA advised that based on the information provided Caltex had not demonstrated that the proposed biopiling, homogenisation process and mitigation measures are suitable for managing asbestos contamination soil. The EPA requested additional information to demonstrate that the active biopiling process including control measures and monitoring will be effective in preventing the emission of asbestos fibres from the soil during the biopiling homogenisation, construction, treatment and deconstruction processes.

On the basis of a review of the information provided, the EPA is not in a position to support the proposed biopiling treatment process. The EPA's justification for this position includes the following:

- The handling of asbestos contaminated waste should be minimised as far as practicable to reduce the potential for mobilisation of asbestos fibres.
- The method of homogenisation and biopiling process (including construction, treatment and deconstruction) has the potential to mobilise asbestos fibres.
- The homogenisation process involves dilution of the asbestos contaminated soil classified as hazardous waste which increases the volume of soil requiring treatment. This is not consistent with the EPA's general waste classification principles.

The EPA recommends that an alternative method of treatment for asbestos contaminated soil (ACS) classified as hazardous waste be proposed. The report states that hazardous asbestos contaminated soil which cannot be appropriately managed onsite would be taken off site for treatment and disposed of in a licensed facility.

The EPA provides comments in the attachment to this letter (Attachment A) to assist Department of Planning and Environment in the assessment and determination of this project. The EPA may have further comments on receipt and review of any additional information provided.

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If you have questions regarding the above, please phone the contact officer on (02) 4224 4100.

Yours sincerely

03/02/17

PETER BLOEM
Manager Regional Operations Illawarra
Environment Protection Authority

Contact officer: CRAIG PATTERSON
(02) 4224 4100

Attachment:

ATTACHMENT A

Section 3.1

1. The report indicates that if the modification is approved, the licence will be varied to include any scheduled activities that may be required. The EPA advises that the licence variation may include other amendments to the conditions of the licence such as monitoring and reporting conditions.

Section 3.3

2. The report states that Caltex proposed to develop a Long Term Environmental Management Plan as a sub plan to the Operational Environmental Management Plan for the site. Caltex propose to list this plan on the Section 149 certificate for the relevant lot (Lot 25 DP776328).

Section 3.5

3. Soil contaminated with friable asbestos has the potential to generate airborne asbestos fibres and must be carefully managed with a high level of control to minimise the release of asbestos fibres into the air.

   The proposal to treat asbestos and hydrocarbon impacted soil classified as hazardous waste through homogenisation and biopiling using an excavator fitted with a crusher bucket is considered to have the potential to mobilise asbestos fibres. The additional information provided by Caltex in relation to the homogenisation and biopiling process using the proposed bucket crusher operation has not demonstrated that this process is suitable for managing asbestos contaminated soil.

   Based on the information provided, the EPA is not in a position to support the proposed treatment process and recommends that an alternative method of treatment for asbestos contaminated soil (ACS) classified as hazardous waste should be proposed. The report states that hazardous asbestos contaminated soil which cannot be appropriately managed onsite would be taken off site for treatment and disposed of in a licensed facility. Homogenisation is also considered to be a form of dilution rather than treatment and would increase the volume of asbestos contaminated soil classified as hazardous waste that requires treatment. This is not consistent with the EPA's general waste classification principles.

   Given the above, the proposed 18 month timeframe for completion of the project and closure of the cell may need to be revised as it was proposed that the biopiling process would take approximately 11 months.

   The report also states that the dust measures for asbestos-in-soil have been successfully applied on a number of asbestos-impacted sites. The report does not provide any details of the measures implemented for the identified sites nor does it indicate whether any of the sites included a homogenisation and biopiling process as part of their operations.

Section 3.9

4. The report provides information on how equipment will be decontaminated after excavation, transport and placement of the ACS has taken place. The information provided appears to focus on the management and disposal of asbestos waste only.

   The report also states that the ACS modification works would be completed in line with the Demolition Environmental Management Plan (DEMP) and Asbestos Management Plan (AMP) for the demolition works and the decontamination procedures would be consistent with this pre agreed management approach. Neither the DEMP nor AMP appear to include any information on appropriate decontamination procedures for this particular activity.

   The decontamination and waste management process should consider the types of asbestos contaminated wastes likely to be generated as part of the decontamination activities. This includes the hydrocarbon impacted soils that are classified as hazardous, restricted or general solid waste. The wastes generated by the decontamination process may require treatment prior to disposal to an appropriately licensed facility particularly for wastes classified as hazardous.

Caltex must ensure that appropriate decontamination procedures are developed to adequately manage the ACS. The Safe Work Code of Practice How to Safely Remove Asbestos provides some information for decontamination procedures but does not appear to deal with multiple waste types. Further information should be provided by Caltex to address this issue.

Section 3.10

5. The report states that Caltex are proposing to agree to a soil acceptance criteria for the containment cell similar to the approach used for the Permanent Soil Regeneration facility. This statement indicates that Caltex may be proposing to use the process of biopiling to treat other ACS obtained from other parts of the site prior to place in the containment cell. This process is not supported by the EPA and further information is requested from Caltex to clarify this matter.

Section 3.11

6. Under the Protection of the Environment Operations (Waste) Regulation 2014, asbestos waste must be covered with virgin excavated natural material or other material as approved in the environment protection licence. The depths of the required covering are immediate covering with 150 millimetres of cover and 500 millimetres of cover at the end of each day.

   In addition to using rigid plastic sheeting to temporarily cover the ACS after placement, Caltex should also consider implementing daily cover options in accordance with the regulations to minimise the release of dust and asbestos fibres when the plastic is remove to allowing filling operations to continue.

DOC17/168999-05:CP

Pamela Morales
Planning Officer
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Dear Ms Morales

Response to Submissions Report – Additional Information
Caltex Kurnell Conversion Works - ACS Management Project (SSD 5544 MOD 2)

I am writing in reply to your email dated 1 March 2017 seeking comments from the Environment Protection Authority (EPA) on the additional information prepared by AECOM Services Pty Ltd for the above Response to Submissions Report.

The EPA met with Caltex, its consultants and the Department of Planning and Environment (DPE) in February 2017 to discuss the proposed project and the issues raised in our letter dated 3 February 2017. Additional information was provided by Caltex in March 2017 for DPE and EPA's consideration. To assist DPE in the assessment and determination of this project, the EPA has held discussions with Caltex's consultants and DPE regarding our review and a suggested approach to manage the Asbestos Contaminated Soil (ACS).

On the basis of the information provided to date, the EPA does not support the proposed homogenisation and biopiling treatment process to manage the ACS classified as hazardous waste. The EPA proposes that a way forward to manage the asbestos contaminated soil is via an onsite containment cell without the homogenisation and biopiling treatment, subject to appropriate conditions. In arriving at this position, the EPA has taken into consideration a number of matters including the following:

- The handling of asbestos contaminated waste should be minimised as far as practicable to reduce the potential for mobilisation of asbestos fibres.
- The method of homogenisation and biopiling process (including construction, treatment and deconstruction) has the potential to mobilise asbestos fibres.
- The homogenisation process involves dilution of the asbestos contaminated soil classified as hazardous waste which increases the volume of soil requiring treatment. This is not consistent with the EPA's general waste classification principles.
- All the asbestos contaminated soil was proposed to be placed into an onsite containment cell. An Asbestos Containment Cell Concept Design Report dated 29 September 2016 was provided in Appendix B of the Environmental Impact Statement.
- Requirements that the EPA has applied to the use of containment cells to manage waste materials generated onsite at other premises.
- The concerns raised in the public submissions regarding asbestos management at the site.

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www.epa.nsw.gov.au

To consider this proposal further the EPA recommends that Caltex provide further information to the DPE and EPA that addresses the requirements identified in Attachment A to this letter. This includes the development of a Remedial Action Plan (RAP) in accordance with *State Environmental Planning Policy 55 (SEPP55)* and the Guidelines for the NSW Site Auditor Scheme. While the proposal provided discusses remedial options, a RAP is requested as the preferred remedial option of homogenisation and biopiling is not considered to be acceptable for the reasons provided above.

Consistent with provisions under Part 9.4 of the *Protection of the Environment Operations Act 1997 ("the POEO Act")*, the EPA may require the provision of a financial assurance for the site. The amount and form of the assurance would be determined by the EPA and required as a condition of the licence. To assist in determining the amount of a financial insurance, the POEO Act (Section 300) permits the EPA to require Caltex to provide an independent assessment of the cost of the relevant work or program for which the assurance is required. This may include the costs involved in construction of the containment cell and the long term operation of the cell over an appropriate time-frame. The requirements for the assessment will developed in consultation with Caltex should the modification application be granted by DPE.

The EPA is happy to meet with Caltex and DPE at a mutually convenient time to discuss this response.

If you have questions regarding the above, please phone the contact officer on (02) 4224 4100.

Yours sincerely

16/05/17

PETER BLOEM
Manager Regional Operations Illawarra
Environment Protection Authority

Contact officer: CRAIG PATTERSON
(02) 4224 4100

Attachment A

Attachment A – Requirements for Onsite Containment of Asbestos Contaminated Soil

A RAP should be developed in consultation with the EPA. In arriving at this position, the EPA has taken into consideration a number of matters including the following:

1. The definition of remediation provided in the *Contaminated Land Management (CLM) Act 1997* which includes preparing a long-term management plan, removing or containing the contamination of the land and eliminating or reducing any hazard arising from the contamination of the land.
2. Sections 1.3, 1.4 and 4.3.3 of the Guidelines for the NSW Site Auditor Scheme which refers to the role of site auditors in general and in assessing any onsite containment and capping proposals.
3. Section 2.3 of the *Guidelines for Consultants Reporting on Contaminated Sites* which identifies the requirements for a RAP.
4. *State Environmental Planning Policy 55 (SEPP 55)* which provides the process for remedial works including the provision of a RAP.

An independent accredited site auditor under the CLM Act should be engaged to review the RAP and associated management plans (for example, Long Term Environmental Management Plan (LTEMP)) to assess the suitability of the proposed remediation strategy.

The RAP should address the proposed onsite containment of the ACS and consider the application of the following which have been applied:

1. Construction of drains to alleviate areas of ponding or high infiltration with all stormwater systems and sewer systems (including subsoil drains, pumping stations, sumps and other infrastructure or equipment) to be isolated from ingress of groundwater.

2. Re-contouring to reduce groundwater recharge through infiltration. All areas except building slabs should be constructed so that no undrained ponding of surface water occurs.

3. Capping to an appropriate maximum permeability (on sites with similar materials the capping has been 10^{-9}m/s to 10^{-11} and minimum thickness of 0.5m however the permeability and thickness should be based on site specific modelling/assessment). The cap must prevent as far as practicable the ingress of water to any part of the site that may be contaminated and, thereby in turn, prevent as far as practicable, the mobilisation and migration of contaminants in surface water or ground water. The cap must have a design life of without substantial maintenance or repair for at least 50 years under the conditions anticipated at the site. The cap is to be constructed from materials which are non-dispersive, resistant to erosion, low shrink swell potential, and be free of acidic leachates.

4. Management of excavated material in order to characterise the material for placement within the containment cell, so that the more highly impacted material may be able to be placed into and contained and isolated in emplacement areas within the area of the works. *Please note that on other sites the more hazardous material has been required to have a minimum cover of at least 500mm plus the surface cap.*

5. Development and implementation of a Long Term Environmental Management Plan (LTEMP) in order to maintain capping and drainage, prevent any activities which could damage the capping or liner layers and undertake groundwater monitoring (including groundwater quality and levels). Restrictions on surface development including buildings/confined spaces and an exclusion zone around the barrier wall should also be included in the plan. The Plan must also detail any ongoing land use restrictions that will apply to the containment cell and be listed on the Section 149 (5) Certificates issued in relation to the site.

6. Prior to the commencement of works, a Construction Quality Assurance Plan must be prepared by a suitably qualified and experienced person to describe the capping materials, thicknesses and jointing methods and to prescribe an inspection and maintenance schedule. Consideration should be given to the design load in order to ensure there will not be any adverse effect on the surrounding ground and that the design of the structures takes account of ground movements predicted by the Construction Quality Assurance Officer.

7. The cell must be capped and permanently sealed as per the containment cell design within one month after it has been validated that all ACS from the pipeways has been removed.

8. The design of the containment cell must include identification of any proposed physical markers, marker layer, notices or other precautions, to warn people if they are about to excavate within an emplacement area onto contaminated materials.

9. A waste register must be prepared, used and maintained by the proponent to track wastes generated from the ACS modification works and used to record and report the types, volumes and management measures for all waste and resources arising from/used for the works.

10. A final report will need to be prepared and submitted to the EPA at the completion and closure of the containment cell. The report must include a summary of the waste classification and environmental monitoring data conducted in accordance with the Environmental Management Plans (and associated Sub Plans). Monitoring data should include but not necessarily be limited to:
    i. Waste Characterisation and Tracking
    ii. Air Quality monitoring (including dust and asbestos)
    iii. Groundwater Monitoring.

11. The RAP should consider how the plan will integrate with the requirements of other management plans such as the Demolition Environmental Management Plan and associated sub plans including but not limited to:
    - Containment Cell Management Plan
    - Asbestos Management Plan
    - Asbestos Removal Control Plan
    - Air Quality Management Plan
    - Long Term Environmental Management Plan

    These plans must be developed in consultation with the EPA. The plans should include but not be limited to the following:
    - dust, asbestos and groundwater monitoring requirements
    - appropriate procedures to verify that the friable asbestos has been removed from the pipeways and contamination of other areas has been prevented
    - appropriate procedures for reviewing and improving the requirements of each plan to allow for adaptive management and to address any contingencies that may arise over the life of the project.

12. The project must comply with the conditions of the Environment Protection Licence (EPL 837) for the site at all times. A copy of the licence is available at: http://www.epa.nsw.gov.au/prpoeoapp/.

    Note: The proposed Asbestos Contaminated Soil (ACS) Modification works will require a variation to Caltex's Environment Protection Licence (EPL 837) if the modification is approved. Caltex will need to submit a separate licence variation application prior to commencing the proposed works.

Health
South Eastern Sydney
Local Health District
Public Health Unit

31/10/2016

Ms Joanna Bakopanos
Team Leader Industry Assessment
Department of Planning
GPO Box 39
Sydney NSW 2031-

Email: Pamela.morales@planning.nsw.gov.au

Dear Ms Bakopanos

Modification to Caltex Kurnell Refinery Conversion Works (SSD 5544 MOD2)

Thank you for inviting the Public Health Unit of South Eastern Sydney Local Health District to comment on the modification works for the above premises. We have reviewed the Statement of Environmental Effects Report (SEER) for the above premise and wish to advise that in proceedings with the modification woks, the following provisions should be observed during the construction period.

1. To minimise the release of asbestos into the air, work should be in accordance with the Worksafe National Code of Practice and Guidance on Asbestos removals and disposal.

2. Comply with the "EPA Guidelines for Environmental management on-site remediation" Appendix C for odour and gaseous (volatile) emission, air quality dust (particulate) emission and Appendix D for noise issues.

3. Appropriate mitigation measures, dust monitors and monitoring stations to be placed along the north-west of the site; Village of Kurnell sensitive receivers as per the Australian/New Zealand Standard 3580.1.1:207 (Guide to sitting air monitoring equipment).

4. Provide the Unit a copy of the "Remediation Action Plan (RAP) for the site for the commencement of remedial works in 2018".

5. NSW Health asks for visual and continuance monitoring for noise, odour and air monitoring asbestos dust emissions along the sensitive receives.

Should you need additional queries, please do not hesitate to call Santo Cannata Senior Environmental Health Officer on 9382 8244

Yours Sincerely

Professor Mark Ferson MPH MD FRACP FAFPHM FRSPH
Director & Public Health Officer

Public Health Unit
South Eastern Sydney Local Health District
ABN 70 442 041 439
Building 23 (Hut U), Easy Street, Prince of Wales Hospital Campus, Randwick
Postal Address: Locked Bag 88 Randwick NSW 2031
Tel (02) 9382 8333 Fax (02) 9382 8334

NSW GOVERNMENT | Department of Primary Industries

OUT16/40753

Ms Pamela Morales
Industry Assessments
NSW Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

pamela.morales@planning.nsw.gov.au

Dear Ms Morales

Kurnell Refinery Conversion Works - ACS Management Project (SSD 5544 MOD 2)
Comment on the Statement of Environmental Effects

I refer to the email dated 20 October 2016 to the Department of Primary Industries (DPI) in respect to the above matter. Comment has been sought from relevant divisions of DPI. Views were also sought from NSW Department of Industry - Lands which is now a division of the broader Department and no longer within NSW DPI. Any further referrals to DPI can be sent by email to landuse.enquiries@dpi.nsw.gov.au.

DPI has reviewed the Statement of Environmental Effects (SEE) and has no objections in relation to the proposal. DPI provides the following comments for consideration with respect to the management of potential impacts to groundwater resources:

- DPI Water considers that the investigatory, construction and monitoring processes outlined in the SEE for the new asbestos contaminated soil containment cell are satisfactory. Existing conditions of consent with respect to environmental performance and management (Schedule C) are considered adequate.

Yours sincerely

Mitchell Isaacs
Director, Planning Policy & Assessment Advice
1 November 2016

DPI appreciates your help to improve our advice to you. Please complete this three minute survey about the advice we have provided to you, here:
https://goo.gl/o8TXWz

NSW GOVERNMENT | Department of Primary Industries

OUT17/5442

Ms Pamela Morales
Industry Assessments
NSW Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Pamela.morales@planning.nsw.gov.au

Dear Ms Morales

Caltex Kurnell Refinery Conversion (SSD 5544 MOD 2)
Comment on the Response to Submissions Report

I refer to your email of 19 January 2017 to the Department of Primary Industries (DPI) in respect to the above matter. Comment has been sought from relevant divisions of DPI. Views were also sought from NSW Department of Industry - Lands that are now a division of the broader Department and no longer within NSW DPI.
Any further referrals to DPI can be sent by email to landuse.enquiries@dpi.nsw.gov.au.

DPI has reviewed the Response to submissions and provides the following comment:

- While not raised in earlier submissions, Crown lands adjoining the project site comprising Lots 1125 and 1118 DP 752064 are Crown land held under Special Leases in perpetuity by Continental Carbon Australia Pty Ltd and are currently under rehabilitation. Any pipeline(s) and services traversing the Caltex Kurnell Terminal site which service Lots 1125 and 1118 DP 752064 should be protected as they may be required for future use.

Yours sincerely

Mitchell Isaacs
Director, Planning Policy & Assessment Advice
3 February 2017

DPI appreciates your help to improve our advice to you. Please complete this three minute survey about the advice we have provided to you, here:
https://goo.gl/o8TXWz

Sutherland Shire
COUNCIL

Administration Centre
4-20 Eton Street, Sutherland
NSW 2232 Australia
Please reply to:
General Manager,
Locked Bag 17,
Sutherland NSW 1499
Australia
Tel 02 9710 0333
Fax 02 9710 0265
DX4511 SUTHERLAND
Email ssc@ssc.nsw.gov.au
www.sutherlandshire.nsw.gov.au
ABN 52 018 204 808
Office Hours
8.30am to 4.30pm
Monday to Friday

Leanne Mariani - 9710 0149
File Ref: DN16/0053

11 November 2016

Department Of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

Dear Sir/Madam

Development Referral No. DN16/0053
Proposal: SSD5544_MOD2 - Modification application for the ongoing conversion and demolition works for the Caltex Kurnell Refinery
Property: 160-166 Captain Cook Drive, Kurnell

I refer to the above development proposal which was referred to Council for comment in accordance with the provisions of the *State Environmental Planning Policy (State and Regional Development) 2011.*

Council has reviewed the proposal and provides the following comments:

1. Surface Water and Flooding
As a condition of the original development approval, the applicant was required to undertake a flood study to assess potential flooding risk with an emphasis on the impacts from surface runoff entering the site from land to the east and south of the site, in particular the national park. It is understood that this flood study is yet to be completed and Council requires this study to be undertaken to its satisfaction prior to the approval of the proposed modification.

Council's Stormwater Engineers advise that the flood model for the Kurnell Township developed by WMAwater (2009), could be extended to cover the subject site. The flood study must show flood behaviour and address hazard and risk at and around the site under both existing and proposed development conditions. The flood study must also consider Council's Draft Sea Level Rise Policy (May 2016).

2. Biopiling Process

With respect to the proposed biopiling processes and effective control of asbestos fibres, Council agrees with the comments and requirements presented by the NSW Environment Protection Authority in their correspondence dated 2 November 2016.

3. Wastewater

With respect to the proposed leachate collection and treatment via the existing wastewater treatment plan, and specifically management of asbestos fibres, Council concurs with the comments and requirements presented by the NSW Environment Protection Authority in their correspondence dated 2 November 2016.

In order for Council to undertake a comprehensive assessment of the proposed modification to the development approval, the information addressing the above matters is required to be submitted by the applicant.

If you need any clarification of the above comments, please contact Council's Development Assessment Officer Leanne Mariani on 9710 0149 or email lmariani@ssc.nsw.gov.au and quote the application number in the subject.

Yours faithfully

L. Mariani

Leanne Mariani

Sutherland Shire
COUNCIL

Administration Centre
4-20 Eton Street, Sutherland
NSW 2232 Australia

Please reply to:
General Manager,
Locked Bag 17,
Sutherland NSW 1499
Australia

Tel 02 9710 0333
Fax 02 9710 0265
DX4511 SUTHERLAND
Email ssc@ssc.nsw.gov.au
www.sutherlandshire.nsw.gov.au
ABN 52 018 204 808

Office Hours
8.30am to 4.30pm
Monday to Friday

Leanne Mariani - 9710 0149
File Ref: DN16/0053

11 November 2016

Department Of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

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Yours faithfully

L. Mariani

Leanne Mariani

Pamela Morales

From: Fernando, Sohan <Sohan.Fernando@safework.nsw.gov.au>
Sent: Tuesday, 1 November 2016 4:33 PM
To: Pamela Morales
Cc: Moore, Robert; Qureshi, Zeeshan
Subject: RE: Caltex Kurnell Refinery Conversion Works - ACS Management Project (SSD 5544 MOD 2) - Exhibition

Security Classification:UNCLASSIFIED

Hi Pamela,

Thanks for the e mail.

The relevant SWNSW team reviewed the proposal, and do not have any concerns. Therefore, SWNSW will not be making a submission.

Regards

Sohan Fernando
Senior Safety Analyst
Major Hazard Facilities Team
SafeWork NSW
2 Burbank Place
Baulkham Hills NSW 2153
Tel: 8867 2747

From: pamela.morales@planning.nsw.gov.au [mailto:pamela.morales@planning.nsw.gov.au]
Sent: Tuesday, 1 November 2016 2:16 PM
To: planning.matters@environment.nsw.gov.au; council@sutherland.nsw.gov.au; Grant Greene-Smith; Landuse Enquiries; Water Referrals; BFS; csc@rfs.nsw.gov.au; Development Sydney; MHF; seslhd-mail@health.nsw.gov.au
Cc: Leanne Mariani; Janne Grose; Fernando, Sohan; Hakoum Shalak
Subject: Caltex Kurnell Refinery Conversion Works - ACS Management Project (SSD 5544 MOD 2) - Exhibition

Hello

This is a reminder that if you wish to make a submission on the modification to Caltex Kurnell Refinery Conversion Works – ACS Management Project (SSD 5544 MOD 2), comments are due by **COB Wednesday 2 November 2016**.

Please let me know if you will be making a submission or if you require any additional time to make a submission.

Regards

Pamela Morales
Planning Officer
Industry Assessments
Level 22, 320 Pitt Street | GPO Box 39 | Sydney NSW 2001
T 02 9274 6386

Pamela Morales

From:	Richard Bonner
Sent:	Friday, 28 October 2016 3:22 PM
To:	Pamela Morales
Subject:	RE: Modification to Caltex Kurnell Refinery (SSD 5544 MOD 2) Sutherland Local Government Area
Follow Up Flag:	Follow up
Flag Status:	Completed

Hello Pamela,

The Office of Environment and Heritage (OEH) has reviewed the Statement of Environmental Effects for this proposed modification and have no comments to make.

Regards

Richard Bonner
Conservation Planning Officer
Greater Sydney Region
Regional Operations Group
Office of Environment and Heritage
T: 02 9995 6917

From: Leanne Grove
Sent: Thursday, 20 October 2016 8:48 AM
To: Planning Matters Mailbox <planning.matters@environment.nsw.gov.au>
Subject: Modification to Caltex Kurnell Refinery (SSD 5544 MOD 2) Sutherland Local Government Area

Good morning,

Please find attached the notice of modification for Caltex Kurnell Refinery (SSD 5544 MOD 2).

Exhibition is from **Thursday 20 October 2016** until **Wednesday 2 November 2016**.

Thank you

Leanne Grove
DA Coordinator | Industry, Key Sites & Priority Projects
Department of Planning & Environment
Level 22, 320 Pitt Street | GPO Box 39 | Sydney NSW 2001
T +61 2 9274 6242 E leanne.grove@planning.nsw.gov.au

NSW GOVERNMENT | Planning & Environment

We've moved You can find us at our new office Level 22, 320 Pitt St, Sydney, 2000

Department of Industry
Resources & Energy

26th October 2016

Joanna Bakopanos
Team Leader
Industry Assessments
Department of Planning and Environment
GPO Box 39
Sydney NSW 2000

Emailed: pamela.morales@planning.nsw.gov.au

Your Reference: SSD 5544 MOD 2
Our Reference (TRIM): OUT16/39731

Dear Ms Bakopanos

**Re: Modification to Caltex Kurnell Refinery Conversion Works (SSD 5544 MOD 2)
Notice of Exhibition**

Thank you for the opportunity to provide advice on the above matter. This is a response from NSW Department of Industry – Geological Survey of New South Wales (GSNSW).

General Information

GSNSW has no resource issues to raise or recommendations to offer regarding the conditions of consent for SSD 5544 Modification 2 for the Caltex Kurnell Refinery Conversion Works.

Geoscience Information Services

The GSNSW has a range of online data related to mineral exploration, land use and general geoscience topics:
http://www.resources.nsw.gov.au/geological/online-services

The location of current exploration and mining titles in NSW, explanations of mining and production titles and the roles of community and government in the decision making process for mining/resource projects may be accessed by the general public using the following online utilities:
http://www.commonground.nsw.gov.au/#!/

Queries regarding the above information, and future requests for advice in relation to this matter, should be directed to the GSNSW Land Use team at landuse.minerals@industry.nsw.gov.au.

Yours sincerely

Cressida Gilmore
Manager - Land Use

Miles, William

From: pamela.morales@planning.nsw.gov.au
Sent: Tuesday, 25 October 2016 9:41 AM
To: Miles, William; Dodd, Katherine
Subject: FW: Sydney Water Referral - SSD 554 MOD 2

Hi Will,

Please see the email below from Sydney Water. Sydney Water raises no issues.

I will forward submissions as they come through.

Regards

Pamela Morales
Planning Officer
Industry Assessments
Department of Planning & Environment
T 02 9274 6386

We've moved You can find us at our new office
Level 22, 320 Pitt St, Sydney, 2000

From: HAWELL, MANWELLA [mailto:MANWELLA.HAWELL@sydneywater.com.au]
Sent: Monday, 24 October 2016 5:18 PM
To: Pamela Morales <pamela.morales@planning.nsw.gov.au>
Subject: RE: Sydney Water Referral - SSD 554 MOD 2

Hi Pamela,

Thank you for referring the Modification to Sydney Water. We have reviewed the changes and have no additional comments to make.

Regards,
Manwella

Manwella Hawell | Student Town Planner

City Shaping | Sydney Water
Level 7, 1 Smith St Parramatta NSW 2150
PO Box 399 Parramatta NSW 2124
T 8849 4354
E manwella.hawell@sydneywater.com.au
sydneywater.com.au

NSW RURAL FIRE SERVICE

PCU068040

Director General
Department of Environment and Planning
GPO Box 39
Sydney NSW 2001

Your reference: SSD 5544 MOD 2
Our reference: D16/3519

31 October 2016

Attention: Pamela Morales

Dear Sir/Madam,

Modification to Caltex Kurnell Refinery- 2 Solander Street Kurnell

Reference is made to your correspondence dated 19 September 2016 seeking advice regarding bush fire protection in relation to the above application made in accordance with Section 96 of the *Environmental Planning and Assessment Act 1979*. The application seeks approval of amendments relating to the on-site management of asbestos contaminated soils (ACS), identified as part of the ongoing conversion and demolition works for the former Caltex Kurnell Refinery. The proposed modifications involve:

- Construction and operation of an on-site containment cell for ACS and associated leachate collection system;
- Excavation and transportation of ACS to the containment cell for emplacement; and
- Construction and operation of a temporary on-site bioremediation area for treating special hazardous solid waste prior to its disposal in the ACS containment cell or off-site (if required).

The New South Wales Rural Fire Service advises that it has no objection to the proposed modification and subsequently raises no issues in relation to bush fire.

If you have any queries regarding this advice, please contact Emma Jensen, Development Assessment and Planning Officer, on 1300 NSW RFS.

Yours sincerely,

Nika Fomin
Manager, Planning and Environment Services (East)

Postal address
NSW Rural Fire Service
Records Management
Locked Bag 17
GRANVILLE NSW 2141

Street address
NSW Rural Fire Service
Planning and Environment Services (East)
42 Lamb Street
GLENDENNING NSW 2761

T 1300 NSW RFS
F (02) 8741 5433
E csc@rfs.nsw.gov.au
www.rfs.nsw.gov.au

Pamela Morales

From: Trevor & Susan Davis <tedsed@bigpond.com>
Sent: Thursday, 3 November 2016 5:24 PM
To: Pamela Morales
Cc: Mark Speakman
Subject: Submission re Caltex plans

Submission to: The Director – Industry Assessment

I apologise for this late submission and hope that you will consider the contents.

I represent the Kurnell Progress & Precinct Residents' Association and, on behalf of that organisation, I wish to submit two questions to be put to the planners:

First it must be said that the local community and the Kurnell Progress Association have very close associations with Caltex. Caltex has always been a good neighbour in this village.

There are really only two questions we wish to raise:

1 We understand what the proposal to store asbestos material on the Caltex site entails, but will it provide an opportunity to bring asbestos material from other sites for storage? There is a concern in the community that more noxious materials might be stored at Kurnell.

2 Will the storage of the asbestos on the Caltex site allow, in any way, affect the aquifer at Kurnell? Is there any chance that asbestos will leech into the local water table? The water table in any suburb is very important but at Kurnell, the water level is not very far below the surface. Is there a chance that the storage, or an accident during the transfer process, could allow dangerous material to enter the aquifer?

I have kept these two questions purpose brief. The answers will be far-reaching and very important for this community.

Yours faithfully
Susan Davis
Secretary
Kurnell Progress Association
9668 9936

Appendix B

Summary of Submissions from the Public

Public Submissions		
Author	**Comment**	**Section Addressed**
Name withheld 1	**Proximity to Residential Areas:** This submission is concerned that the storage and movement of asbestos so close to residential areas will put residents at risk.	**9.1.1**
David Keirle	**Alternative Locations:** This submission suggests storing the ACS at an alternate location.	**0**
David Keirle	**Proximity to Residential Areas:** This submission is concerned that the ACS Modification works are too dangerous to be near residential areas.	**9.1.1**
Heather Bourne	**Storage of ACS from Other Locations:** This submission is concerned about asbestos being bought in from other sites to store at the Site.	**9.1.5**
Heather Bourne	**Proximity to Residential Areas:** This submission is concerned about the hazard of storing asbestos near residential areas.	**9.1.1**
Heather Bourne	**Impact of Extreme Weather Events:** This submission is concerned about the consequences if asbestos is disturbed and spread amongst the community, noting the tornado which occurred in the area **I** 2015.	**9.9.6**
Karen Shanley	**Storage of ACS from Other Locations:** This submission is concerned about asbestos being bought in from other sites to store at the Site.	**9.1.5**
Karen Shanley	**Dust and Particulate Matter:** This submission is concerned about the effects of the ACS Modification works on air quality, in particular if asbestos was distributed amongst the community.	**9.4.1**
Kristy Craft	**Proximity to Residential Areas:** This submission is concerned that the ACS Modification works are too dangerous to be near residential areas.	**9.1.1**
Kristy Craft	**Dust and Particulate Matter:** This submission is concerned about the effects of the ACS Modification works on air quality.	**9.4.1**
Kristy Craft	**Caltex Record:** This submission is concerned about Caltex's history of being non-compliant.	**9.9.3**
Kristy Craft	**Risk to Community:** This submission is concerned about the risk to the community of the ACS Modification works.	**9.3.1**
Michelle Myers	**Project Description:** This submission objects to the Site being used to store ACS.	**9.1.4**
Michelle Myers	**Adequacy of Consultation Effort:** This submission claims that the community was not adequately consulted.	**9.2.1**
Michelle Myers	**Financial Motivation:** This submission is concerned that the financial motivation is the determining factor of the ACS being stored on-site.	**9.1.3**
Michelle Myers	**Permanent Nature of Proposal:** This submission objects to ACS being stored on the Site permanently. This submission is concerned that the ACS Modification works are a short-term solution and will have long-term impacts.	**9.1.7**
Michelle Myers	**Permanent Nature of Proposal:** This submission objects to toxic materials being stored at the Site permanently.	**9.1.7**

Public Submissions		
Author	**Comment**	**Section Addressed**
Michelle Myers	**Regulatory Requirements:** This submission believes that the ACS should be disposed of in accordance with the *Protection of the Environment Operations (Waste) Regulation 2014*.	**9.9.1**
Michelle Myers	**Permanent Nature of the Proposal:** This submission is concerned that long-term impacts of the ACS Modification works to local residents and the environment have not been considered.	**9.1.7**
Michelle Myers	**On-site Treatment of Hazardous Material:** This submission is concerned that the ACS Modification works will result in other hazardous material being treated on-site.	**9.1.6**
Michelle Myers	**Remediation of the Site:** This submission suggests a long-term remedial action plan be considered.	**9.9.4**
Michelle Myers	**Regulatory Requirements:** This submission claims that the Site is not a licensed facility for storing the ACS.	**9.9.1**
Michelle Myers	**Surface Waters and Soil**: This submission is concerned that the asbestos fibres in the soil will leach into the groundwater.	**9.6.1**
Michelle Myers	**Dust and Particulate Matter:** This submission is concerned about the impacts of the ACS Modification works on air quality.	**9.4.1**
Michelle Myers	**Surface Waters and Soil:** This submission is concerned about the impacts of the ACS Modification works on soil.	**9.6.1**
Michelle Myers	**Proximity to Residential Areas:** This submission is concerned that the proximity to residential areas of the ACS Modification works will affect the health of the residents.	**9.1.1**
Michelle Myers	**Impact on House Prices:** This submission is concerned that the ACS Modification works will negatively impact house prices in the Kurnell area.	**9.9.5**
Michelle Myers	**Land Zoning:** This submission claims that the Site is zoned E4 Environmental Living and so the ACS Modification works should not be approved.	**0**
Michelle Myers	**Storage of ACS from Other Locations:** This submission is concerned about asbestos being bought in from other sites to store at the Site.	**9.1.5**
Michelle Myers	**Alternative Locations:** This submission suggests that the ACS be stored in an alternate location.	**0**
Michelle Myers	**Environmental Monitoring:** This submission questions the monitoring of the ACS containment cell in the long-term.	**9.9**
Michelle Myers	**Adequacy of Consultation Effort:** This submission asks how the local community will be informed in the future about ongoing monitoring.	**9.2.1**
Michelle Myers	**Monitoring of Air Quality:** This submission suggests that daily air monitoring be undertaken and published to the local residents.	**9.4.2**
Michelle Myers	**Noise and Vibration:** This submission suggests that noise consideration and restrictions be agreed upon with the community.	**9.5**
Kerry Ward	**Proximity to Residential Areas:** This submission objects to the ACS Modification works due to the proximity to residential areas.	**9.1.1**

Public Submissions		
Author	**Comment**	**Section Addressed**
Kerry Ward	**Transport and Access:** This submission is concerned that the increase in truck movement due to ACS Modification works will impact traffic.	**9.7**
Name withheld 2	**Surface Water and Soils:** This submission is concerned that the ACS Modification works will result in contamination of the Site.	**9.6.1**
Name withheld 2	**Noise and Vibration:** This submission is concerned that the ACS Modification works will increase noise impacts to residential areas.	**9.5**
Name withheld 2	**Proximity to Residential Areas:** This submission claims that asbestos should not be moved or stored in close proximity to residential areas.	**9.1.1**
Name withheld 3	**Proximity to Residential Areas:** This submission is concerned about the impact of the ACS Modification works on the community and environment.	**9.1.1**
Name withheld 4	**Adequacy of Consultation Effort:** This submission believes that the Kurnell community was not adequately consulted about the ACS Modification works.	**9.2.1**
Name withheld 4	**Caltex Record:** This submission claims that correct safety procedures are not being adhered to on the Site.	**9.9.3**
Name withheld 4	**Risk to Community:** This submission is concerned that the ACS Modification works present a significant risk to the community.	**9.3.1**
Name withheld 4	**Dust and Particulate Matter:** This submission is concerned about hazardous dust impacting the air quality.	**9.4.1**
Name withheld 4	**Impact on House Prices:** This submission claims that the ACS Modification works will negatively impact house prices in the Kurnell area.	**9.9.5**
Name withheld 4	**Adequacy of Consultation Effort:** This submission believes the community should be consulted first.	**9.2.1**
Name withheld 5	**Storage of ACS from Other Locations:** This submission objects to asbestos being stored at the Site,	**9.1.5**
Name withheld 5	**Remediation of the Site:** This submission suggests that the site needs to be returned to a decontaminated state,	**9.9.4**
Name withheld 5	**Alternative Locations:** This submission suggests storing the ACS at an alternative location.	**0**
Name withheld 5	**Proximity to Residential Areas:** This submission believes that residents will be put at considerable risk due to the proximity of the ACS Modification works to residential areas.	**9.1.1**
Name withheld 6	**Risk to Community:** This submission claims that the health and safety of the community should be the first priority.	**9.3.1**
Name withheld 7	**Storage of ACS from Other Locations:** This submission objects to the ACS being stored on Site.	**9.1.5**
Ashleigh Hudson	**Proximity to Residential Areas:** This submission believes that storing the ACS on-site in unfair to the community.	**9.1.1**
Ashleigh Hudson	**Storage of ACS from Other Locations:** This submission asks if asbestos containing material from other sites would be bought on-site to store in the containment cell.	**9.1.5**
Ashleigh Hudson	**Proximity to Residential Areas:** This submission claims that the residential areas close to the Site will be negatively impacted should an extreme weather event damage the containment cell and expose the contaminated soils.	**9.1.1**

Public Submissions		
Author	**Comment**	**Section Addressed**
Ashleigh Hudson	**Risk to the Community:** This submission raised their concern that asbestos contamination would result in homes becoming unliveable and health implications.	**9.3.1**
Ashleigh Hudson	**Impact on House Prices:** This submission claims that the ACS Modification works will negatively impact house prices in the Kurnell area.	**9.9.5**
Ashleigh Hudson	**Risk to Community:** This submission requested that the well-being of the community be put ahead of the needs of industry.	**9.3.1**
Naomi Iredale	**Proximity to Residential Areas:** This submission objects to the pollution the ACS Modification works would cause, close to residential areas.	**9.1.1**
Name withheld 8	**Risk to Community:** This submission is concerned about the health risk the ACS Modifications works would have on the community due to exposure to asbestos fibres.	**9.3.1**
Name withheld 8	**Alternative Locations:** This submission suggests that the ACS be stored off-site in an alternate location.	**0**
Name withheld 8	**Storage of ACS from Other Locations:** This submission is concerned about asbestos being bought in from other sites to store at the Site.	**9.1.5**
Name withheld 8	**Risk to Community:** This submission is concerned about the health risk the ACS Modifications works would have on the community due to exposure to asbestos fibres.	**9.3.1**
Yvonne Banks	**Storage of ACS from Other Locations:** This submission is concerned about asbestos being bought in from other sites to store at the Site.	**9.1.5**
Yvonne Banks	**Risk to Community:** This submission is concerned that the ACS Modification works puts the health of the community at risk.	**9.3.1**
Yvonne Banks	**Impact of Extreme Weather:** This submission is concerned that the ACS Modification works would be susceptible to extreme weather events, resulting in the community being exposed to asbestos fibres.	**9.9.6**
Yvonne Banks	**Proximity to Residential Areas:** This submission claims that the residents should not have to live in proximity to an asbestos disposal site.	**9.1.1**
Yvonne Banks	**Storage of ACS from Other Locations:** This submission is concerned about asbestos being bought in from other sites to store at the Site.	**9.1.5**
Yvonne Banks	**SafeWork NSW:** This submission suggests the safe and proper removal of the Asbestos on-site under the watchful eye of Work Cover.	**9.9.7**
Greg Denaro	**Alternative Locations:** This submission queried the amount of ACS material on-site which would require transport to an alternative location and noted that the material would also be contaminated with hydrocarbons. In addition the submission noted that the ACS should disposed off-site in an appropriate tip.	**0**
Greg Denaro	**Remediation of the Site:** This submission noted that the Site is moving towards being remediated by 2020.	**9.9.4**

Public Submissions		
Author	**Comment**	**Section Addressed**
Greg Denaro	**Dust and Particulate Matter:** This submission is concerned that the ACS Modification works would result in loose fibres being exposed into the air.	**9.4.1**
Greg Denaro	**Permanent Nature of the Proposal:** This submission is concerned that the containment cell would be abandoned in the future, creating a larger issue of disposing the ACS in the long-term.	**9.1.7**
Greg Denaro	**Storage of ACS from Other Locations:** This submission claims that contaminated soil has been bought on site to be treated.	**9.1.5**
Greg Denaro	**Caltex Record:** This submission raised concerns about Caltex's past records.	**9.9.3**
Greg Denaro	**Permanent Nature of the Proposal:** This submission is concerned that the containment cell is not a permanent solution and so the ACS will have to be dealt with in the future.	**9.1.7**
Greg Denaro	**Caltex Record:** This submission claims that Caltex have not been competent in managing environmental issues in the past.	**9.9.3**
Greg Denaro	**Caltex Record:** This submission claims that Caltex will not properly manage the ACS Modification works as they have not managed oil spills and offensive odours in the past.	**9.9.3**

Appendix C

Original Management and Mitigation Measures from the SEE

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
General								
A1	Caltex would carry out the proposed works in accordance with the EIS, the SEEs and the approval conditions.	✓	✓	✓	✓	✓	✓	✓
A2	Caltex would implement reasonable and practicable measures to avoid, or minimise impacts to the environment that may arise as a result of the Project.	✓	✓	✓	✓	✓	✓	✓
A3	Caltex would ensure that the Project contractor prepares and implements a Construction Environmental Management Plan (CEMP) for the conversion works and a Demolition Environmental Management Plan (DEMP) for the demolition works **(inclusive of the ACS Modification works)** to manage any Project impacts. This would be reviewed and approved by a Caltex Environmental Management Representative (EMR). Elements of these plans may be shared as required.		✓			✓	✓	
A4	Caltex would appoint an EMR to monitor the implementation of all required environmental mitigation and management measures. The EMR would ensure that all measures were being effectively applied during the proposed works and that the work would be carried out in accordance with the CEMP, the DEMP and all environmental approvals and legislative conditions.		✓			✓	✓	
A5	Caltex and the various works' contractor personnel would undergo training in accordance with the CEMP, the DEMP and currently implemented environmental and safety measures agreed as part of the Project approval.		✓			✓	✓	
A6	Caltex would provide Sutherland Shire Council the opportunity to review and comment on the CEMP prior to the commencement of conversion works.		✓					
A7	Prior to the demolition works commencing for a particular structure or group of structures, Caltex would develop a specific demolition management plan (DMP) for each structure or group of structures to be demolished. The DMPs would be made available to the appropriate regulators prior to being implemented if requested. The DMPs for the two concrete stacks (power plant and common stacks) and for the tall complex structures (two catalytic cracker units (plants 4 and 34)) would be provided to the EPA for comment ahead of the demolition works for these structures taking place.					✓		
A8	Caltex would provide a draft of the DEMP and SWMP to NSW DPI for review and comment prior to finalising.				✓			

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
A9	Caltex would provide NSW Health with a copy of the DEMP and Asbestos Management Plan (AMP) for review and comment prior to finalising.				✓			
A10	Caltex would provide NSW OEH with a copy of the Biodiversity and Weed Management Plan (BWMP) for review and comment prior to finalising.				✓			
A11	**Following the ACS Modification works, Caltex will update the Asbestos Management Plan for the Site and Asbestos Register.**							✓
Hazards and Risk								
B1	A program of routine testing, inspection and maintenance would be developed for each new piece of equipment or function of instrumentation to be added to the preventative maintenance program already established for existing plant and equipment.		✓	✓				
B2	The recommendations of the Fire Safety Study would be implemented for the design and operation of the terminal.	✓	✓					
B3	The Process Hazard Analysis Recommendations would be implemented for the design and operation of the terminal.	✓	✓					
B4	The spill response plan for the Site would be updated for the proposed terminal.		✓					
B5	Caltex would review hardware protection in place and proposed to ensure the risk of filling low flash point material into tanks designed for high flash point usage is minimised. Particular attention to human factors issues at manifolds.	✓	✓					
B6	Caltex would determine need for additional means of communication, e.g. for lone worker on the proposed terminal.		✓					
B7	Caltex would review the procedures used for potentially hazardous manual operation to ensure they are appropriate and sufficient for any increased frequency of use.		✓					
B8	The bullet pointed measures listed in Section 8.7 of the SEE would be implemented to ensure that the conclusions of Appendix C Hazards and Risks Assessment of the SEE remain valid.				✓	✓		
B9	**Personnel required to work with hazardous/flammable/contaminated materials would be trained in safe use and handling and would be provided with all relevant safety equipment.**						✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
B10	**Procedures are currently in place to manage incidents and injuries at the Site. This includes an established incident reporting and response process. These processes would be implemented for the ACS Modification works.**						✓	✓
Soils, Groundwater and Contamination								
C1	A Soils and Erosion Management Plan would be developed as part of the Construction Environmental Management Plan (CEMP) to manage the excavation, testing, stockpiling, reuse and rehabilitation of soils. This plan would outline: • the areas where soil disturbance is likely; • soil testing procedures; • soil handling procedures; • locations where soil would be stockpiled on-site for either removal, treatment or reuse; • procedures to reduce erosion and the spread of dust; • restricting traffic to defined roads or tracks where necessary; and • the rehabilitation of bare soil following completion of the construction works.		✓					
C2	All materials would be stockpiled in accordance with 'The Blue Book' *Managing Urban Stormwater - Soils and Construction Volume 1 and 2* (Landcom, 2004). Principal controls would include the following: • silt fences would be installed around stockpiles to reduce erosion and protect vegetation or Site infrastructure as necessary; • silt and sediment traps would be installed across stormwater drains in proximity to excavation areas; • stockpiles would be restricted to cleared areas and not impact any vegetation; • stockpiles would be placed on impermeable sheeting; • stockpiles would be covered and wetted down in order to reduce dust creation; • stockpiles would not be located in close proximity to any stormwater drainage systems; • Caltex would not stockpile in areas that are prone to flooding as identified in Figure 4-10 of Appendix D of the SEE; and • Stockpile locations and erosion and sediment control requirements associated with the Project would be reviewed by a suitably qualified person to ensure that the recommended measures achieve the environmental outcomes for the Site.		✓			✓	✓	
C3	The Soils and Erosion Management Plan would also outline the inspection program for any erosion control structures and bunded areas.		✓					

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C4	Excavated soils would be tested for both contaminants and odour using standard practices (e.g. soil vapour and soil sampling etc.)		✓					
C5	Clean materials would be separated from contaminated materials for reuse as backfill where required.		✓					
C6	A Contamination Management Plan would form part of the CEMP for the Project. This plan would outline measures for testing, classifying, handling, storing and managing contaminated soils and contaminated groundwater.		✓					
C7	Suspected contaminated materials would be assessed and classified in accordance with EPL requirements and NSW (2009) *Waste Classification Guidelines: Part 1: Classifying Waste*, batched, further tested (where required) and disposed by a licenced contractor.		✓					
C8	Disposal of any contaminated soils or groundwater would be in accordance with EPL requirements and NSW DECCW's *Waste Classification Guidelines* and the Contamination Management Plan (CMP) for the Project. Contaminated materials would be sent to appropriately licensed facilities in accordance with the *Contaminated Land Management Act 1997*.		✓					
C9	If Acid Sulfate Soils (ASS) are encountered during construction **or the ACS Modification works**, an ASS Management Plan would be prepared in accordance with the ASS Manual (ASS Management Advisory Committee 1998).		✓			✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C10	A Groundwater Management Plan (GWMP) would be developed and included within the CEMP. This plan would outline the measures that would be used to manage the testing, dewatering, storage, movement and treatment of any groundwater intercepted during the construction phase. Measures would include: • the use of appropriate drip trays and interception techniques for any construction specific liquids stored on the Site; • bunding of any fuel or chemical storage area at the construction Site; • regular inspection of construction equipment to ensure any leaks are minimised and rectified; • management of vehicles leaving the Site to reduce soil on roads, production of dust and the introduction of contamination to the groundwater and/or stormwater system; • appropriate and timely disposal of any contaminated soil, water or waste generated during construction; • regular inspection of erosion control structures and bunded areas; and • regular inspection and testing of containment areas, drainage lines and process pipe work.		✓					
C11	Any runoff that may accumulate in excavations would be periodically tested for elevated levels of contamination. Water that is found to have elevated levels of contaminants would be collected and sent to the on-site Wastewater Treatment Plant in accordance with the established refinery wastewater management procedures.		✓					
C12	Runoff entering any excavations would be limited by using bunds or similar structures as required.		✓			✓		
C13	Construction/demolition workers would be instructed in appropriate health and safety and handling protocols for minimising human contact with contaminated soils and groundwater.		✓			✓	✓	
C14	During the cleaning of the crude and finished fuel tanks, measures would be implemented in line with Caltex's existing Turnaround and Inspection process to contain and collect any potentially contaminating material for appropriate disposal to the on-site wastewater treatment plant, landfarm or appropriate off-site disposal facilities. This process would be detailed within the CEMP.		✓					
C15	Permits would be required to work in the areas where potential soil and groundwater contamination exists. The work permit includes requirements such as monitoring and PPE. No unauthorised entry into these areas is permitted, without a permit.		✓			✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C16	Appropriate inspection, assessment, maintenance and repair programmes that would be implemented as part of the operation of the Project. These safeguards would be incorporated into the updated management plans for the proposed terminal. The Project would be appropriately licenced under the *Protection of the Environment Operations Act 1997* and would be managed in accordance with EPL requirements.		✓	✓				✓
C17	A Contamination Management Plan would be developed to outline measures for monitoring, handling, storing and managing contaminated soils and contaminated groundwater. It would include the following: • During excavation visual and olfactory indicators of impact would be monitored. Where there is potential for volatile organic contaminants (based on known ground conditions) or where hydrocarbons are seen or smelt during excavations, soils would be inspected for hydrocarbon impacts using a PID and/or testing. Excavated soils would not be used for backfill if they are impacted at levels exceeding commercial/industrial as defined by Schedule B1 Guidelines, *Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013*. • All excavations would be sampled for asbestos. Asbestos assessment would be undertaken in accordance with Schedule B1 Guidelines, *Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013.* • Asbestos impacted soil **not found in the pipeways** would be **disposed of at the ACS containment cell or** removed from the Site as soon as practicable **if excavated**. If these soils need to be temporarily stockpiled they would be stored at a defined location at the former CLOR site, covered and labelled as asbestos waste. Asbestos impacted soil would be classified in accordance with NSW EPA guidelines for transport and disposal at **either the ACS containment cell or** a licensed landfill (and in accordance with the Site waste management system and the Demolition Waste and Resource Management Plan (DWRMP) for the demolition works. The excavation, transport and disposal of asbestos impacted soil would be undertaken by a licenced contractor and comply with NSW WorkCover requirements. • Hydrocarbon impacted soil would not be temporarily stockpiled adjacent to the excavation. If these soils need to be temporarily stockpiled they would be stored at a defined location at the former CLOR site. • Excavated soils would be separated into stockpiles according to odours, staining and other					✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
	environmental indicators. Soils that are potentially contaminated (following visual and olfactory inspection and or use of monitoring equipment) would be placed on impermeable sheeting into uniquely identified stockpiles and appropriately bunded and managed. The bunds would be impermeable and of sufficient capacity to ensure that runoff from these stockpiles is contained prior to being sent to the WWTP. • Where no contamination issues are identified, excavated material would be used as backfill to bring the excavated area back to grade as soon as practicable. If required, certified VENM, ENM or appropriated remediated material would be used to provide additional backfill material. • If excavated material cannot be re-used or managed on-site then it would be removed off-site as waste to an appropriately licensed facility. • Further, excavated material; would be classified in accordance with EPL condition O5.1 which requires “any liquid and/or non-liquid waste generated and/or stored [at the Site] is assessed and classified in accordance with the NSW (2009) *Waste Classification Guidelines: Part 1: Classifying Waste*, batched and further tested (where required, for example Toxicity Characteristics Leaching Procedure (TCLP) testing)”. • The method of disposal or reuse would be in line with the materials’ classification in accordance with specifications set out in a DWRMP. • Where soils are reused on Site (i.e. are not considered to be impacted at levels exceeding commercial/industrial as defined by *Schedule B1 Guidelines, Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013)* a record would be kept (in the Waste Management Database) of where these soils are reused, the volumes reused; the type and levels of contaminants present in the soils and the soil classification.							

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C18	The Soil and Water Management Plan would outline management measures for any soils that are excavated or stored on-site during the demolition works **and ACS Modification works** and water management requirements. It would identify: • the areas where soil disturbance is likely; • how excavations would be staged so that the length of time that excavations are left open and temporary stockpiles are required is minimised; • locations where soil would be stockpiled on-site for either removal, treatment or reuse; • that if additional backfill material is required, only certified VENM, ENM or appropriated remediated material would be used; • procedures to reduce erosion and the spread of dust; • restricting traffic to defined roads or tracks where necessary; • measures to protect excavations from increased stormwater runoff (e.g. by using bunds or similar structures where required); • measures to manage the storage of demolition **and ACS Modification works** specific liquids at the Site and the appropriate bunding or containment of demolition related fuel or chemical storage areas; • demolition **and ACS Modification works** equipment is maintained and operated in a proper and efficient condition to reduce the likelihood of spills or leaks; • measures to manage vehicles leaving the Site to reduce soil on roads, production of dust and the introduction of contamination to the groundwater and/or stormwater system; • measures for the dewatering, storage, movement and treatment of groundwater encountered in excavations. Dewatered groundwater would be collected and sent to the on-site Wastewater Treatment Plant in accordance with the established Site wastewater management procedures, unless it is tested and is of suitable quality to be directed to stormwater; • procedures for dewatering, including the need to liaise with NOW to ensure the necessary water licences are obtained, if required; and • how the rehabilitation of bare soil would be managed across the Site once areas are returned to grade.					✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C19	The Soil and Water Management Plan would also: • be developed in accordance with *'The Blue Book' Managing Urban Stormwater – Soils and Construction Volume 1 and 2* (Landcom, 2004); • outline the inspection program for erosion control structures and bunded areas; • continue the existing groundwater monitoring program; and • include a plan for corrective action should an unexpected increase in COPC be observed in the groundwater monitoring.					✓	✓	
C20	An Asbestos Management Plan would be developed in accordance with the relevant guidelines. Caltex would utilise existing registers, procedures and plans in place for the Site for the preparation of an Asbestos Management Plan.					✓	✓	
C21	**Additional sampling would be undertaken to ensure that the area of soil disturbance is restricted as far as practicable to asbestos impacted areas only.**						✓	
C22	**ACS in the pipeways would be wetted down prior to excavation, loading and transport.**						✓	
C23	**ACS classified as hazardous under the Waste Classification Guidelines would be transported to the ACS biopile for processing prior to placement in the containment cell. Hazardous soils would not be placed into the containment cell.**						✓	
C24	**ACS classified as general or restricted under the Waste Classification Guidelines would be transported directly to the containment cell. Excavation works would be staged to allow placement of ACS directly into the containment cell to minimise the need to stockpile ACS.**						✓	
C25	**Where hazardous ACS cannot be appropriately managed on-site, it would be taken off-site for treatment and disposal at an appropriately licensed facility.**						✓	
C26	**All vehicle tyres would be cleaned before exiting the containment cell works area and the biopile works area via a temporary truck wash system.**						✓	
C27	**The containment cell area and biopile works area would remain bunded to prevent water flowing out of the respective areas except via the OWSS and WWTP.**						✓	✓
C28	**Stormwater within the containment cell works area and biopile works area would be directed to the OWSS and treated at the WWTP.**						✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
C29	**Stormwater from within excavated areas of the pipeways would be sent to the WWTP unless it is tested and is of suitable quality to be directed to stormwater, as per normal operation of the pipeways.**						✓	
C30	**Two groundwater monitoring bores would be installed at the north and west of the containment cell. Quarterly monitoring would be undertaken during construction, filling and closure of the cell.**						✓	✓
C31	**A marker layer would be installed during the final capping of the containment cell to identify the presence of asbestos as a safeguard for potential future use.**						✓	
C32	**Following excavation of ACS, an independent licenced asbestos inspector would be employed to verify that the friable asbestos has been removed from the pipeways and that the Exemption Order under Section 419 of the Work, Health and Safety Regulation 2011 is no longer required.**						✓	
C33	**The OEMP for the Site would be updated to include the following measures:** • **Quarterly groundwater monitoring for two years for the two installed monitoring wells. Following this time, annual groundwater monitoring would be undertaken to provide ongoing demonstration that the containment cell liner is operating effectively. Monitoring of these bores would occur in accordance with the existing groundwater monitoring program for the Site.** • **Regular inspections of the containment cell to monitor the effectiveness of the erosion and sediment control measures incorporated into the design of the containment cell, in line with the Site's existing Inspection Checklist and following heavy rain events.**							✓
Human Health and Ecological Risk								
D1	Construction/demolition personnel would be made aware of the potential presence of Non Aqueous Phase Liquids (NAPL) and would be shown how to identify its presence. The CEMP/DEMP would include management measures to appropriately deal with any NAPL found on Site.		✓		✓		✓	
D2	Construction/demolition staff would be inducted and provided with training prior to working with potentially contaminated soil as part of the Project, to prevent unnecessary disturbance (e.g. dust generation, asbestos fibre liberation, contaminant mobility and volatilisation).		✓		✓		✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
D3	The location of potentially contaminated areas would be noted in the CEMP/DEMP and provided to construction/demolition personnel involved in soil excavation and handling. The CEMP/DEMP would also identify the type of contamination found in each area. Where necessary, safety training and appropriate PPE would be provided.		✓	✓	✓	✓	✓	
D4	Caltex would continue to monitor groundwater quality in areas that are known to contain impacts to ensure that significant mobilisation of COPC from groundwater to surface water is not occurring.		✓	✓	✓	✓		
Waste Management								
E1	The Project would be integrated into existing resource efficiency, waste management and handling, emergency response and preparedness plans for the existing Site.	✓	✓	✓	✓	✓	✓	✓
E2	Construction and Operation Waste and Resource Management Plans (WRMP) and Demolition Waste and Resource Management Plans (DWRMP) would be compiled prior to the each phase commencing. **The DWRMP would be updated to include reference to management of waste generated by the ACS Modification works prior to construction works commencing.**	✓			✓		✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
E3	The WRMPs and DWRMP would: • identify requirements consistent with the waste and resource hierarchy; • ensure resourcing efficiency is delivered through the design and responsible construction, demolition and operational practices; • **ensure procurement of pre-fabricated materials to eliminate off-cuts on-site, and the re-use of materials where possible;** • provide consistent clear direction on waste and resource handling, storage, stockpiling, use and reuse management measures (consistent with current management practices relating to Caltex's Kurnell Waste Management System); • **provide separate waste containers/skips to ensure waste material segregation and maximise the opportunities for re-use and recycling;** • identify disposal and management routes consistent with current management practices as adapted for the Project; • set out clear requirements for meeting legislative and regulatory requirements; • **ensure safe storage and disposal of waste ensuring least amount of harm to surrounding environment;** • define requirements to support Caltex's sustainable procurement objectives through effective, design, construction, operation and procurement; and • set out processes for disposal, including on-site transfer, management and the necessary associated approvals.	✓	✓	✓	✓	✓	✓	
E4	The WRMP and DWRMP would incorporate the requirements of the waste and resource hierarchy and cleaner production initiatives.	✓	✓	✓	✓	✓	✓	
E5	The WRMP and DWRMP would include a process for auditing, monitoring and reporting, which would include regular inspections off-site activities and the waste management area(s). The WRMP and DWRMP would be subject to regular auditing and a system would be used to record and report the types, volumes and management measures for all waste and resource arising from/used for the works.	✓	✓	✓	✓	✓	✓	
E6	Project-generated waste would be segregated at the source and stored in accordance with current Site practices. Site management practices would potentially need adapting to consider additional storage requirements. Regardless, all waste would be stored in suitable containers and designated waste management areas.		✓	✓		✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
E7	Caltex's existing procedures for the disposal of sewage, greywater, hazardous materials, general waste and recyclable materials would be adopted for the Project (and modified if required). This would include using licensed contractors to remove and transport waste from the Site.						✓	✓
E8	A Waste Register would be prepared, used and maintained by the Demolition Contractor to track all wastes generated from demolition works. The Demolition Contractor would retain waste receipts to indicate evidence of waste disposal. The database would also be used to track all materials reused at the premises including its reuse location, type of waste and classification. **A Waste Register would be prepared, used and maintained by the Contractor to track all wastes generated from the ACS Modification works and used to record and report the types, volumes and management measures for all waste and resources arising from/used for the works. This would be subject to regular auditing.**				✓	✓	✓	
E9	Stockpiled wastes would be: • appropriately segregated to avoid mixing and contamination; • clearly labelled; • contained in bunded areas and if necessary on an appropriate lining; • less than 5m in height; and • located >40m away from any sensitive receivers, heritage, ecological areas and watercourses.				✓	✓	✓	
E10	Materials to be re-used would be analysed to ensure material is not contaminated and re-use is appropriate.				✓	✓	✓	
E11	An Asbestos Management Plan would be prepared and implemented in accordance with relevant legislative and other requirements. This plan would outline proposed methods of managing asbestos waste by the contractor. **The Asbestos Management Plan would be updated to include the ACS Modification works.**				✓	✓	✓	
E12	The Site's existing Asbestos Waste Register would be amended as appropriate, implemented and maintained to track asbestos wastes generated during the works.				✓	✓	✓	✓

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
E13	If stored on-site, asbestos wastes would be located away from operational areas and properly sealed and contained to minimise human exposure and clearly labelled. Signage and barriers/fencing would be installed to ensure all employees, contractors and visitors would keep away from the area at all times.					✓	✓	
E14	The removal and disposal of asbestos wastes would be undertaken by a licenced asbestos contractor.					✓	✓	
E15	A Decontamination Area would be provided on-site for all authorised personnel handling asbestos.				✓	✓	✓	
E16	Wastes (both liquid and non-liquid) generated from the works would be assessed, classified and managed. Wastes would be disposed of at an appropriately licenced facility.					✓	✓	
E17	**Recyclable wastes would be stored in suitable containers and designated waste management areas, to be transferred by a licensed waste contractor to an appropriate recycling facility where possible.**						✓	
E18	**Treated soils from the CSRF would be used where possible for the containment cell construction works in accordance with the conditions of the Caltex treated soil exemption 2016.**						✓	
E19	**New waste streams would be addressed as they arise and assessed to determine the most suitable management measures to use when handling, storing, transporting and disposing of the waste.**						✓	
E20	**Unidentifiable waste streams would be analysed and sent for testing in an accredited laboratory to assess the risks associated with handling and disposal of the waste.**						✓	
E21	**Additional sampling will be undertaken in the pipeways to further delineate the areas classified as asbestos contaminated in order to minimise the volume of soil classified as Special Waste and disposed of in the containment cell. In addition soils currently classified as hazardous waste will have additional sampling undertaken to ensure only hazardous soil is being processed at the ACS biopile.**						✓	
E22	**Caltex would complete inspections following periods of extended heavy rainfall to confirm that pumps within the containment cell sumps are directing leachate to the Site's WWTP.**						✓	✓

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
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E23	**Hazardous waste removed from the site would be tracked using the NSW EPA online waste tracker and each delivery would be provided with a consignment authorisation and transport certificates which would be provided to Caltex;**						✓	
E24	**Special waste removed from the site would be transported in accordance to Part 7 Transportation and Management of Asbestos Waste of the POEO (Waste) Regulation 2014. This outlines the requirements for waste transporters to record and monitor the movement of more than 100 kilograms of asbestos waste or more than 10 m² of asbestos sheeting from the Site of generation to the final disposal point using the NSW EPA online system called WasteLocate. The removal and disposal of asbestos wastes would be undertaken by a licenced asbestos contractor.**						✓	
Surface Water, Wastewater and Flooding								
F1	The Construction Environmental Management Plan (CEMP) for the Project would include a Soil and Erosion Management Plan. This plan would include the following measures: • All materials would be stockpiled in accordance with '*The Blue Book' Managing Urban Stormwater – Soils and Construction Volume 1 and 2* (Landcom, 2004); • Silt fences would be installed around stockpiles to reduce erosion and the movement of suspended solids as necessary; • Soil stockpiles and any polluted materials would be stored in designated areas which are not in close proximity to any stormwater drainage systems; • Erosion control structures, bunded areas, containment areas, drainage lines and interception measures would be subject to regular inspection; • Clean materials would be separated from contaminated materials; and • Soil erosion and sedimentation devices would remain in place until the disturbed ground surface is restored. These devices would also capture any gross pollutants.		✓					

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
F2	A Soils and Water Management Plan would be developed as a sub plan to the DEMP. Measures to be included in the plan and implemented during the demolition works to protect stormwater quality would include: • Stormwater or groundwater ponded in excavations would be sent to the WWTP, unless it is tested and is of suitable quality to be directed to stormwater; • Stormwater that is captured in the bunds around the contaminated soil stockpiles would be collected and sent to the WWTP; • Silt fencing and/or alternate sediment control measures would be installed around soil stockpiles and disturbed areas or areas where dust suppression is being undertaken; • Regular inspection would be undertaken of soil stockpiles/excavation areas, including following rainfall events; • **Regular inspection of excavation areas, containment cell and biopile works areas, including following rainfall events;** • Regular inspections would be undertaken of stormwater drains down hydraulic gradient of disturbed areas; • **Stormwater management measures incorporated into the design of the containment cell would be regularly inspected during operation in line with the Site's existing Inspection Checklist and following heavy rain events;** • If stormwater quality is impacted during the demolition works **and ACS Modification works** in areas that have been disturbed, water would be diverted to the intermediate sewer system; and • During the demolition works **and ACS Modification works**, following notable but prolonged rainfall events (over three days) or following heavy rainfall events over a shorter timescale, water sampling would be completed at the stormwater retention basin to ensure that the quality of the water is of an appropriate standard to be discharged from the Site. Water that is not of an appropriate quality would be either treated in situ or directed to the WWTP.					✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
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F3	Caltex would continue to implement the measures within the Stormwater Management Plan (SMP) for the Site. This plan has been produced in response to Environment Protection Licence No. 837, PRP U24.1: Stormwater Catchment and Management Plan. The SMP has committed Caltex to implementing a Stormwater Management Strategy and completing a number of stormwater management measures in a staged manner. Measures include: • Ongoing maintenance of the existing stormwater system; • Implementation of a number of projects to improve the infrastructure, reduce the potential for the refinery to flood, and prevent contaminated stormwater leaving the refinery premises; • Working with the NSW Office of Environment and Heritage (OEH), NSW EPA and Sutherland Shire Council to divert to flow of stormwater from the National Park away from the Site's stormwater system to the Sutherland Shire Council's stormwater infrastructure; • Carrying out stormwater flow monitoring; and • Updating the Site's stormwater system performance model to account for the changes to the stormwater system infrastructure that can then be used as a tool to assess future modifications, as necessary. This work would be completed in consultation with NSW EPA.	✓	✓	✓	✓	✓	✓	✓
F4	Discharges from the Wastewater Treatment Plant would be within existing EPL limits during demolition, construction and operation. Any required change to this Oily Water Management System would be discussed and agreed with NSW EPA.	✓	✓			✓	✓	✓
F5	The measures and processes currently in place at the Site to prevent any loss of contaminant would be maintained throughout the demolition, construction and operation phases of the Project. All bunds on tanks which are retained in service would meet the capacity requirements of *Australian Standard AS1940* during the operation of the Project.	✓	✓			✓	✓	✓

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
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F6	Improvements to monitoring would be initiated to ensure that if a loss of containment into a bund occurs it is detected early and contingency actions can be taken promptly. The measures for tanks containing low flash materials include: • explosive vapour detectors within the bunds; • triple infrared scanners on tank roofs; and • CCTV in conjunction with infrared cameras as a confirmation for alarms. All tanks on-site would be subject to: • an automated high level shut off system; and • continuance of a comprehensive inspection/repair program.			✓				
F7	Caltex undertakes a flood study, commencing within 3 months of completion of demolition works that assesses potential flood risks from the Site to the Kurnell township, with a particular emphasis on the impacts from surface water entering the Site from land to the east and south of the Site and whether current diversion methods are appropriate. ***<u>The flood study would consider the Sutherland Shire Council's Draft Sea Level Rise Policy (May 2016), or a latest revision.</u>*** Caltex to remain in consultation with Sutherland Shire Council throughout the flooding investigation works to identify a mutually acceptable solution to potential flood risks along the north eastern boundary of the Site. The timing and form of consultation is to be mutually agreed by both parties (Caltex and Sutherland Shire Council) and outlined within a written document to be produced by Caltex prior to commencement of the flood study. It shall include regular reporting updates and milestone meetings, for example, at the Scope of Works, concept design, at the issuing of the draft report to discuss results and recommendations as a result of the study.			✓		✓		

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		CD	Conv	Op	DD	Dem	Con	Op
F8	The following measures would be employed during and following the demolition of the refinery process units and associated infrastructure: • Appropriate bunding and controls would be put in place to prevent stormwater runoff from the demolition works area entering the stormwater system. • Following the completion of the demolition works and removal of redundant infrastructure, the former refinery process area would be regraded. The regrading would aim to ensure that water does not pool in this area. • As part of the regrading works, the surface material in this area would meet the commercial/industrial criteria as defined by Schedule B1 Guidelines, *Investigation Levels for Soil and Groundwater, National Environment Protection Measure (Assessment of Site Contamination) Amendment Measure 2013*. A crushed aggregate made from clean concrete and asphalt from the demolition works would also be spread across the surface to help reduce soil erosion. • Stormwater runoff collected in the stormwater system would be subject to the controls within this system (such as the oily water separators) prior to being discharged.					✓		
F9	**Excavation of the pipeways would be staged, effectively minimising the area of disturbance at one time. The ACS Modification works would be undertaken in a manner to minimise the potential for soil erosion and sedimentation.**						✓	
F10	**Local weather patterns would be monitored to ensure that workers completing the ACS Modification works at the Site were aware of predicted heavy rainfalls so that work could be stopped in the pipeways prior to them containing surface water flows.**						✓	
F11	**The OEMP for the Site would be updated to include the following measures:** • **the new stormwater management infrastructure for the containment cell would be regularly maintained to ensure that stormwater flows are properly conveyed to the wider catchment; and** • **the leachate collection system including the tank would be regularly inspected to ensure that it is operating effectively and that no leaks have occurred.**							✓

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		CD	Conv	Op	DD	Dem	Con	Op
Noise and Vibration								
G1	The CEMP/DEMP for the Project would include a Noise and Vibration Management Plan (NVMP). The NVMP would outline: • The locations of noise sensitive receptors; • Construction noise monitoring procedures; and • Construction equipment maintenance to ensure good working order.		✓			✓		
G2	Low-noise plant and equipment would be selected, where practicable, in order to minimise potential for noise and vibration. All equipment would be regularly checked to ensure that the mufflers and other noise reduction equipment are working correctly.		✓			✓	✓	
G3	Community consultation with local residents would be undertaken to assist in the alleviation of community concerns. Prior to the proposed demolition works commencing within the Eastern and Western Right of Ways, at Silver Beach, on the Wharf or prior to particularly loud demolition works occurring on the main terminal site, potentially affected residents within Kurnell would be notified in advance. Should complaints be received, the complaints register would continue to be maintained and managed in line with the existing feedback process at the Site.		✓	✓		✓	✓	
G4	Any noise complaint(s) would be investigated immediately. Reasonable and feasible measures would to be implemented to reduce noise impacts.		✓	✓		✓	✓	✓
G5	Construction/demolition equipment would be located to reduce noise emission to sensitive receptors, where practicable.		✓			✓	✓	
G6	The majority of the conversion works for the Project would typically be completed between 7.00am to 10.00pm seven days a week. Some works consistent with Caltex's existing day-to-day operational and maintenance procedures would occur over a 24 hour period as regulated by the Environmental Protection Licence (No. 837) (EPL) for the Site.		✓			✓	✓	
G7	Construction/Demolition staff and contractors would undergo training in environmental noise issues including: • minimising the use of horn signals and maintaining a low volume. Alternative methods of communication should be considered; • avoiding any unnecessary noise when carrying out manual operations and when operating plant; and • switching off any equipment not in use for extended periods during construction work. • ensuring works occur within approved hours.		✓			✓	✓	

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
G8	Should any unexpected construction activities occur which could potentially generate significant noise not described in this report, monitoring would be undertaken to ensure construction noise emission levels do not exceed EPL limits.		✓				✓	
G9	Pipeline removal works would be confined to 7.00 am to 6.00 pm Monday to Saturday as per Condition C19 (for SSD 5544).					✓	✓	
G10	Demolition works near 30D Cook Street (i.e. within 500m) would be confined to 7.00am to 6.00 pm Monday to Saturday as per Condition C19.					✓		
G11	Demolition noise monitoring would be undertaken when necessary to ensure compliance with demolition noise criteria.					✓	✓	
G12	Caltex would ensure that the noise generated by the demolition works does not exceed the criteria defined in Table 2 (from Condition of Consent C16 of SSD 5544) unless the reasonable and feasible noise mitigation strategies outlined within the DNVMP have been implemented. Reasonable and feasible noise mitigation strategies would include appropriate respite periods during particularly noisy or prolonged activities.					✓		
G13	The DNVMP would describe where demolition noise limits from Table 2 (from Condition of Consent C16 of SSD 5544) are likely to be exceeded and what reasonable and feasible noise mitigation would be employed to minimise noise.					✓		
G14	To help ensure that the structures on Site that are to be retained with high or medium heritage significance are protected from potential vibration impacts, the DNVMP would also • Utilise Appendix H Heritage Impact Assessment to identify the medium to high heritage significance buildings to be retained; • Identify where works to demolish redundant structures are occurring within 20 m of a medium to high significance heritage building and the requirement to undertake vibration monitoring and management for these buildings to protect their integrity; and • Outline general monitoring and management measures to monitor vibration and manage buildings.				✓			

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Air Quality and Odour								
H1	Dust emissions from the construction phase of the Project and during the demolition works would be monitored by construction/demolition staff. Visual inspections would be completed by demolition staff during the works. Demolition staff would also complete dust deposition monitoring during the demolition works (as per AS/NZS 3580) in appropriate locations on the Site boundary and in Kurnell. Staff would also monitor dust (PM_{10}) levels using the on site real time ambient air quality monitoring station. When required, during activities likely to cause high dust levels or adverse weather conditions etc., a designated worker would continuously monitor downwind emissions to the community or local residents, using the methods described above, and call a halt to activities if sensitive receptors are likely to be affected by airborne particulate matter. Should significant impacts be likely, appropriate measures would be taken to mitigate adverse air quality impacts.		✓			✓	✓	
H2	Within the refinery, vehicles would only travel on designated roads where possible and would be limited to a maximum speed of 10 km/hr in offroad areas, and 25 km/hr elsewhere.		✓			✓	✓	
H3	Where there is the potential for dust or odour generation from trucks carrying spoil, loads would be covered and all tailgates would be securely fastened. Vehicles would not be loaded higher than the sides and tailboard.		✓			✓	✓	
H4	Construction and potentially dust generating demolition activities would be limited during high wind events if sensitive receivers are likely to be significantly impacted.		✓			✓	✓	
H5	All plant would be maintained and operated in line with the manufacturer's specifications in order to minimise the emission of air pollutants and offensive odours. Plant and construction vehicles would be turned off when not in use.		✓			✓	✓	
H6	Stockpiled material would be assessed for the potential for causing odorous or particulate emissions. If air pollutants and offensive odours are likely, controls would be put into place to manage adverse impacts.		✓			✓		
H7	All concrete cutting and coring would to be undertaken using "wet tools".		✓			✓		
H8	An odour reduction program would be implemented in accordance with the existing EPL.		✓	✓				
H9	The guidepoles on the EFRTs in gasoline service would be fitted with sleeves.		✓	✓				

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H10	Caltex's Leak Detection and Repair (LDAR) Program would continue in accordance with the Environment Protection Licence.		✓	✓				
H11	All reasonable and feasible measures would be implemented to minimise dust and odour emissions during the demolition works					✓	✓	
H12	VOC and Odour Monitoring would be undertaken by demolition workers (i.e. visual and olfactory monitoring) and monitoring equipment during excavation activities where potential hydrocarbon contamination is present. Contractors would notify the Caltex Environment Specialist of any significant odours identified during demolition.					✓	✓	
H13	Soils or concrete with significant hydrocarbon staining or obvious hydrocarbon odours would be transported to the former CLOR area and stored appropriately. Stockpiles of contaminated soil stored on-site would be managed to prevent odorous VOC emissions and windblown particulate emissions.					✓		
H14	Excavation would be staged to manage potential VOC and odour emissions. Where practical, excavations would not commence prior to 8am nor after 4pm as weather conditions at these times are generally conducive to adverse odour air quality situations from fugitive emissions.					✓	✓	
H15	In unfavourable weather conditions (e.g. dry and windy conditions) or where dust sources are present near sensitive receivers, water sprays would be used to dampen down soils prior to excavation, handling and/or loading/unloading materials. All exposed surfaces (from recent excavations) and stockpiles (of excavated material) would also be watered, sprayed or covered where required, to minimise nuisance dust and odours.					✓	✓	
H16	During adverse meteorological conditions and extraordinary events, such as events where elevated background dust is present, additional mitigation measures would be considered to prevent and minimise air quality impacts from demolition works. These measures would include, but not be limited to implementing the following during high wind events (e.g. > 8m/s hourly average): • Reducing working surface area • Commencing excavation during favourable wind conditions • Increase wetting agents for exposed surfaces • Increase covering of exposed surface areas.					✓	✓	

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H17	Surface disturbance would be minimised. Exposed ground would be rehabilitated as soon as practicable.					✓	✓	
H18	Real-time dust monitoring would be undertaking during the operation of the concrete crusher. Details of this monitoring (and associated response actions) would be incorporated into the AQMP for the demolition works.					✓		
H19	During crushing, a number of dust suppression measures would be implemented. These could include regular watering of stockpiles, dust curtains and other measures as appropriate.					✓		
H20	Where biological matter is present within cooling water inlet pipework, the pipework would be removed be as soon as possible. This would help to minimise the potential for odour issues associated with the degradation and then exposure of the biological matter.					✓		
H21	Where visible dust emissions are observed appropriate management actions would be implemented to prevent impact.					✓		
H22	In the event of an odour complaint, an evaluation would be undertaken to confirm if the demolition works are the source of the odours. If the demolition works are confirmed as a potential ongoing odour source additional mitigation measures would be implemented which could include the use of water sprays to suppress odours and, if necessary, the use of odour suppressants. Off-site olfactory observations and VOC monitoring using equipment would also be undertaken if necessary. In the event of ongoing odour issues, excavation activities would be stopped and if necessary the excavation covered or backfilled.					✓	✓	
H23	In line with Caltex's existing procedure, following a complaint and its subsequent investigation, feedback regarding the source and nature of the complaint would be provided to the affected community members.					✓	✓	
H24	Dust deposition monitoring would be undertaken during the demolition works (as per AS/NZS 3580). This would include monitoring points in appropriate locations on the Site boundary and in Kurnell.					✓		
H25	The on-site real time ambient air quality monitoring station would continue to operate throughout the demolition works. This station continuously monitors for PM_{10}, wind direction and speed, temperature and humidity and rainfall.					✓	✓	
H26	A summary of the air quality monitoring data for the demolition works would be provided to the community during Caltex's quarterly community meeting.					✓	✓	

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H27	**The DEMP would include two new subplans: Containment Cell Management Plan; and an ACS Biopile Management Plan. With regards to air quality, these subplans would include:** • **A brief overview of site operations relevant to potential air emission sources.** • **Identification of mitigation measures for each respective emission source including those measures outlined in the DEMP for the Site (where relevant to operations within each works area).** • **Details of proposed monitoring and recordkeeping procedures.**						✓	
H28	**The ACS Biopile Management Plan would include the following specific air quality control measures:** • **Bucket crusher operation for the homogenisation process will be conducted so as to minimise potential dust emissions, including the use of:** - **directed water sprays throughout operation.** - **localised wind breaks within the soil screening area.** - **cessation of works during high winds (as defined within the DEMP).** • **Aeration system emission vents will be monitored for VOCs using a Photo-Ionisation Detector (PID) on a weekly basis.** • **The aeration system design will give consideration to potential asbestos emissions, and include emission monitoring for asbestos fibres prior to the commencement of continuous operations.** • **Soil moisture content will be managed in order to minimise potential particulate matter and asbestos emissions to the maximum extent practicable.** • **Provisions for management of odorous material, including notifications from the pipeway excavation operations in the case that odorous material is encountered. These odour controls would be consistent with the measures contained within the DEMP.**						✓	

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H29	**The Containment Cell Management Plan would include the following specific air quality control measures:** • **Soil moisture content will be managed in order to minimise potential particulate matter and asbestos emissions to the maximum extent practicable.** • **Directed water sprays will be used when required throughout ACS handling operations.** • **Plastic sheeting would be placed over ACS in the containment cell to minimise the generation of dust. Prior to the placement of the next load of ACS and at the start of each day, the plastic sheeting would be stripped back to allow filling operations to continue.** • **Stockpiles will be maintained in a moist condition, and covered if not in use or left overnight.** • **Completed areas of the works area will be revegetated with native grasses as soon as is practicable.**						✓	
Transport and Access								
I1	Local Authorities and Kurnell residents would be informed of any Project related work which would affect the road network.		✓			✓	✓	

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I2	A Traffic Management Plan would be developed for the construction/demolition phase. The Traffic Management Plan would comply with all relevant Regulations and By-Laws and in particular address safe access and egress to the public road network. The Transport Management Plan would include: • hours of permitted vehicle activity; • designated routes for construction and demolition traffic and defined access points to the Site and demolition works area; • duration of works; • permitted demolition vehicle types; • designated areas within the Site and demolition works area for truck turning movements, parking, loading and unloading to allow heavy vehicles to enter and leave the Site and demolition works area in a forward direction; • sequence for implementing traffic management measures should these be required; and • procedures and/or principles for construction and demolition vehicle speed limits and the safe operation of construction and demolition vehicles; and • **coordination of off-site heavy vehicle movements from the demolition works and ACS Modification works to ensure that heavy vehicle movements do not exceed 60 movements per day.**		✓			✓	✓	
I3	Works to remove pipelines from under the road reserves in Kurnell would not take place before a road opening application has been approved by Sutherland Shire Council and on the days the following events are taking place: • Australia Day (January); • The Festival of Kites (May); • The Boree Regatta (October). and • Water events for the Australian Scout Jamboree (first two weeks of January 2016).				✓	✓		
I4	**Traffic related to the ACS Modification works would be managed under the Traffic Management Plan that forms a sub-plan to the DEMP.**						✓	

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Heritage								
J1	A Heritage Management Strategy would be prepared for the Australian Oil Refinery prior to shut-down of the refinery plant, to provide Caltex with a basic framework for the ongoing management of the Site's heritage during present and future works. The Strategy would include a review of the heritage significance of the overall Site. The review would clarify the extent and relative heritage value of the place by identifying key elements of industrial and built heritage as well as social values of the refinery, and the relative contribution of these elements to the overall significance of the Site. Recommendations would also address the future assessment and management of memorabilia and other significant items of moveable heritage maintained on-site.	✓						
J2	If any further heritage items were discovered throughout the Project, work would cease until an assessment is carried out by a qualified heritage professional.	✓	✓			✓	✓	
J3	An archival photographic record of the existing fabric and operations of the Kurnell Refinery would be prepared while the plant is still operational, and during the decommissioning process. The recording would be undertaken in accordance with the Heritage Council guidelines on *Photographic Recording of Heritage Items Using Film and Digital Capture* (2006). The archival recording would be maintained for the appreciation of present and future generations. To this end, the recording would be lodged with the Sutherland Shire Library and NSW State Library.	✓	✓					
J4	The Heritage Management Strategy (HMS) and the management strategies within it would continue to be implemented.				✓	✓		
J5	Opportunities to adaptively reuse redundant buildings identified in the HMS as having high or moderate heritage significance would continue to be reviewed prior to final demolition works.				✓	✓		
J6	The sculptural panels by Bert Flugelman would be retained and preserved.				✓	✓		
J7	Sandstone blocks from the informal sandstone wall along Silver Beach would be set aside in a secure location prior to works, and reinstated in the same location following removal of the cooling water outlet pipeline.				✓	✓		

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J8	Appropriate mitigation measures would be implemented to reduce the likely damage to the interpretive footpath in front of the driveway entrance to the Kurnell Wharf. Measures would include: • Making a record of the current state of the pavement. • Removing the affected pavement in sections and storing these sections in a secure location. • Reinstating the pavement in the same location following the removal of pipelines; • If this is not practicable, a similar pavement treatment and a matching or compatible interpretative design would be reinstated.				✓	✓		
J9	If historical archaeological relics are unexpectedly found during the demolition works, works in the area of the relics would cease and the Heritage Council of NSW would be notified.					✓	✓	
J10	A Stop Works procedure would be implemented should any Aboriginal Heritage items be found. Works would cease at the vicinity of the item and OEH would be notified as soon as possible					✓	✓	
J11	If any human remains are disturbed, all work in the vicinity of the remains would stop immediately and the remains would not be further disturbed or moved. Works would cease at the vicinity of the item and OEH and NSW Police would be notified as soon as possible.					✓	✓	
J12	Prior to works commencing, all personnel and contractors involved in ground disturbance works would be briefed on the procedures to follow if human remains or unexpected heritage items are found.				✓	✓	✓	
J13	As part of the DEMP, a Heritage Management Section will be developed. This will incorporate previous Management and Mitigation Measures that are not already included in the HMS.				✓	✓	✓	

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Ecology								
K1	A Biodiversity and Weed Management Plan (BWMP) would be prepared in order to limit and control the spread of noxious weeds within the Site/demolition works area. It would include the following: • wash down procedures to reduce the spread of weeds via vehicles and machinery; • measures to target potential new weed outbreaks including soil stockpiles and any other disturbed areas; • outline monitoring programs for noxious and problematic weeds on site and in the surrounding areas; • measures for strict stockpiling control to help eradicate all noxious weeds as per NSW DPI specifications for Sutherland Shire LGA; • include a list of 'frog-friendly' and 'wetland friendly' herbicides such as Roundup Biactive or Weedmaster DUO for the control of noxious weeds; and ensure that only amphibian friendly herbicides are used; • wash down protocols for construction/demolition vehicles and machinery to prevent the spread of root-rot fungus (*Phytophthora cinnamomi*) and noxious weeds; • all personnel undertaking routine management activities of any noxious weeds should be appropriated trained and all contractors should hold the necessary permits and licenses. Noxious weed information sheets would be provided to demolition contractors to help identification of relevant noxious weeds.	✓	✓	✓	✓	✓		
K2	A BWMP would be prepared in order to limit potential impacts to existing vegetation outside of the area of proposed works, but within the Site. It would include the following: • existing vegetation on Site would be clearly marked on all Site plans and construction diagrams, with clear indications of no-go zones within all vegetated areas; • existing vegetation would be clearly signposted and fenced off prior to the commencement of construction activities, and should remain fenced off until the completion of works (as per the Vegetation Exclusion Zones shown on Figure 17-1); and • absolutely all works would be limited to the defined construction/demolition footprint.	✓	✓	✓	✓	✓		

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
K3	To minimise the potential for impacts to native fauna species, the BWMP would be developed and include following measures: • if any frogs are found within the Project Area, works would cease until frogs have been relocated to areas outside the area of impact; • if any threatened frogs e.g. Green and Golden Bell Frog or Wallum Froglet are identified within the Site, works would cease and active searching should be undertaken by a qualified zoologist experienced in the identification and management of the Green and Golden Bell Frog and Wallum Froglet; • all trenches would be inspected prior to works each morning. Any frogs that become trapped within trenches would be assessed by a suitably qualified ecologist or veterinarian and then released into the nearest suitable habitat if uninjured; • identification sheets would be provided to all construction workers on Site for the two threatened frog species predicted to occur within the Site; • wash down protocols to prevent the spread of Amphibian Chytrid Disease (chytridiomycosis) would be implemented at relevant work areas. Protocols would be consistent with OEH guidelines (DECC, 2008b); • 'frog-friendly' and 'wetland friendly' herbicides such as Roundup Biactive or Weedmaster DUO would be used for the control of noxious weeds; and • if fauna are found to be utilising the Site, or a nest, den or roost is found, work in the immediate area is to stop and the animals are to be allowed to move off freely, or relocated by an authorised person to an area outside the construction footprint.	✓	✓	✓				

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
K4	To minimise the potential impacts to native fauna during the demolition works the following measures would be included in the BWMP: • demolition workers would be provided with identification sheets relating to the threatened fauna species predicted to occur within the Site. • Stop work procedures would be implemented during the works on the chance encounter of any dispersing threatened frogs or the identification of nesting Pied Oystercatcher, Little Tern, Osprey or White-bellied Sea-eagle to avoid death or injury to frogs dispersing across the study area, or disturbance to nesting threatened birds. • Trenches/holes would be back-filled daily or covered overnight. Where this is not possible, other measures would be considered to prevent and/or mitigate fauna entrapment. Trenches/holes would be inspected prior to works each morning. Injured frogs that become trapped within trenches would be assessed by a veterinarian or ecologist. Uninjured frogs would be captured and released into the nearest suitable habitat to the south of the study area. • If threatened frogs, Green and Golden Bell Frog or Wallum Froglet are identified during demolition works, active searching would be undertaken by a qualified zoologist experienced in the identification and management of the Green and Golden Bell Frog and Wallum Froglet. • When open trenching/digging/excavating, Caltex would ensure that exclusion fencing is erected prior to works commencing each morning. Exclusion fencing shall be maintained during all seasons of the year, given the active season for the Green and Golden Bell Frog extends from September to April and the Wallum Froglet peak activity period occurs during the colder months. • If practicable, works at Silver Beach to remove the cooling water outlet should be completed outside of the known nesting periods for Pied Oystercatcher (August to January) and Little Tern (Spring/Summer). If nesting shorebirds are encountered in the Silver Beach foreshore area in the vicinity of works (within 20 m), works at Silver Beach would cease, a qualified zoologist would be consulted and appropriate actions would be implemented, prior to works recommencing. • If practical, works to remove tall structures on-site should be completed outside of the known nesting periods the threatened bird species (July to September for Osprey and June to January for White-bellied Sea-eagle). If not practical then tall structures would be inspected for active nests prior to commencing the demolition works.				✓	✓		

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
K5	The following recommendations, would be contained in the Cooling Water Outlet Management Plan for managing the potential marine ecology impact and implemented during demolition works: • silt curtains would be installed seaward of the demolition works area but not directly above existing seagrass communities; • all plant and equipment used in the water column would be appropriately prepared, checked and cleaned to avoid potential release of contaminants; • plant and equipment used in the water column would be inspected to ensure fragments of the invasive algae Caulerpa taxifolia are not present; • spill kits would be used to contain and clean up any spills from demolition plant and equipment. Spill kits would be located within 20 m of demolition plant and equipment; and • demolition works at Silver Beach (particularly those located in the water column) would be timed such that they do not coincide with high-tide conditions or during significant wave action.				✓	✓		
K6	Following the removal of the continental carbon pipeline and other infrastructure Caltex would develop a strategy to manage the redundant right of way (CCROW). The strategy would include measures to: • remove fencing, reprofile and allow natural regeneration the southern part of the CCROW (beyond the southern boundary of the Site) to promote consistent and connected vegetative communities across the southern part of Caltex's ownership; • remove and keep out noxious and invasive weeds, especially during the regeneration phase; and • reprofiling of the CCROW could include creating gaps in the raised easement to allow for hydrological exchange and habitat regeneration.					✓		
K7	Caltex would undertake the following prior to excavation along the Continental Carbon Right of Way: • pre-clearing inspections; and • implementing frog exclusion measures to ensure dispersing frogs are not captured and trapped in trenches during pipeline removal (e.g. exclusion fencing).					✓		

Item	Management and Mitigation Measure	Conversion		Demolition			ACS Works	
		CD	Conv	Op	DD	Dem	Con	Op
Coastal Processes								
L1	A Cooling Water Outlet Management Plan would be developed as part of the Demolition Environment Management Plan (DEMP). Rehabilitation works at Silver Beach would be in accordance with this Cooling Water Outlet Management Plan. The following measures would be included:				✓	✓		
L2	A detailed survey of the likely extent of the disturbed area at Silver Beach would be undertaken prior to commencing demolition works to ensure that the pre-existing topography is re-established following the works.					✓		
L3	The affected sand dunes (including the back-beach and sub-aerial beach) would be re-instated using the stockpiled overburden sand and if necessary, additional sand. Additional sand used for reinstating sand dunes would be of similar particle size and composition as the overburden sand.					✓		
L4	The affected sand dunes would be restored to match the previously surveyed topography. A smooth profile from the back-beach area to the dune would be re-established to ensure the aerodynamics are as consistent as possible with the undisturbed areas adjacent to the disturbed area. If necessary, liquid sprays or geotextiles would be used to help stabilise the beach and protect against erosion.					✓		
L5	The affected sand dunes would be re-vegetated using indigenous, native flora. The existing vegetation is limited to grasses, with no woody vegetation. The area would be re-planted with similar grass species in a manner that ensures minimal loss of wind-blown sand from the dune while the area is re-vegetating. All re-vegetated areas would: • contain signage to highlight these areas as rehabilitation zones that prohibit public and vehicular access; • be temporarily fenced, and • be maintained and monitored until vegetation is established using approved dune rehabilitation methods.							✓
L6	Material of a similar sediment size and colour characteristics would be used as back fill material for the trench below the low tide mark. To account for later settling and consolidations, some overfilling would be undertaken to account for later consolidation (approximately 10 % would be recommended).							✓

Appendix D

Example Asbestos Control Plans and Decontamination Procedures

DOCUMENT COMPLETION DETAILS

- Complete project details (name, location, description);
- Complete permit details (if applicable) and creation date;
- Complete details of participants who assisted in the creation of the document; **IT IS ESSENTIAL THAT ALL WHO WILL WORK ON THE JOB CONTRIBUTE THEIR THOUGHTS TO THIS SWMS AND SIGN THE DOCUMENT**
- Complete review details (if applicable);
- **MAKE SURE ALL JOB STEPS ARE COVERED AND THAT THE LEVEL OF RISK IS ELIMINATED IF POSSIBLE OR CONTROLS PUT IN PLACE TO REDUCE THE LEVEL OF RISK TO ACCEPTABLE LEVELS.**
- Make sure that all the potential hazards are covered for each step;
- Put a risk score beside the potential hazards for each step (utilise the risk assessment matrix as a guide);
- Check that all the hazard control measures noted;
- Put an amended risk score after taking into account the hazard control measure that you will be taking;
- If you are sure that this is the safest way to perform the work, then sign onto the SWMS before work commences on every occasion
- If the conditions in the work area change, then changes must be noted and everyone working on the job must re-sign onto the SWMS

PROJECT NAME:	Caltex Demolition – Asbestos Removal		
PROJECT LOCATION:	Caltex Refineries Kurnell –		
PROJECT DESCRIPTION:	Safe Removal of Asbestos materials – Plant 4/34		
Permit No (if applicable):	Removal of asbestos related materials as required	**DATE CREATED:**	10/02/2017
SWMS NAME:	Asbestos Removal of Asbestos Pipe and Contaminated soil.		

Project Description:
Removal of friable and non-friable Asbestos from identified areas during the demolition phase (when required). The amounts of asbestos material will vary. The method chosen will be will be determined by the asbestos removal supervisor and performed in consultation with Industrial Demolition and Caltex. The project will be carried out in line with the current "Safe Work Australia Code of Practice 'Safe Removal of Asbestos'. This document forms the basis of our Asbestos Control Plan. This SWMS will be used to perform removal work

Applicable Standards, Codes of Practice *(for details refer to code of practices)*
- NSW WorkCover 'Working with Asbestos' 2008 (Ref Only)
- Safe Work Australia Code of Practice for 'Safe Removal of Asbestos'
- WH & S Regulation 2011
- AS1715-1994 Selection & Use of Respiratory Protection
- Manual Handling
- Occupational Health and Safety Induction Training for Construction Work
- Occupational Health and First Aid in the Workplace
- Confine Spaces Code Of Practice

PPE/RPE Required *(for details refer to PPE/RPE register)*
- Disposable Coveralls Type 5 with hood
  Steel capped gumboots
- Sundstrom SR100 Half Face Respirator & SR700/200 Full Face PAPR (as required)
- Safety Glasses
- Hard Hat, 'Ninja' Gloves, Cut Resistant gloves
- Other PPE listed on the Caltex Work Permit

Permit/License Required *(for details refer to license, notification and work permits)*
- NSW WorkCover AS1 License(Friable Asbestos)
- WorkCover Permit Notification
- Caltex Hot Work Permit
- Caltex Safe Entry Certificate
- Demolition approval and permits

Training/Qualifications Required *(for details refer to induction, skill & experience register)*
- Friable Asbestos Removal certificate
- OH&S Construction industry induction White Card
- WorkCover Friable Asbestos Supervisor certificate
- Senior First Aid training
- Caltex Refinery & Demolition Induction
- Caltex Permit Training
- Caltex Driving in the refinery training
- Nationally accredited WAH training (as required)

Plant/Equipment/Tools *(for details refer to plant/equipment/tools register)*	**Inspection Requirements** *(for details refer to inspection register)*
· Hand Tools · 2-Way Radios · First Aid Kit · 5 Stage Wet decontamination units (as required) · AMS4000 Negative Air Units (as required) · Utility Trucks & Mini Buses	· Decontamination Area (Daily) · Asbestos exclusion zone & containment · Plant, Equipment & RPE · Safe Entry Gas Testing · Personal Gas Monitors

SAFE WORK METHOD STATEMENT DEVELOPER		
Names	**Title**	**Signature**
Tihapa Moanaroa	**Supervisor**	

REVIEW DETAILS			
Revision	**Date**	**Names**	**Signature**

HIERARCHY OF CONTROLS

- Can the hazard be eliminated or removed from the workplace?
- Can the product or process be substituted for a less hazardous alternative?
- Can the hazard be engineered away with guards or barriers?
- Can administrative controls be adopted i.e. procedures, job rotation etc.
- Can personal protective equipment and clothing be worn to safe guard against hazards?

RISK ASSESSMENT MATRIX

OUTCOME OF OCCURANCE	LIKELIHOOD OF OCCURANCE			
	VERY LIKELY	LIKELY	UNLIKELY	VERY UNLIKELY
Death or permanent disability	1 High	2 High	3 High	7 Medium
Serious injury or illness	4 High	5 High	8 Medium	9 Medium
Medical treatment	6 High	10 Medium	11 Medium	14 Low
First aid treatment	12 Medium	13 Medium	15 Low	16 low

STEP NO.	JOB PROCEDURES	POSSIBLE HAZARDS	RISKS	RISK SCORE	SAFETY CONTROLS	FINAL RISK SCORE	RESPONSIBILITY
1	Read, discuss and agree to this SWMS	Not discussing and reviewing all aspect of job at hand. Misunderstanding Giovenco & Industrial Demolition work safety procedures.	Injury or illness to workers Injury or illness to other contractors	5	• Always assess the risk prior to commencement and when changing steps. • This SWMS will be utilised by Giovenco asbestos removal crew to assist Industrial Demolition regarding the removal of asbestos on various plant and equipment as required. • Should any additional job activities be required then a review of the SWMS is mandatory. • This SWMS must be reviewed by all personnel and signed prior to	15	Caltex IDES Giovenco Supervisor Team leaders workers

					performing any asbestos removal tasks as part of demolition works.		
2	Obtain relevant work permits & clearances prior to starting work	Not receiving correct permit, commencement of work on wrong equipment, crew not clear on the work scope being performed. Working in a dangerous environment. Site possibly unsafe, Miscommunication and misinterpretation.	Injuries through poor preparation. Lack of project knowledge & OHS requirements	5	• Obtain relevant permits and clearances where required. • Discuss the work scope with Industrial Demolition supervisor and with work group to ensure that all personnel have a clear understanding of the task requirements. • Discuss potential work hazards prior to commencement of task with Industrial Demolition team and ensure they are identified and controlled. • Prior to entering Demolition zone, all workers must sign onto the appropriate register, pending work location (cold/hot zone). • All personnel must sign the relevant permit to work. • Ensure all correct PPE and safety equipment listed on the permit is worn.	15	Supervisor Team Leaders Caltex IDES
3	Make sure all plant/equipment and consumables (PPE) are readily accessible prior to and during the works	Incorrect consumables, leading to containment exposure	Injuries to site personnel Environmental contamination	10	• Make sure that all PPE is right for the work task required and available to use for all contractors onsite.	16	Team Leaders
4	Assessing work area and job set up.	Failure to complete a risk assessment and review the JSA. Unsafe structure, unauthorised personnel entering the area during work tasks.	back strain, cuts from loose sheet metal, other contractors being injured	5	• IDES prepare area for safe removal of asbestos and discuss with gio the extent of preparation required. JSA must be developed, understood, reviewed and signed by all workers for task.	15	Team Leaders Workers

					• Erect barricading at all times where required to ensure unauthorised personnel cannot enter the area. • Gio setup work area – barricade, decon, signage and no go zones in consultation with onsite Hygienists , • When erecting barricades, ensure to place correct signage and information tags to indicate barricade ownership. A spotter should be utilised if necessary. • Once work area is barricaded and signage is installed, Giovenco supervisor is to contact IDS management requesting that Giovenco take control of the barricaded area. • Where asbestos is identified, ensure to use correct removal techniques to minimise particle release. • Confirm the type of removal technique with your supervisor prior to engaging in removing any asbestos materials. • Dust suppression techniques to be employed will include but are not limited to: Water saturation of the work area, • Ensure a suitable and safe area is designated and provided to perform the required decontamination techniques and avoid cross contamination.		

					• Ensure to perform SPSA prior to, during and after tasks, SPSA should be performed additionally after breaks, when conditions change or when work task becomes uncertain, Discuss this with your supervisor.		
5	Giovenco perform survey to determine extent of asbestos material and locations in conjunction with IDS.	Falls, Sharp edges on sheet metal, dust/fibre, Working on grade, Working at heights, slips & trips	Injuries through poor preparation. Lack of project knowledge & OHS requirements	**10**	Supervisor revises survey reports, undertakes consultation with site hygienist, sampling and referring to asbestos register Steel plates to be removed where required to access sample points.	**16**	Supervisor IDES Site Hygienist
6	Remove Asbestos Materials (behind steel plates)	Falls, Sharp edges on sheet metal, dust/fibre, Working on grade, Working at heights, slips & trips, waste materials left onsite. Removal of gaskets	Injury or illness to workers Injury or illness to other contractors Environmental contamination	**5**	• Asbestos PPE suitable to the task is to be worn at all times when handling asbestos materials. The PPE required must be ticked off on the PPE checklist. • For works carried out within EWP or man box, a rescue plan must be developed, reviewed and communicated to the entire team prior to commencement of the task. • Cut resistant gloves must be worn when handling sheet metal. Black gloves may be used to remove asbestos. • Dust suppression techniques to be employed as required. etc. • IDES remove furnace sheeting to allow access to the void for removal work • All waste is collected into asbestos	**16**	Team leaders Workers IDES

					bags and sealed with adhesive tape. • Ensure all surfaces and work platforms are free of any debris following the removal. All waste to be collected, double bagged, goose necked and sealed when at capacity. • At the completion of removal, site hygienist to inspect area for cleanness.		
7	Manual handling	Back injuries, sprains and strains due to incorrect manual handling	Injury or illness to workers	10	• Only lift to own capacity, obtain assistance to prevent injury • Use mechanical aids where possible • Consider doing some warm up exercises on cold mornings • Report any feeling of discomfort to your supervisor immediately.	15	Team Leaders Workers
8	Working around Cranes, hoists and heavy machinery	Operating Plant Overhead loads Demolition machinery Pinch points	Critical injury caused by moving plant or machinery Death or permanent disability	3	• Only licensed operators are to operate any plant equipment. • Use spotters where necessary if working in close proximity with machinery. • Never cross the path of a moving load and never walk beneath a suspended load. • When lifting loads over walls or where a line of sight cannot be maintained dog man must be in contact with operator at all times.	15	Team leaders Workers IDES

					• If crane is required for job task, workers must remain harnessed up to man box at all times. • Ensure to discuss abnormal conditions with Industrial demolition supervisor and Giovenco supervisor.		
							0
9	Clean-up and demobilise	Trips, slips and strains. Heavy weights. Permit still active. Leaving loose materials on plant, structure or walkways, miscommunication or misinterpretation.	Injury or illness to workers Injury or illness to other contractors Environmental contamination	**10**	• Structure cleared by site hygienist and hand over to IDES for demolition preparation • Giovenco staff remain onsite during the deconstruction phase carrying out dust suppression and visually observing for any traces of asbestos found in unknown areas. (working alongside heavy machinery) • Giovenco instructs excavator operator to stop work if asbestos is identified and remove accordingly in conjunction with water suppression techniques applied. (Only if structure is considered safe and approval given by the demolition contractor. • Giovenco removes all traces of asbestos and any cross contamination and place into marked asbestos bags immediately. • Giovenco inspects the area for cleanness and request the site hygienist	**16**	Team leaders Workers IDES Site Hygienist

					for a full clearance • Giovenco demobilise area and dispose of all waste. • When leaving the area, ensure that it is in a tidy state. • Do not lift items that feel too heavy. Arrange for a team lift or use mechanical aids. •When the barricading and signage is removed Giovenco supervisor is to contact IDS management to hand back control of the designated area. • Make sure the permit is returned to permit issuer. • Ensure all materials have been secured. • Ensure to sign out of register upon completion of days' work.			

Decontamination Procedures Dry Decontamination	Methodology		NOTE: Dry Decontamination is NOT as detailed as the wet methodology, but dependant on exposure levels acceptable method of personal decontamination, evaluation of fibre levels and site consultation will dictate the type of decontamination required.
Step 1	Wear two sets of coveralls into the work area Make sure both sets of coveralls are zipped up and the hoods are in place.		
Step 2	On exit remove the outer coverall and place in the waste bags provided, this is carried out on the 'dirty' side of the decontamination area, respirator must be left in place. On the dirty side of the work area ensure the overalls are removed and pulled inside out.		
Step 3	In the 'buffer' remove the respirator and clean ready for re use or dispose of appropriately if P2.		
Step 4	In the 'clean' area remove the inner coverall and hang up, ready for re-entry, these become the outer coverall at the next shift.		
Step 5	Wash hands/face with soap and water within the 'clean area.		
Step 6	Enter the change area and put on normal plant clothing		

Decontamination Procedures Wet Decontamination	Methodology		NOTE: Wet Decontamination is NOT as detailed as the wet methodology, but dependant on exposure levels acceptable method of personal decontamination, evaluation of fibre levels and site consultation will dictate the type of decontamination required.
Step 1	Wear two sets of coveralls into the work area Make sure both sets of coveralls are zipped up and the hoods are in place.		
Step 2	Remove the outer 'dirty' coverall, respirator pre-filer on the work area side of the containment and place in an asbestos waste bag leaving the inner coverall and respirator in place. Wash gumboots ensuring no remnants of insulation are found. Poor decontamination can lead to severe illness with asbestos and associated illness		
Step 3	Transit through the designated walkway to the decontamination unit. Remove the inner coverall and place into an asbestos bag. Remove boots and hang up ready for reuse. Enter the 'dirty shower' wash body and hair, finger nails and the like. Make sure all body and in particular hair, finger nails and underarm are washed thoroughly		
Step 4	In the middle change area, remove the respirator, clean with alcohol wipes and hang up, ready for re-entry. The respirator needs to have both the inside		

	and outside cleaned with alcohol wipes		
Step 5	Enter the 'clean shower' and again hair, body and finger nails. Second wash will ensure that dust/asbestos residuals are removed from the body and parts.		
Step 6	Enter the change area and put on normal plant clothing. Make sure that the body is dry and the disposable towels is treated as asbestos contaminated, this is a precaution only.		

Waste Disposal Plan Waste Type	Volume	**Procedures On Site**	**Procedures Off Site**	Target
Asbestos Waste, Contaminated PPE Contaminated Plastic Sheeting	TBA	· Separate and wrap in 200um plastic. Loaded into bins/trucks for transportation · It is the responsibility of Giovenco Industries to make sure the waste is loaded and sealed.	Transported by DECC licensed operator. Disposed of at designated DECC contaminated waste depot	Landfill
Asbestos Waste Removal		· The supply of the waste contractor is TBA	The waste is to be transported offsite via Transpacific to the approved landfill. Copies of waste disposal dockets must be supplied to Giovenco Industries	
General	TBA	· Minimise and separate general waste	Dispose of general waste at waste management site	Landfill

SIGN ON SHEET – by signing this sheet you are acknowledging that you have read and clearly understand and will comply with the provisions contained in this document. This document is a "live" document and is to be updated as the conditions in the work area change. If changes are made to the document below all personnel are to resign.

FULL NAME	CLASSIFICATION	SIGNATURE	DATE
Yeoun Yung			
Mai Chhoeun			
Boroth Chea			
Sokmeng Ly			
Yiv Chung Luy			
Vanly Hong			

SWMS change sheet: If other hazards has been identified and not written down as part of the original SWMS. Please write down the possible hazards and safety controls. Complete the required risk score using the risk assessment matrix. All entries are to be signed and dated by all those involved in the job.					
DATE	**POSSIBLE HAZARDS**	**RISK SCORE**	**SAFETY CONTROLS**	**FINAL RISK SCORE**	**RESPONSIBILITY**

DOCUMENT CHANGE RE-SIGN SHEET			
FULL NAME	CLASSIFICATION	SIGNATURE	DATE

Asbestos Removal Control Plan

Prepared By: Tihapa Moanaroa	Date: 10/02/2017
Asbestos Licensed Holder: Giovenco Industries	License Number: AD211000
For ACM removal at (address): Solander St, Kurnell NSW 2231	
On behalf of (client): Caltex Refineries Kurnell	

IDENTIFICATION – Type

Type (tick appropriate box)

□ Flat asbestos cement
□ Corrugated Asbestos
□ Cement Sheet
X Formed asbestos cement products
□ Sprayed Insulation
x Pipe Insulation
□ Millboard
□ Textile
x Loose Fill

Quantity of ACM to be removed: The locations and quantity will be determined via the site survey, sample reports and in consultation with the Occupational Hygienist.

Conditions of ACM to be removed (tick appropriate box)

X Good Condition
□ Painted
□ Unsealed
□ Fire Damage
X slightly weathered
□ significant weathering
X Minor breakages
□ Extensive breakages

Additional Details:

Location (tick appropriate box)

□ Indoors
X Outdoors but protected
□ Outdoors and exposed to weather
□ Fire Damage
□ Enclosed in ducts
x Below ground in trenches

Additional Details: all personnel conducting the work must be ticketed and trained.

CONSULTATION

Will be undertaken with the following persons at any business and workplace where ACM removal takes place

X The client
X The occupying employer
X Their employee's
X An employee safety committee
X The principal contractor
X Other contractors' onsite
□ Neighboring business
X Other authority

Additional Details: In addition to the above and Work Cover, Caltex will publish a toolbox talk communicating the works, location & scheduling to other staff members onsite.

Consultation continued:

Will be undertaken with the following neighbor's property owners, including domestic properties prior to any ACM removal

Property Address: Solander St, Kurnell NSW 2231

CONTROL

Person supervising the asbestos work is: Tihapa Moanaroa
Their direct contact number is: 0296681868

Timing of removal works

Planned start date: 10/02/2017

EMERGENCY PLANNING

First aid officer is: Caltex Medical Centre/Security Staff

Emergency contact details are maintained onsite	X YES	□ NO
All site workers are trained in emergency response	X YES	□ NO

The following emergency response equipment is held onsite (provide details): First aid kits, Elevated Work Platforms, Crane & Rescue Man Boxes, 2-Way Radios, Fire Extinguishers/Department. C.R Rescue Support

The following have been identified as potential emergency situations (provide details): Heat Stress, Working at Heights, Asbestos Removal & other emergencies within the Refinery Terminal

BOUNDARIES & BARRICADES

The asbestos work area will be (define area involved): Plant 4 and 34

It will be defined by the following signage (type and locations) and barricade (type & location): Danger – No Entry, ASBESTOS, DO NOT ENTER, Caltex Red Danger Flags at each quadrant

The asbestos removal site will be (define the area involved): Fully fenced off using temporary fencing in each section on the boundary of the removal site or rope barricading if approved by the site hygienist and Caltex Co-coordinator.

It will be defined by the following signage (type and locations) and barricade (type & location): Asbestos working area – No Unauthorized Entry, Danger No Entry Asbestos Fibers, Danger Asbestos Removal in Progress & Respiratory Protection must be worn in this area.

The following electrical safety issues have been identified during the planning for ACM removal: All electrical safety will be terminated and or made safe by a qualified and competent electrician onsite.

The following actions will be initiated to control those electrical safety issues: Stop Work if hazards are evident.

PERSONAL PROTECTIVE EQUIPMENT

The following PPE is required and will be supplied and worn at all times throughout the ACM removal process: Type 5 Disposable coveralls with hood, protective gloves, protective eyewear, hearing protection as required, Half/Full Face Respiratory protection, Steep cap safety work boots.

All workers wearing a negative pressure respirator will be clean shaven: X YES □ NO

If not the following respiratory protection will be provided: N/A – All operatives are to be clean shaven at all times.

AIR MONITORING PROGRAM

If no air monitoring required please provide reasons below:

The following air monitoring will be conducted:

□ Background monitoring before removal	Number & frequency of testing:
X Control monitoring during removal	Number & frequency of testing: 1 Run
□ Exposure monitoring during removal	Number & frequency of testing:
□ Clearance monitoring following removal	Number & frequency of testing:

Competent person engaged to plan and conduct air monitoring: Graham Ward – Man Power

Contact details of the competent person: Graham Ward – 02 9668 1281

ON SITE MANAGEMENT OF REMOVED ACM

Removed ACM will be held on site for more than one working day: X YES □ NO

If yes, describe how the ACM will be stored including the type of storage containers to be used and dedicated location for stored ACM within the removal area: All waste will be placed into 200um plastic liners and or 200um asbestos bags and sealed with adhesive tape. Waste will be placed in the designated skip bin or in a secured fenced off location with appropriate signage in place.

REMOVE METHOD

Detail the planned methodology for removing the ACM; this must comply with the “Code of Practice”:

Refer to SWMS - Asbestos Removal: Contaminated soil and Insulated pipe plant 2 and plant 32

(Provide additional pages as necessary)

TOOLS AND EQUIPMENT

Warning: high speed abrasive power or pneumatic tools such as angle grinders, sanders, saws and high speed drills must never be used when removing ACM:

Hand tools:
(Detail) Scrapers, Tin Snips, Bannister brush & Pan, Broom, Utility knives & wire brushes

Powered equipment:
(Detail) Fork Lift Trucks, Diesel Generators, Decontamination Equipment & Elevated Work Platforms

Spray equipment:
(Detail) Pump action spray bottle or airless sprayer unit, Envirovac Wet Injection Unit

Vacuuming equipment:
Model: HZQ200 Make: Nu-Matic Hepa Vacuum Cleaner
Mode: Make:

Other details:

Maintenance statement:
All tools and equipment used in the removal of ACM are inspected before all removal work and inspected and clean following all removal work and at least 7 days when in continuous use in accordance with the "Code of Practice"

X YES □ NO

ENCAPSULATING FOR ACM REMOVAL

Complete encapsulation of the work area is required: □ YES x NO

The enclosure will be constructed as follows: No encapsulation will be required.

(Provide additional pages as necessary)

The following negative pressure exhaust equipment will be used in conjunction with the enclosure:

Make: AMS Model: 4000 Rating 4500CFM

Make: Model: Rating

Other details:

Encapsulation continued:

Smoke testing of the enclosure will be conducted prior to use and at the following intervals to confirm the integrity of the enclosure, records of these tests will be developed and maintained: TBA by Site Hygienist

Frequency of testing:

Persons responsible for conduct & recording of testing:

Decontamination Units
The following details outline the decontamination unit that will be interconnected with the enclosure: Decon will be Remotely connected to the enclosure.

Other control measures
The following additional controls will be enacted to ensure asbestos containment within the designated asbestos work area:
Regular inspections of the work area shall be maintained at all times to ensure no breaches occur within the work zone and surrounding areas. The external area will be kept damp at all times during the course of the removal.

DECONTAMINATION – ACM REMOVAL AREA

The following decontaminations efforts will be applied to the removal area: All contaminated soil to be removed and clearance obtained from Occupational Hygienist.

EQUIPMENT, TOOLS & PLANT

The following decontamination methods will be applied to the tools, equipment and plant:
All tools will be wiped down with a damp rag and placed into a marked asbestos bag and sealed with adhesive tape for reuse

SOIL

The following decontamination methods will be applied to the soil in the removal area: The area will be assessed by the site hygienist to determine if soil remediate will be carried out. Area to remain barricaded if soil removal is to occur

PERSONAL DECONTAMINATION

The following personal decontamination procedures will be applied to all workers engaged in the removal work: Dry decontamination procedures will be carried out for the removalist and any other staff in direct contact with asbestos.

RECYCLING

Is any recycling planned for materials that previously had ACM attached: X YES ☐ NO

Detail the procedures for ensuring all recyclable materials will be decontaminated prior to reuse or disposal: Materials disposed as waste or recycled will be free of asbestos material as per the clearance certificate.

DISPOSAL OF WASTE

Proposed disposal site is: TBA – Waste Managed by Caltex

Company engaged to transport waste: TBA – Waste Managed by Caltex

Hazardous waste cartage license no: TBA – Waste Managed by Caltex

Appendix E

BioCover product information sheet

Profile®
Solutions for your Environment™

BioCover™ ADC

Alternative Daily Cover


Upon application forms a consistent and effective layer between waste and the surrounding environment


Dyed green to confirm coverage rate for efficiency, unlike non-dyed spray-on products


Debris on an open-faced landfill


A polysaccharide tackifier increases the surface bond to debris, including plastic and other slick-surface materials, ultimately lowering blowing debris and trapping odors

An Effective, Cost-Saving Alternative to Soil or Tarps

BioCover™ Alternative Daily Cover (ADC) is hydraulically applied, meets federal regulations, is less expensive than other alternate covers and is easier to apply. Manufactured from Thermally Refined® wood fibers combined with cellulose fiber and a viscous polysaccharide tackifier, BioCover is the superior alternative to soil, mulch or plastic daily covers.

BioCover Advantages:

- Better for the environment—minimizes the accumulated leachate pockets and leachate seeps that are typically caused by continuous daily soil cover practices; designed as 100% biodegradable and non-toxic
- Preserves air space—creates a uniform protective layer that is dramatically thinner than comparably effective soil applications, increasing available space and the functional lifespan of the landfill
- Improves Landfill Gas Management System efficiency—minimizes the number of intermediate impervious layers which increases the capture zone and efficiency of the gas extraction system
- Prevents water infiltration—reduces leachate runoff with excellent absorption properties
- Lowers emissions—conserves fuel, requiring less excavation and transportation equipment needed on the jobsite
- Inhibits scavengers—deters unwanted pests

BioCover™ ADC Technical Data:

BioCover™ meets the ASTM International's standard guide for evaluation and selection of alternative daily covers for sanitary landfills (ASTM 6523-00), assists in the understanding of performance features to determine the extent and degree to which different ADC's are able to "control disease vectors, fires, odors, blowing litter, and scavenging without presenting a threat to human health and the environment" as intended by United States Environmental Protection Agency regulations.

As with any ADC, the final application cost per square foot will vary depending on the type of waste materials, compaction, moisture content, weather conditions, local regulatory requirements and local environmental issues. However, BioCover is the fastest, provides the best coverage and is the most affordable option on the market today.

COMPOSITION

Thermally Refined® Wood Fiber—51% ± 3%
Cellulose Fiber—27% ± 3%
Polysaccharide Tackifier—10% ± 1%
Moisture Content—12% ± 3%

ADC APPLICATION RATE

BioCover should be used at 1500-2500 pounds per acre (1700-2800 kg/ha).

1/4" (0.64 cm) ADC NEEDED PER APPLICATION VS 6" (15 cm) COMPACTED SOIL

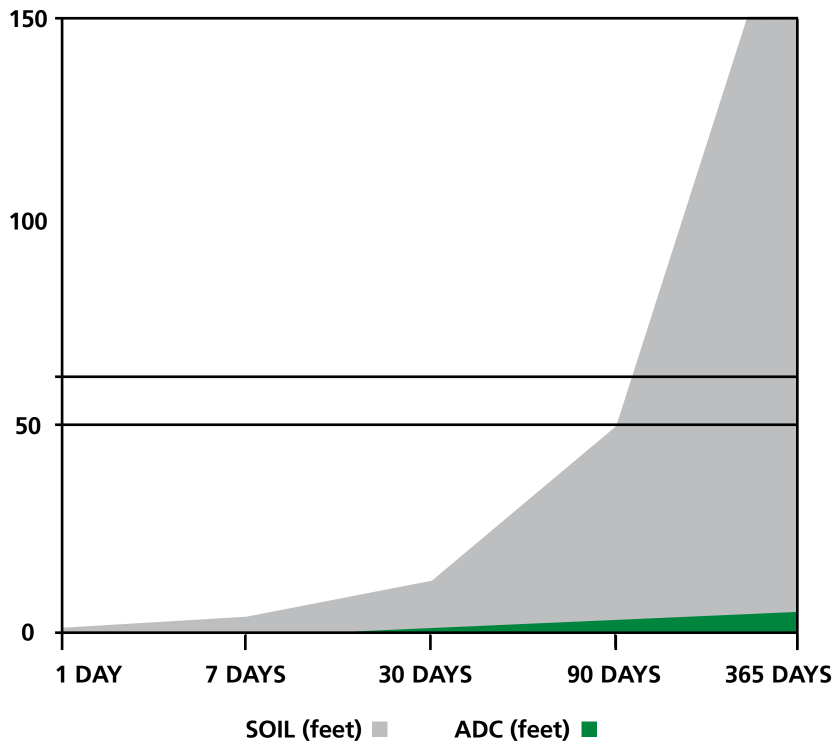

Chart demonstrates amount of landfill space lost over the course of a year with a standard soil application compared to ADC. ADC requires minimal coverage of 1/4-inch (0.64 cm) per application, resulting in greater available landfill space for waste.

PACKAGING

Bales: Net Weight – 50 lb (23 kg)

Pallets: 40 bales/pallet 1 ton (907 kg)/pallet

BIOCOVER PRESERVES LANDFILL CAPACITY

Soil—33 square feet (0.93 m^3) of dirt on top of the refuse (when applied at six inches (15 cm) of soil per day)

BioCover—33 inches (0.02 ft^3) of material (when applied at 1/4-inch (0.64 cm) per day)

GREEN DESIGN ENGINEERING™
EARTH-FRIENDLY SOLUTIONS FOR SUSTAINABLE RESULTS™

Green Design Engineering™ is a holistic approach that combines agronomic and engineering expertise with advanced technologies to provide cost-effective and earth-friendly solutions. Profile strives to deliver Green Design Engineering across our team of consulting professionals, innovative products and educational resources.

PS³ PROFILE SOIL SOLUTIONS SOFTWARE

PS³ is a free, comprehensive 24/7 online resource you can use to design a project and select the right products that address both the physical and agronomic needs of your site. It will help you develop holistic, sustainable solutions for cost-effective erosion control, vegetation establishment and subsequent reductions in sediment and other pollutants from leaving disturbed sites. Because good plans start with the soil, PS³ offers free soil testing to ensure this critical step is considered. To access the site, design your project and take advantage of a free soil analysis, visit **www.profileps3.com**.

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Appendix F

Draft Remediation Action Plan

ACS Modification works
Caltex Australia Pty Ltd
20-Jun-2017

DRAFT - ACS Modification works - Remediation Action Plan

Caltex Kurnell Terminal

D R A F T

DRAFT - ACS Modification works - Remediation Action Plan

Caltex Kurnell Terminal

Client: Caltex Australia Pty Ltd

ABN: 46 004 610 459

Prepared by

AECOM Services Pty Ltd
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20-Jun-2017

Job No.: 60488804

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

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Quality Information

Document	DRAFT - ACS Modification works - Remediation Action Plan
Ref	60488804
Date	20-Jun-2017
Prepared by	Katherine Dodd, Senior Environmental Scientist & Steve Randall, Senior Environmental Scientist
Reviewed by	Jonathan Ho, Associate Director & William Miles, Associate Director

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
1	20-Jun-17	Draft – reviewed by Certified Practitioner: Site Assessment and Management	Jonathan Ho Associate Director & Certified Practitioner: Site Assessment and Management	

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Executive Summary

AECOM Services Pty Ltd (AECOM) was commissioned by Caltex Australia Pty Ltd ABN 46 004 610 459 (Caltex) to prepare a Remediation Action Plan (RAP) for the excavation of asbestos contaminated soils (ACS) from an areas termed the 'pipeways' and for its placement in a purpose built Containment Cell (the '*remediation works*') at the Caltex Kurnell Terminal, located in Kurnell, NSW (the 'Site').

Historically certain pipes within the Site were wrapped in material that contained asbestos. Over time this material degraded and dropped friable asbestos into the pipeways below. This asbestos containing material (ACM) contaminated some of the soils that had collected in the pipeways.

The presence of asbestos means that Caltex currently require an Exemption Order under Section 419 of the *Work, Health and Safety Regulation 2011* (WH&S Regulation) in order to complete activities within the pipeways including conversion and demolition activities, routine maintenance, sampling, valve operations, weed removal etc.

Various investigations have identified the extent of ACS in the pipeways. Aside from the friable asbestos present within the soil in the pipeways (to a depth of 200 mm and 500 mm), other contaminants related to the Site's previous use as a refinery have also been detected.

The removal and transport of the ACS in the pipeways was consented as part of the demolition works under SSD 5544 MOD1. Development consent for the construction, filling, closure and management of the containment cell is being sought under application SSD 5544 MOD2. The ACS Modification works are detailed in the Statement of Environmental Effects (AECOM, 2016e) and Response to Submissions Report (AECOM, 2017d).

The objectives of the ACS Modification works RAP are to:

- Meet the requirements of SSD MOD 2 [insert reference to specific conditions].
- Remove the current SafeWork NSW Exemption Order.
- Remove potential human health risk posed by the ACS.

The scope of works for the RAP is to identify and document the necessary regulatory approvals required for the works, the nature and extent of asbestos impacts in soil to define the proposed remediation areas, remediation assessment criteria, procedures required to implement and validate the proposed works and remedial contingencies.

In 2013, AECOM undertook a contamination and characterisation assessment of the pipeways which provided preliminary estimates of the quantity of ACS. In 2016 and 2017, AECOM undertook detailed characterisation of the pipeways asbestos impact, classifying insitu the waste as General Solid Waste (GSW) – Special Waste, Restricted Solid Waste (RSW) – Special Waste and Hazardous Solid Waste (HSW) – Special Waste, or just GSW, RSW or HSW if no asbestos was detected. The assessment divided the soils in pipeways into areas of asbestos and non-asbestos waste under GSW, RSW or HSW categories.

Implementation of the RAP including the remediation methodology, validation sampling and environmental control measures will remove the potential health risk posed by ACS, meet the requirements of SSD MOD 2 [insert reference to specific conditions] and remove the current SafeWork NSW Exemption Order.

This draft RAP has been prepared as part of the Response to Submissions Report at the request of the Department of Planning and Environment (DPE). It would be finalised in consultation with the NSW Environment Protection Authority (NSW EPA) once the conditions of consent for SSD 5544 MOD2 are confirmed.

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Abbreviations

Abbreviation	Description
ACM	Asbestos Containing Material
ACS	Asbestos Contaminated Soil
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BTEXN	Benzene, toluene, ethylbenzene, xylenes and naphthalene
CLM Act	Contaminated Land Management Act 1997
COC	Chain of Custody
CCLTEMP	Containment Cell Long Term Environmental Management Plan
COPC	Contaminants of potential concern
CSRF	Caltex Soil Remediation Facility
DQI	Data Quality Indicators
DQO	Data Quality Objectives
EPA	Environment Protection Authority
EPL	Environment Protection Licence
ESA	Environmental Site Assessment
HIL	Health Investigation Levels
HSL	Health Screening Level
IL	Investigation Level
ISCO	In-Situ Chemical Oxidation
kL	Kilolitre
L	Litre
Landfill Guidelines	NSW EPA Environmental Guidelines: Solid Waste Landfills, second edition 2016
LOR	Limit of Reporting
m	metres
mbgs	metres below ground surface
mbtoc	metres below top of casing
MHF	major hazard facility
mm	millimetres
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measure
NHMRC	National Health and Medical Research Council
OCP	Organochlorine pesticides
OH&S	Occupational Health and Safety

DRAFT

Abbreviation	Description
OWSS	Oily Water Sewer System
PARCC	Precision, accuracy, representativeness, completeness and comparability
PID	Photo-ionisation Detector
POEO	Protection of the Environment Operations
PPE	Personal Protective Equipment
ppm	parts per million
QA/QC	Quality assurance/quality control
RAP	Remediation Action Plan
Remediation works	Excavation of ACS from part of the Site termed the 'pipeways' and placement in a purpose built Containment Cell
SA	Standards Australia
SAQP	Sampling, Analytical and Quality Plan
SEPP	State Environmental Planning Policy
SPR	Source-Pathway-Receptor
SSD	State Significant Development
SWL	Standing water level
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
TVOC	Total volatile organic compounds
VENM	Virgin Excavated Natural Material
VOC	Volatile Organic Compounds
WWTP	Wastewater Treatment Plant

D R A F T

1.0 Introduction

AECOM Services Pty Ltd (AECOM) was commissioned by Caltex Australia Pty Ltd ABN 46 004 610 459 (Caltex) to prepare a Remediation Action Plan (RAP) for the excavation of asbestos contaminated soils (ACS) from an areas termed the 'pipeways' and placement in a purpose built Containment Cell (the '*remediation works*') at the Caltex Kurnell Terminal, located in Kurnell, NSW (the 'Site', refer to **Figure 1** below). Historically certain pipes within the Site were wrapped in material that contained asbestos. Over time this material degraded and dropped friable asbestos into the pipeways below. This asbestos containing material (ACM) contaminated the soils in the pipeways and as such these soils require removal. It is proposed to excavate the ACS and place it in an on-site containment cell.

The purpose of this RAP is to:

- Support the modification application (reference SSD 5544 MOD2) for the placement of the ACS into a purpose built Containment Cell at the Site.
- Remove potential human health risk posed by the asbestos.
- Address the requirements of the NSW Environment Protection Authority (EPA), under the *Contaminated Land Management Act 1997* (CLM Act) which includes preparation of a long term management plan, removing or containing the contamination of the land (i.e. the ACS) and eliminating any hazard arising from the contamination of the land (i.e. the ACS)
- Address the requirements of *State Environmental Planning Policy 55* (SEPP 55) where applicable.

1.1 Background

The area of remediation covered by this RAP, referred to as the 'pipeways', is shown in **Figure 1**. The pipeways contain aboveground fuel pipelines which were largely used during the refinery operations. Decommissioned pipelines are scheduled for removal as part of the demolition works currently being completed at the Site. The pipeways act as spoon drains for the Site. Runoff from the pipeways is discharged off site or directed to the Site's Waste Water Treatment Plant (WWTP) for treatment prior to disposal, in accordance with the Site's Environment Protection Licence (EPL) no. 837.

As discussed in **Section 4.0**, aside from the asbestos present within the soil of the pipeways (to a depth of 200 mm and 500 mm), other contaminants detected within the pipeways included Total Recoverable Hydrocarbons (TRHs), Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene (BTEXN), metals and benzo(a)pyrene. The AECOM report "*Kurnell Pipeways Asbestos Waste Classification Report*" (AECOM, 2017) details concentrations of the above contaminants.

Based on the presence of asbestos, Caltex require an Exemption Order under Section 419 of the *Work, Health and Safety Regulation 2011* (WH&S Regulation) in order to complete activities within the pipeways including conversion and demolition activities, routine maintenance, sampling, valve operations, weed removal etc. Further, Caltex staff and contractors require special processes and equipment in order to work in these areas. This ongoing maintenance and operation work is required to maintain the safety of the Site, its employees and the local community.

ACSs contained within the pipeways are currently being managed in situ, however in order to remove the ongoing health and safety risks and the operational constraints, Caltex proposed to excavate and place ACSs within an on-site containment cell (the ACS Modification works).

The objective of the 'remediation' works is to remove the need for works to be completed under the Exemption Order, thereby removing the risk of asbestos to human health during work within the pipeways. In order to manage the environmental and human risk of the other contaminants detected in the ACS, ACS from the pipeways will be placed in an onsite containment cell which has been designed in general accordance with the requirements of the NSW Environment Protection Authority (EPA) Solid Waste Landfill Guidelines 2016 for a restricted landfill cell. As such, the design and management of the containment cell is discussed in this RAP.

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The removal and transport of the ACS in the pipeways was consented as part of the demolition works under SSD 5544 MOD1. Development consent for the construction, filling, closure and management of the containment cell is being sought under application SSD 5544 MOD2. The ACS Modification works are detailed in the Statement of Environmental Effects (AECOM, 2016e) and Response to Submissions Report (AECOM, 2017d).

This draft RAP has been provided as part of the Response to Submissions Report at the request of the Department of Planning and Environment (DPE). It would be finalised in consultation with the NSW Environment Protection Authority (NSW EPA) once the conditions of consent for SSD 5544 MOD2 are confirmed.

D R A F T

Figure 1 ACS Modification Works – Site Plan

D R A F T

1.2 Objectives

The objectives of the ACS Modification works RAP are to:

- Meet the requirements of SSD MOD 2 [insert reference to specific conditions].
- Remove the current SafeWork NSW Exemption Order.
- Remove potential human health risk posed by the ACS.

1.3 Scope of Works

The scope of works undertaken, as presented in the following report sections, include the following:

- identifying and documenting necessary regulatory approvals required for the works (**Section 2.0**)
- summarising the Site investigation history to identify the nature and extent of asbestos impacts in soil and define the proposed remediation areas (**Section 3.0** and **Section 4.0**)
- identifying the remediation assessment criteria as well as the soil validation criteria that are required to meet the remediation goals (**Section 5.0** and **Section 6.0**)
- identifying the procedures required to implement and validate the proposed remediation works, (**Section 6.0**)
- identifying remedial contingencies (**Section 5.7**)
- identify health and safety and environmental management and mitigation measures requirements during the remediation works (**Section 7.0** and **Section 8.0**)

2.0 Regulatory and Legislative Requirements

2.1 Relevant Policy and Guidelines

The following key legislation and guidelines are relevant to the works proposed as part of this RAP:

- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Protection of the Environment Operations Act 1997 (POEO Act)
- POEO (Waste) Regulation 2014
- Contaminated Land Management Act 1997 (CLM Act)
- Clean Air Regulation 2002
- Work Health and Safety Act 2011 (WH&S Act)
- Work Health and Safety Regulation 2011 (WH&S Regulation)
- *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended on 16 May 2013 (*ASC NEPM*, 2013)
- NSW DEC 2006, Guidelines for the NSW Site Auditor Scheme (2nd Edition), April 2006 (NSW DEC, 2006)
- NSW Environment Protection Authority (EPA) 1995. Sampling Design Guidelines, September 1995 (NSW EPA, 1995)
- NSW Environment Protection Authority (EPA) 1997. Guidelines for Consultants Reporting on Contaminated Sites, November 1997 (NSW EPA, 1997)
- NSW EPA Waste Classification Guidelines 2014 – Part 1: Classification of Waste (NSW EPA 2014)
- State Environmental Planning Policy (SEPP) No. 55 Remediation of Land
- Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (DOH, 2009)

2.2 Development Consent – SSD 5544

Caltex received development consent for the conversion of the refinery into a terminal in January 2014 (SSD 5544). This work involved the conversion of tanks and installation of pumps and associated pipelines to allow for the cessation of refining at the Site and to allow for the expansion of terminal operations. Cessation of refinery operations occurred in Q4 of 2014. In 2015 a modification to this consent (SSD 5544 MOD1) was granted to consent the proposed ‘demolition works’ at the Site.

The pipeways at the Site contains areas of ACSs based on characterisation works conducted in 2013 and 2016 and detailed in the AECOM report titled *Kurnell Pipeways Asbestos Waste Classification Report* (AECOM, 2017). The presence of ACSs at the Site was discussed in both the development application for the conversion works (SSD 5544) and the modification application for the demolition works (SSD 5544 MOD1). This contamination within the pipeways is largely due to the historic use of ACM within the pipeways and the associated infrastructure when the Site was operating as a refinery.

The ACS Modification works (SSD 5544 MOD2[1]), under which the ‘remediation’ works (for the purpose of this RAP) are defined, are directly linked to the approved Project SSD 5544 and SSD 5544 MOD1 as they are the next step in the conversion process at the Site to establish a viable, safe, reliable and sustainable finished product import terminal at Kurnell.

[1] Note – MOD 2 has not been approved at the time of preparation of this Draft RAP. The RAP will be updated with requirements of MOD2 as applicable.

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The relevant conditions of consent for SSD 5544, MOD1 and MOD2 must be implemented as part of the remediation works, as applicable. The consent and required environment management and mitigation measures have been incorporated into this RAP [update with reference to condition numbers when MOD 2 approved] and the associated management plans would be implemented at the terminal. A summary of environmental management plans applicable to the remediation works is provided in **Section 7.0**.

2.3 Environment Protection Licence (EPL)

Current operations at the Site must comply with relevant legislative and regulatory requirements including EPL no. 837. This EPL is regularly updated to ensure the management of the Site meets certain environmental requirements. As the operations on the Site change, the EPL will continue to be updated to ensure that it remains relevant to the activities being completed on-site. This is expected to include an amendment to the EPL to incorporate activities associated with the proposed ACS Modification works. Following variation of the EPL to manage the ACS Modification works, this RAP would be updated with any relevant information which applies to the remediation works.

The following EPL conditions in particular are of relevance to the remediation works.

Table 1 Key EPL Conditions of Relevance Remediation Works

EPL Condition No.	EPL Condition	Relevance to ACS Modification
2	Discharges to Air and Water and Applications to Land	Leachate from the ACS Containment Cell will be conveyed to the on-site wastewater treatment plant (WWTP). The EPL requires effluent quality and volume monitoring sampling is undertaken at the WWTP (sampling point '27').
3	Limit Conditions	This condition outlines limits for discharges to water, land and air and receipt of waste (no asbestos waste is permitted to be received from off-site), and management of asbestos which must be met by the facility including the remediation works.
4	Operating Conditions	This condition outlines requirements related to handling of materials, maintenance of plant and equipment, dust, emergency response and treatment of wastewater which must be met by the remediation works.
5	Monitoring and Recording Conditions	This condition outlines requirements related to monitoring of effluent at the WWTP and groundwater at the Site. These monitoring requirements are of relevance to the remediation works in relation to discharge of wastewater from the pipeways and leachate to the WWTP and monitoring of groundwater quality in the vicinity of the containment cell.
6	Reporting Conditions	This condition outlines reporting requirements for the Site in particular the Annual Return. Monitoring related to the remediation works would be incorporated into the Annual Return as relevant.

2.4 SafeWork - Exemption Order (005/2013)

The WH&S Act and WH&S Regulation defines major hazard facilities (MHFs), regulates their operation and includes measures to prevent accidents occurring at MHFs. They also include specific provisions regarding the management of asbestos and ACMs.

At present Caltex require an 'Exemption' to Section 419 of the WH&S Regulation in order to complete activities within the pipeways, including conversion and demolition activities, routine maintenance, sampling, valve operations, weed removal etc where there is known asbestos contamination of the sand and soil. The purpose of the remediation works is to remove ACS from the pipeways area by removing and validating the impacted soil from the top 200 mm or 500 mm which will remove the requirement for an exemption. The area and depth of ACS is shown in **Appendix A-Figure 1**.

Any works to or modifications of a MHF need to be discussed with Safework NSW as the administrators of the WH&S Act. Caltex have consulted with Safework NSW on the remediation works and will continue to do so moving forward. However, as the works would not modify the MHF, consent and approval of WorkCover NSW is not required.

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3.0 Site Setting

3.1 Site Information

Site identification summary details are presented in **Table 2**. The location of the Site is provided in **Appendix A - Figure 1**.

Table 2 Site Information Summary

Site Information	Detail
Site Identification	Caltex Kurnell Terminal
Caltex Site ID	535
Site Address:	Solander Street, Kurnell, 2231, NSW
Site Area:	The Site is approximately 187 ha.
ACS Modification Works Area:	The works area as defined under SSD 5544 MOD2.
Pipeways Area:	The pipeways area containing ACS transverse an area of approximately 4.6 ha. ACS has been detected up to 200 mm and 500 mm depth.
Property Zoning:	Zone IN3 Heavy Industrial under the *Sutherland Shire Local Environment Plan 2015*
General Land Use of the Area:	Liquid Fuel Depot – predominantly a finished fuel import terminal with ancillary land uses
Adjacent Site Uses	Adjacent land uses to the Site include: · North and North-west: Village of Kurnell and Marton Park · East and South: Kamay Botany Bay National Park · West: Quibray Bay · South-west: land zoned as general industrial, light industrial, special industrial and special development
Site Access	The main entrance to the Site is via Solander Street exiting from Captain Cook Drive. Vehicle access to the Site is also available from Sir Josephs Banks Drive. The Site contains a number of established internal roads. The majority of the movements associated with the works will be contained within the Site via the existing internal road network to and from Solander Street.

The Site (refer to **Figure 1**) is legally described under the following lot and deposited plan (DP) numbers:

Lot 56/ DP 908	Lot D/ DP 361103	Part Lot 123/ DP 8135
Lot 62/ DP 908	Lot G/ DP 361103	Part Lot 125/ DP 8135
Part Lot 12/ DP 7632	Lot K/ DP 362655	Lot 77/ DP 9564
Lot 190/ DP 7632	Lot 570/ DP 752064	Lot 81/ DP 9564
Lot 44/ DP 8135	Lot 1/ DP 1044690	Part Lot 2/ DP 215818
Lot 46/ DP 8135	Lot 283 / DP 752064	Lot B/ DP 338897
Lot 78/ DP 8135	Lot 57/ DP 908	Part Lot F/ DP 361103
Part Lot 122/ DP 8135	Part Lot 11/ DP 7632	Lot J/ DP 362655
Part Lot 124/ DP 8135	Lot 189/ DP 7632	Lot H/ DP 362655
Lot 48/ DP 9564	Lot 43/ DP 8135	Lot 24/DP 776328

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Lot 78/ DP 9564	Lot 45/ DP 8135	Lot 25 / DP 776328
Part Lot 1/ DP 215818	Part Lot 77/ DP 8135	Lot 1 / DP 132055
Lot 1/ DP 215819	Lot 79/ DP 8135	

3.2 Site History

Prior to the construction of the 'Australian Oil Refinery' between 1953 and 1956, the Kurnell peninsula was used for farming, timber in the 1800s and for sand extraction in the early 1900s.

The Australian Oil Refinery (the Kurnell Refinery) commenced operation in 1956 and expanded over the following decades to include a Lubrication Refinery in 1961. The Site boundary includes the former operation areas of the Australian Oil Refinery and the Australian Lubrication Oil Refinery.

Kurnell Refinery was the largest oil refinery in NSW and the second largest of the seven oil refineries in Australia, based on crude oil processing capacity. The refinery received and stored refined products and crude oil for refining into other petroleum products. The refinery was in operation from 1956 to 2014 and the Site has been highly disturbed during that time. As such there are few areas of ecological or aboriginal significance within the Site boundary.

As approved in SSD 5544 refinery operations ceased in 2014. Caltex now only import finished products (gasoline, jet fuel and diesel) through the two fixed berths at the existing wharf and the additional sub berth located in Botany Bay. These products are stored in existing and converted tanks.

For further information on the history of the Site refer to the Heritage Management Strategy (Australian Museum Consulting, 2014) or the Appendix H of the Environmental Impact Statement (EIS) for the Kurnell Refinery Conversion Project (SSD 5544) available here:

https://www.caltex.com.au/our-company/environment/kurnell-refinery-conversion-project

The current operations at the terminal are managed under the Operational Environmental Management Plan (OEMP) (Caltex, 2015).

3.3 Pipeways Condition

The process to convert the refinery to a terminal has involved a number of related activates including numerous upgrades and changes to operational infrastructure, as well as the removal and demolition of redundant infrastructure including a number of pipelines located in the pipeways.

As discussed earlier, the pipeways act as spoon drains for the Site. Overtime the pipeways have collected sediment (sand and soil). The pipelines were traditionally covered with ACM (lagging and gaskets) which deteriorated and resulted in asbestos contamination of soils, predominately by friable asbestos, in certain areas of the pipeways (**Figure 1**). In addition the soil in the pipeways has been contaminated by spills of petroleum products resulting in additional COPC. Contamination with petroleum is visually evident by staining and odour.

As part of the works undertaken to date, ACMs have been removed from the pipelines within the pipeways. Decommissioned pipelines have been or are scheduled to be removed prior to excavation of ACS. The majority of pipeways contain bare soil with minor vegetation (weeds).

During all asbestos works the works area will be appropriately delineated using fencing to restrict access.

D R A F T

3.4 Geology and Hydrogeology

3.4.1 Regional Topography and Geology

The Kurnell Peninsula is an elevated plateau of Hawkesbury Sandstone which is approximately 18 km in length (URS, 2004). The elevation on and around the Site is generally in the region of 5 m Australian Height Datum (AHD). Land to the east of the Site in Kamay Botany Bay National Park rises to approximately 30 m AHD (Port Hacking 9129-4N Topographic Map, Third Edition, Land and Property Information NSW, 2001). The depth to bedrock beneath the Site varies between 2 m to 20 m. Bedrock surface elevation rises toward the east and south of the Site, with sandstone outcrops mapped at the northeast and southeast boundaries (URS, 2006).

According to published geological information (Sydney 1:100,000 geological service sheet), the Site is underlain by Quaternary (Pleistocene) wind-blown medium- to fine-grained well-sorted marine quartz sand (URS, 2004, 2010).The sandstone is described as medium- to coarse-grained, composed predominantly of quartz with minor lithic fragments, feldspar, mica and clay pellets. The Site lies on the aeolian Kurnell landscape unit, composed of gently undulating to rolling coastal dunefield and relict dunes (NSW Soil Conservation Service Soil Landscape Series, Wollongong-Port Hacking, URS, 2011).

3.4.2 Acid Sulphate Soils

Acid sulfate soils have been recorded and classified by Sutherland Shire Council in the works area. These maps show the remediation works area extending across land classified as Class 4 with respect to PASS. Sutherland Shire Council has provided the following definition of Class 4 areas:

- In a Class 4 area, acid sulphate soils are likely to be found beyond 2 metres below the natural ground surface. Any works that extend beyond 2 metres below the natural ground surface, or works which are likely to lower the water table beyond 2 metres below the natural ground surface, will trigger the requirement for assessment and may require management (Sutherland Shire Council, 2010).

The remediation works would not require excavation beyond 0.5 metres below ground level (mbgl) therefore acid sulphate soils are unlikely to be encountered.

3.4.3 Hydrogeology

3.4.3.1 Hydrogeology at the Site

A *Voluntary Investigation Final Report* by Coffey (2003) indicated that groundwater at the Site is contained within an unconfined aquifer in Quaternary sands, generally 2 to 2.5 mbgl. Although the groundwater is generally found at this depth, groundwater monitoring (Coffey 2011, Caltex 2013a) indicates there is variable depth to groundwater across the Site, ranging from approximately 1 mbgl in the north-western area of the Site, to 15 mbgl in the south eastern area of the Site. The groundwater flow is generally to the northwest and influenced by the strike and dip of the underlying sandstone bedrock (Coffey 2007). Within the Site there is an east-west groundwater divide located south of the pipeways and north of the Caltex Soil Remediation Facility (CSRF) (Caltex, 2013b). To the north of the divide the groundwater flows in a north-westerly direction to Botany Bay at a gradient of 0.003 to 0.005. South of the divide the groundwater is thought to flow south west at gradient of 0.006 towards a stormwater drain, and then flow north west into Botany Bay via Quibray Bay.

The remediation works area is located to the north of the divide therefore would potentially impact groundwater flowing in a north-westerly direction. Although the ACS are located in the pipeways which are spoon drains and therefore separate from groundwater flows.

The Soil and Groundwater Contamination Assessment, Classification and Risk Ranking Report by Coffey (2007) reports that groundwater in the north of the Site is thought to discharge to Marton Park Wetland. The receiving waters for groundwater migrating from the Site is Botany Bay to the north and Quibray Bay to the west. The ecosystem within Quibray Bay is considered sensitive and different parts of it comprise either Towra Point Nature Reserve or Towra Point Aquatic Reserve.

A quarterly groundwater monitoring program is implemented at the Site as a protection system to identify the potential for migration of hydrocarbon contaminated groundwater before it leaves the Site. The monitoring program includes monitoring wells in the central part of the Site and various boundary monitoring wells along the northern and western boundaries of the Site corresponding to the down gradient direction of groundwater flow (Coffey, 2003). There are also a number of private groundwater bores in Kurnell that are generally used for watering gardens. Monitoring of groundwater bores in the Kurnell residential area is conducted by Caltex every seven years. The most recent monitoring, GHD (2015), reported that "*overall, there is no evidence of impact to groundwater quality from the historical refining operations to the areas down hydraulic gradient*".

3.4.4 Hydrogeology at the Containment Cell Works Area

In order to determine baseline groundwater quality at the containment cell works area, two groundwater monitoring bores were installed AECOMMW1 and AECOMMW2. Monitoring at these bores was undertaken and identified that groundwater sampled from these wells did not show hydrocarbon impacts that exceeded ecological or groundwater health screening levels (ASC NEPM, 2013). Hydrocarbon detections were present but resulting concentrations were more than one magnitude of order below the criteria (AECOM, 2016c). Both wells showed exceedances of the marine and fresh water guidelines for chromium and zinc which is consistent with wells in the surrounding region based on the Annual Groundwater Monitoring Event report by Coffey (2015) where wells PMW01 and PMW10 exhibited exceedances of zinc and PMW04 exhibited exceedances of chromium.

Groundwater for the wells south of the containment cell works area was inferred to flow in a westerly direction as these wells are located south of the onsite interpreted groundwater divide (Caltex, 2014). The location of AECOMMW1 and AECOMMW2 are north of the onsite interpreted groundwater divide (Caltex, 2014), and the likely flow from this area is towards the north-west. As part of the remediation works, AECOMMW1and AECOMMW2 will be decommissioned and replaced with two additional groundwater monitoring bores at the north and west of the containment cell. Environmental monitoring is discussed in **Section 8.0**.

3.5 Previous Site Investigations

3.5.1 Reports Reviewed

The following reports, presented in chronological order, were reviewed as part of the preparation of this RAP. A summary of the key findings of onsite historical investigations is provided throughout this plan.

- AECOM, 2013. *Caltex Kurnell (535) Pipeways Contamination Assessment / Characterisation - Stage 2 Report*
- AECOM, 2016. *The Kurnell Pipeways Asbestos Classification Report*
- AECOM, 2016. *Kurnell ACS Management – Options Report*
- AECOM, 2016. *Kurnell Terminal Geotechnical / ESA*
- AECOM 2016. *Containment Cell Concept Design*
- Coffey (2003) Voluntary Investigation Final Report
- Coffey (2007). *Soil and Groundwater Contamination Assessment, Classification and Risk Ranking Report*
- Coffey, 2015. *Annual Groundwater Monitoring Event report*
- Coffey, 2015. *Caltex Refineries (NSW) Pty Ltd: Bi-annual Groundwater Monitoring Report, Caltex Refinery Process Plant Kurnell NSW*
- Coffey, 2015. *Caltex Refineries (NSW) Pty Ltd: Spent Phosphoric Acid Limestone Pits, Groundwater and Surface Water Assessment*
- Caltex, 2013. *Caltex Refinery Kurnell Contamination Data Gap Assessment*
- Caltex, 2014. *Caltex Refinery Kurnell Preliminary Investigation Order 20131001 April*
- URS, 2013. *Kurnell Refinery Conversion Environmental Impact Statement*
- URS, 2014. *Kurnell Refinery Demolition, Statement of Environmental Effects*
- URS, 2015. *Caltex Soil Remediation Facility, Environmental Impact Statement*

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4.0 Environmental Site Status

4.1 Contaminants of Potential Concern (COPC)

As discussed in Section 1.1, a variety of COPCs were identified in pipeways; however, the scope of this RAP is limited to remediation of ACS. Other COPCs will be addressed separately.

4.2 Nature and Extent of Contamination in the Pipeways

The following provides a summary of the current understanding of the Site in regards to ACS within the pipeways. Additional information is provided on other contamination in soil and groundwater at the Site in **Section 4.2.2**.

4.2.1 Asbestos Contaminated Soil in the Pipeways

In 2013, AECOM undertook a contamination and characterisation assessment of the pipeways which provided preliminary estimates of the quantity of ACS. In 2016 and 2017, AECOM undertook detailed characterisation of the pipeways asbestos impact, classifying insitu the waste as General Solid Waste (GSW) – Special Waste, Restricted Solid Waste (RSW) – Special Waste and Hazardous Solid Waste (HSW) – Special Waste, or just GSW, RSW or HSW if no asbestos was detected (**Appendix A – Figure F2**). The assessment divided the pipeways into areas of asbestos and non-asbestos waste under GSW, RSW or HSW categories. The following table displays the volume and extent of ACS within the pipeways and the attached Figure (**Appendix A - Figure F2**) showing the extent throughout the pipeways.

Table 3 Volume Estimates of Asbestos and Non Asbestos Classified Material

Soil Category		Area (m^2)	Volume[1] (m^3)
1.	Remain in-situ (asbestos not detected)	36,642	7,330
2.	On-site asbestos containment cell [Special Waste (Asbestos) - General Solid Waste (GSW) or Restricted Waste (RSW)]	48,380	10,500
3.	On-site asbestos containment cell [Special Waste (Asbestos) - Hazardous Waste]	11,365	2,275
Total volume for containment cell (2+3)		**59,745**	**12,775**

1 Bank Cubic Meters (BCM) have been provided to measure the volume of material in the ground prior to excavation

The above volumes were calculated on 57 primary samples collected across the pipeways in 2013 and 47 primary samples collected across the pipeways in 2016 totalling 104 samples at an approximate density of 1 sample per 25 m length of investigation area. A summary of the historical results is presented in **Table 4** below.

Table 4 Historical Asbestos Results

Area	Samples 2013	Results 2013	Samples 2016	Results 2016
A	A001 to A019, soil samples collected at depths of 0.0-0.2 m below ground surface (bgs) and 0.4 to 0.5 m bgs.	Asbestos was detected in 10 out of 28 samples and exceeded the ASC NEPM (2013) health screening level (HSL) for commercial / industrial land use (HSL D) of 0.001% w/w of FA/AF in 8 of the 28 samples.	A020, A003.5 and A005.5 to A008.5, and A013.5 to A014.5 soil samples collected at depths of 0.0 – 0.2 m bgs and 0.4 – 0.5 m bgs.	Asbestos was detected in 4 of the 9 samples and exceeded the ASC NEPM (2013) health screening level (HSL) for commercial/industrial land use (HSL D) of 0.001% w/w of FA/AF in 2 of the 4 quantification samples

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Area	Samples 2013	Results 2013	Samples 2016	Results 2016
B	B001 to B030, soil samples collected at depths of 0.0-0.2 metres below ground surface (m bgs) and 0.4 to 0.5 m bgs.	Asbestos was detected in 11 out of 33 samples and exceeded the ASC NEPM (2013) health screening level (HSL) for commercial / industrial land use (HSL D) of 0.001% w/w of FA/AF in 8 of the 28 samples.	B031 to B036, B043 to B052B001, B003.5, B007.5, B009.5 to B010.5, B012.5 and B016.5 soil samples collected at depths of 0.0-0.2 metres below ground surface (m bgs) and 0.4 to 0.5 m bgs.	Asbestos was detected in 9 of the 34 samples and exceeded the ASC NEPM (2013) health screening level (HSL) for commercial/industrial land use (HSL D) of 0.001% w/w of FA/AF in 2 of the 9 quantification samples
C	C003 to C010, soils samples collected at depths of 0.0-0.2 m bgs and in some locations depths between 0.4 to 2.0 m bgs.	Asbestos was detected and exceeded the ASC NEPM (2013) health screening level (HSL) for commercial / industrial land use (HSL D) of 0.001% w/w in 1 out of 23 samples.	C011 to C013 soils samples collected at depths of 0.0-0.2 m bgs	No asbestos was detected in the samples collected.

4.2.2 Other Contaminants of Potential Concern in the Pipeways

Aside from the asbestos present within the soil of the pipeways, other contaminants detected within the pipeways include TRHs, BTEXN, metals and benzo(a)pyrene. The AECOM report "*Kurnell Pipeways Asbestos Waste Classification Report*" (AECOM, 2017) details concentrations of the above contaminants in Tables 2a and 2b of that report. Based on the concentrations encountered, exceedances of the NEPM HSLs for vapour intrusion are present within the soils of the pipeways, however this RAP details only the remediation of ACS. The containment cell would be consented under SSD 5544 MOD 2 to take the ACS from the pipeways which may be contaminated with other COPCs.

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5.0 Remediation Strategy

5.1 Objective

Based on the presence of asbestos, Caltex require an Exemption Order under Section 419 of the WH&S Regulation 2011 in order to complete activities within the pipeways including conversion and demolition activities, routine maintenance, sampling, valve operations, weed removal etc. where there is known asbestos contamination of the sand and soil. Further, Caltex staff and contractors require special processes and equipment in order to work in these areas. This ongoing maintenance and operation work is required to maintain the safety of the Site, its employees and the local community.

The objective of the proposed remediation works is to remove the potential human health risk posed by asbestos and remove the current SafeWork Exemption Order.

The Containment Cell Management Plan (AECOM, 2017b) provides a detailed description of the process for construction and closure of the containment cell, including environmental management controls. These controls have been summarised in the RAP.

5.2 Asbestos Containing Soil (ACS) Management Options Assessment

A multi-criteria analysis (AECOM, 2016c) was conducted to evaluate options to manage the ASC found in the pipeways. The multi-criteria analysis identified containment on-site as the preferred long term option for management of the ACS. The findings of the multi-criteria analysis for each option are discussed below.

5.2.1 Evaluation of Soil Remediation Options

ACS may be managed in situ in two ways, continuation of operation under the Exemption Order (005/2013), or covering the pipeways with a suitable barrier to minimise exposure risk. Neither of these options is considered appropriate as an ongoing management option for the Site.

Continuing to operate under the Exemption Order would not resolve the existing hygiene risk and operational constraints posed by the ACSs and Safe Work NSW do not consider it as a permanent option for management of the asbestos hazard. As such this option does not meet the project objective and is therefore discounted.

Covering of the pipeways with a suitable barrier would mean that the ACSs remain in situ but would still be located across the Site. The pipeways act as spoon drains for the Site. Therefore concrete spoon drains would need to be constructed over the existing pipeways. In terms of complexity the necessary civil works would be minor. This approach gives the perception of a low health and safety risk to workers and the community, however in order to maintain the function of the pipeways as drainage lines, the pipeways would require grading potentially exposing workers to airborne asbestos. Covering the ground may impact existing pipework in the pipeways, as a result of surface level changes as additional material would have to be removed and/or added to achieve the correct levels. Alternatively the pipes may have to be relaid at a different height to allow the barrier layer to be installed to contain the ACS. A large number of truck movements would also be required to bring the concrete and other materials to Site. Covering the pipeways would require ongoing monitoring of a large area of the Site, and would create a potential barrier for other works. Covering the pipeways may also reduce the capacity of the pipeways to store water during wet periods and therefore impact the overall stormwater management of the Site. As a result, secondary engineering works may be required. The potential additional costs and operational constraints that could result from this option mean that it does not effectively meet the project objective and is therefore discounted.

5.2.2 Removal of Contaminated Material from the Site

Disposal off-site would require engagement of a suitably licensed waste contractor for excavation, transport and disposal off-site to a licensed landfill.

Due to the large volume of ACS, approximately 820 trucks (1,640 truck movements) are required for off-site disposal, based on 30 tonne loads. Transport of ACS off-site poses a potential off-site health and safety risk due to the risk of a vehicle accident. Given the number of truckloads required to

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transport waste off-site, noise, traffic and greenhouse gas impacts may be expected as a result of increased traffic on local roads.

In addition the cost associated with transportation of ACS from the pipeways off-site to licensed facility is considerable. As such Caltex does not consider this an acceptable solution for an operating facility that is looking to minimise risk and ensure viability of the operation of the terminal. Therefore this option is not a viable management option for the ACS.

5.2.3 Containment On-site

ACS would be excavated from the pipeways, and placed in a designated containment cell. Given the characteristics of the soils to be excavated, the containment cell would be designed in general accordance with the requirements of a restricted solid waste landfill, as per the N*SW EPA Environmental Guidelines: Solid Waste Landfills, second edition 2016* (the Landfill Guidelines).

Removal of ACS from the pipeways and placement within an on-site containment cell would ultimately remove the following:

- the potential health risks associated with the presence of ACS;
- the operational constraints regarding the working in the pipeways; and
- the additional costs associated with the ongoing operation of works within the pipeways.

Containing the ACS in a cell on Site would remove the risks associated with transporting a large volume of this material across metropolitan Sydney. Equally, it would remove the need to introduce approximately 1,640 truck movements (820 truck and dogs carrying 24,500 t of soil) on to the road network, with the associate traffic effects.

As noted above the Site is at the heart of Caltex's operation in NSW and the ACT and is its only import location for these markets. The Site continues to be managed and is staffed by up to 150 people on a daily basis. If constructed, the cell would be managed as part of the wider operation at the Site and would not be abandoned.

Therefore, the placement of ACS in an on-site containment cell was considered the best option for ensuring a viable, safe, reliable and sustainable finished product import terminal at Kurnell.

5.2.4 Selected Approach

Placement of ACS in an on-site containment cell would eliminate ongoing operational costs of working within the pipeways under the Exemption Order, and would minimise short term costs of off-site disposal, ensuring the ongoing commercial viability of the terminal, whilst also removing potential risks to the operations at the Site, the terminal workers and the local community.

5.3 Proposed Remediation Methodology

The remediation works as outlined in the multi-criteria analysis (AECOM, 2016c) would broadly involve the following activities:

Construction:

- Construction of the containment cell base and leachate collection system in the proposed cell location;
- Installation of ground water monitoring wells down gradient of the proposed cell location;
- Excavation and transportation of ACSs that have been classified as general, restricted or hazardous solid waste directly to the containment cell location for emplacement;
- Filling and compaction of the ACSs into the containment cell;
- Environmental management of the containment cell;
- Verifying the removal of ACS from the pipeways; and
- Closure of the containment cell.

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It is proposed that the containment cell would predominantly be used to dispose of ACSs from the pipeways in order to remove the hygiene risk and remove the WHS Regulation Exemption. However, Caltex may also dispose of ACSs from other parts of the Site if there is available capacity following disposal of the pipeway ACSs. These ACSs would need to be classified as Special General Solid Waste or Special Restricted Solid Waste. All soils that would be placed within the containment cell would only be sourced from the Site. No material from off site would be accepted in the containment cell.

Detailed design drawings for the containment cell are provided in the Containment Cell Detailed Design Report (AECOM, 2017a).

5.3.1 Cell Design and Capacity

The containment cell has been designed to create a maximum airspace capacity for up to 24,500 tonnes of ACS.

The NSW EPA, in their letter dated 16 May 2017 to DPE indicated their preferred approach to managing all ACS from the pipeways is to place the material within the containment cell. This includes ACS classified as special hazardous waste, without the need for pre-treatment. [Insert reference to MOD2 approval condition number, for acceptance of hazardous soils in containment cell] The concept design of the containment cell is suitable for the placement of all excavated ACS material from the pipeways including soil classified as hazardous due to the elevated hydrocarbon concentrations.

5.4 Construction

5.4.1 Cell Construction

The containment cell would be constructed in general accordance with the Landfill Guidelines and in the following manner:

- Minor excavation in the existing ground surface for sump bases. Sump bases would be designed to be depressed to create a storage volume to minimise continuous pumping of leachate and/or inundation of large areas of the liner with leachate. The sump base is depressed approximately 500 mm into the existing surface in the area of the two sumps.
- Placement of sub-base fill to mirror the top of the liner. Liner surface grades would be designed in accordance with the Landfill Guidelines.
- Installation of the lining system, including leachate collection layer, to extend for the full extent of the footprint area to the top of the surrounding bunds.
- The leachate barrier system would be a dual barrier system for containment of Restricted Solid Waste.
- Installation of a leachate storage tank within bund for tank 226.

The approximate extent of the containment cell is 80 metres in the east-west direction and 114 metres north-south.

The construction of the Containment Cell will be undertaken in accordance with the Construction Quality Assurance (CQA) Plan (AECOM, 2017c).

5.4.2 Excavation and Transport of ACSs

ACS from within the pipeways would be excavated by a licenced contractor. ACS would be excavated into a truck and dog and transported to the containment cell. ACS would be progressively excavated to align with the filling rate of the containment cell to minimise stockpiling.

A water truck would be used to wet down areas during excavation to minimise dust emissions. In the event that stockpiling is required, stockpiled soils would be wetted down to minimise dust emissions, placed on impermeable sheeting and covered, if being left overnight or unattended.

Following excavation, validation of the excavated areas would be undertaken to certify that asbestos is no longer present (refer to **Section 6.0** for further detail). Where required, the pipeways would be graded and backfilled with an appropriate material to protect against erosion.

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5.4.3 Cell Filling and Temporary Management

ACS would be transported from the pipeways via truck. These soils would then be placed in the containment cell at the same rate as the ACSs are excavated from the pipeways. Once soils are placed into the cell a dozer and compactor would be used to fill in the cell in the appropriate sequence and grade.

It is proposed to use spray cover which would be placed immediately over the ACS after it is placed in the containment cell to contain dust. The final cover selected would achieve similar or better outcomes as covering by soil, namely:

- Minimise generation of dust.
- Limit rainfall infiltration into the waste material.

The cover would be applied following the placement of asbestos contaminated soils within the containment cell, and at the end of each day.

The containment cell is located within a bunded area. During filling of the containment cell stormwater from within the bunded area would be treated as leachate and directed to the Site's WWTP via the OWSS. Stormwater outside of the containment cell area would continue to be managed in accordance with the existing processes at the Site.

5.4.4 Cell Closure

The containment cell capping layer would be designed to meet the minimum requirements of the Landfill Guidelines. At the completion of the filling the final cap would be installed and meet the following requirements:

- The top of the cap would meet the outer crest of the surrounding bunds except for the eastern side.
- The existing eastern bund would be removed to allow surface water flows from the final cap to drain to the Site's stormwater drainage system.
- The final height of the cap would be determined during waste placement and would be dependent on the final volume of waste generated from the ACS excavation works.
- To facilitate runoff and minimise ponding of water, the cap would have a gradient of greater than 5% to defined drainage points. However, to reduce the risk of erosion, the cap has been restricted to a gradient of ≤20%.
- The cell would be revegetated as soon as practicable following civil works with native grasses.

The Landfill Guidelines and *POEO (Waste) Regulations* require 3 m of VENM cover over asbestos contaminated waste however they do not require a geosynthetic liner in the cap. The proposed cap design, as described above, includes 1.6 m of soil and aggregate layers and two layers of geosynthetic including a Geosynthetic Clay Liner (GCL) and an High Density Polyethylene (HDPE) liner. The 3 m of VENM over asbestos containing waste is prescribed in the Waste Regulations to ensure no friable particles are released from waste. The 1.6 m of soil and aggregate and the two layers of geosynthetic are considered an appropriate alternative to 3 m of VENM to contain asbestos fragments. In addition a marker layer would be included as a separation geotextile to reduce the risk of the cap being removed.

The closure of the Containment Cell will be undertaken in accordance with the Construction Quality Assurance (CQA) Plan (AECOM, 2017c).

The proposed cell cap and cell liner are presented in **Figure 2** and **Figure 3** respectively below.

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Figure 2 Containment Cell Cap

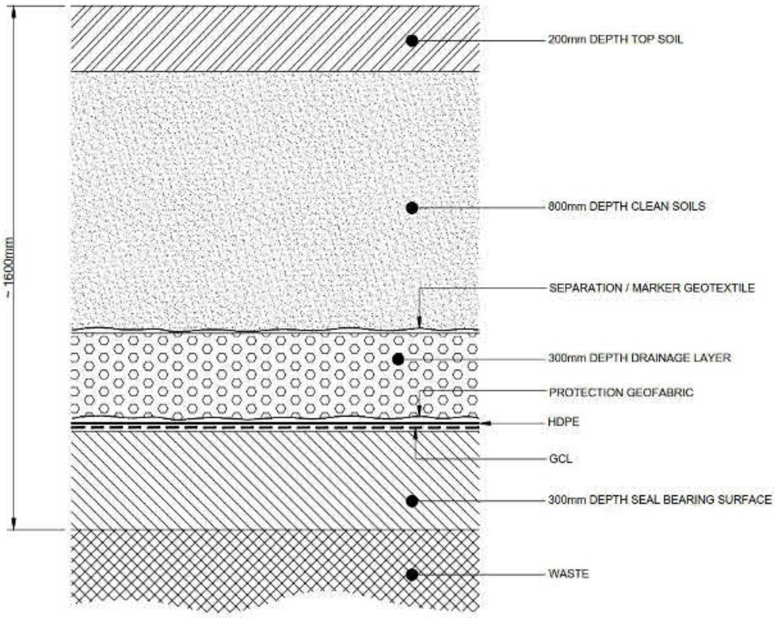
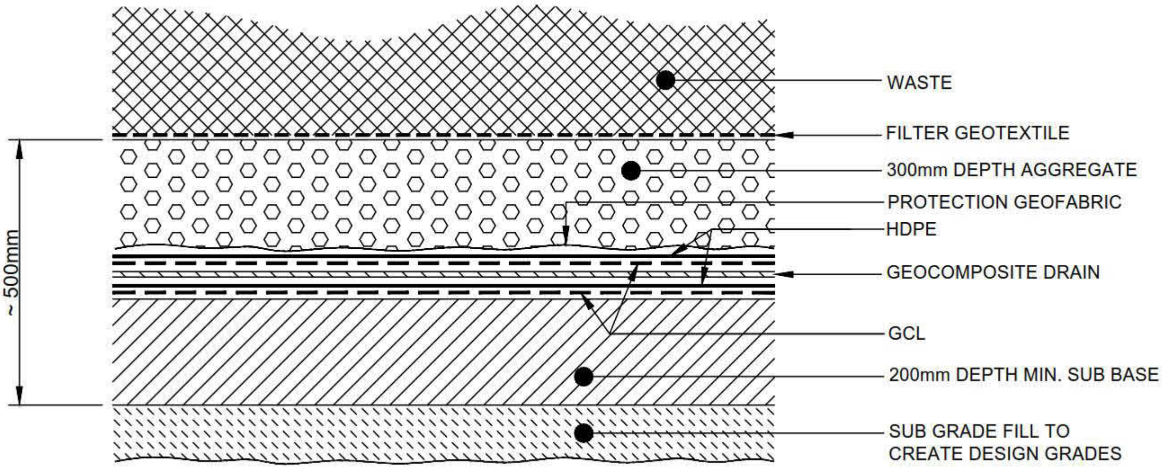


Figure 3 Containment Cell Liner



Following closure, the long term management of the containment cell would be managed in line with the Long Term Environmental Management Plan (refer to Section 8.6) which would be incorporated into the Site's Operational Environmental Management Plan (OEMP).

5.5 Excavation

The schedule for excavation of soils will be staged in order to allow more highly impacted soils (with other COPC) to be placed into isolated areas within the containment cell. As such, soils classified as hazardous (as shown in **Figure 1**) will have a minimum cover of at least 500 mm plus the surface cap.

The approximate extent of the remediation will be the width of the pipeways, which is approximately 10 m wide to a depth of 0.2 m, except for 3 locations where it will be 0.5 m depth.

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5.6 Remediation Schedule

The remediation works would be undertaken over an 18 month period starting in 2017.

Table 5 Proposed Works Schedule (Dates TBC following approval date)

Task	Timing
Containment Cell Construction	6 months
Excavation of ACS (general and restricted solid waste) from Pipeways	6 months
Filling of Containment Cell with ACS	
Closure of Containment Cell	6 months

5.7 Remediation Contingency Options

Table 6 Remedial Contingency Options

Scenario	Remedial Contingencies / Actions Required
Additional capacity is available in the containment cell following removal of the ACS from the pipeways	A 40% contingency which allows for sensitivity in soil density and potential use of daily cover soils during waste placement has been incorporated into the design of the cell. Should additional capacity in the cell be available following removal of the ACS from the pipeways, this would be filled with ACS from other parts of the Site. Once the cell is filled and capped, if additional ACSs are identified on-site these would excavated and disposed off-site to an appropriately licensed facility.
Excessive vapours emanating from excavated and stockpiled soil or excavation pits.	Work should be suspended and the environmental consultant should instruct on how best to proceed regarding safe management of contaminant vapours to address potential risks posed to onsite occupants. Once the assessment is completed, a decision on any changes to the remediation approach should be agreed with the appropriate parties prior to implementation.

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6.0 Validation Strategy

6.1 Validation Criteria for asbestos

AECOM have adopted the guidelines outlined in the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (DOH, 2009) which is also incorporated into the *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended on 16 May 2013 (ASC NEPM, 2013). The validation limit for asbestos is set as 0.001% weight for weight (w/w) asbestos, which is protective of all site uses for asbestos fines and friable asbestos. In addition, AECOM will adopt the guidance that the top 10 cm of soil should be free of visible asbestos as an additional marker for the validation of asbestos removal.

6.2 Data Quality Objectives (DQOs)

As stated in **Appendix B** of Schedule B *Guidelines on Site Characterisation* (ASC NEPM 2013), the Data Quality Objectives (DQO) process is used to "*define the type, quantity, and quality of data needed to support decisions relating to the environmental condition of a site*". The seven-step DQO process that will be adopted for the proposed removal of ACS is outlined in **Table 7**.

Table 7 Data Quality Objectives

DQO Steps	Details of DQO Process
1. State the Problem	Certain pipes within the Site contained friable asbestos lagging and gaskets. This asbestos contaminated the underlying soils and as such these soils require removal. It is proposed to excavate the ACS and place it in an on-site containment cell.
2. Identify the Goals (decisions)of the Organisation	The decisions to be made, to meet the remediation objectives are as follows: 1. Has adequate characterisation of the pipe ways regarding asbestos contamination been completed? 2. Is the containment cell large enough for the amount of ACS identified to be removed? 3. Is the remedial approach scientifically suitable and defensible? 4. Has the remediation work been carried out in accordance with this RAP? 5. Does the validation criteria meet the objectives of the work? 6. Was the validation data set sufficient to successfully meet the objectives of the work?
3. Identify the information inputs	The inputs required to make the above decisions listed in Step 2 are as follows: · Existing Site data (from previous investigations); · Proposed land uses and Site boundaries; · Appropriate NSW EPA endorsed and guideline documents; · Appropriately experienced environmental consultants; · Geological data and information relevant to subsurface structures; · Hydrogeological data; · Observations regarding the presence asbestos; · Distribution of identified contamination both laterally and vertically; · Plans showing the location of underground services and known, present subsurface infrastructure; and · Quality Assurance and Quality Control (QA/QC) data.

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DQO Steps	Details of DQO Process
4. Define the Study Boundaries	The boundaries of the investigation have been identified as follows: · Spatial boundaries – The lateral boundary of the remediation area is limited to the Site boundary shown on **Figure F2 (Appendix A)**. The vertical boundary for soil excavation will be to approximately 0.3 m and 0.5 m in selected locations where deeper asbestos has been identified; and · Temporal boundaries – data collected from previous soil investigations undertaken in 2013 and 2016 by AECOM. Future data sets from the works proposed herein will also be considered.
5. Develop a Decision Rule	The remedial and investigation activities described by the RAP will be considered a success if. 1. It is established that all visible asbestos and concentrations greater than 0.001% w/w in the soil are removed from the pipeways through validation sampling. 2. The exemption order for the pipeways is removed
6. Specify performance or acceptance criteria that the data need to achieve	Acceptable limits on decision errors and the manner of addressing possible decision errors developed based on the Data Quality Indicators (DQIs) of sensitivity, precision, accuracy, representativeness, comparability and completeness (SPARCC). The tolerable limits on decision errors for data are that AECOM considers acceptable are: · Probability that 95% of data satisfied the DQIs, therefore the limit on the decision error was 5% that a conclusive statement may be incorrect; · In applying statistical analysis of a data set (where appropriate): - No individual sample will report a concentration that exceeds 250% of Site assessment criteria; - A normal distribution will only be used if the coefficient of variance is not greater than 1.2; - The standard deviation of a sample population will not exceed 50% of the Site assessment criteria; and · A robust quality assurance and quality control (QA / QC) program for soil will be designed and implemented. The possible outcomes on making an error in the decision are: · Basing decisions on unreliable data and consequently making incorrect decisions; and · Basing decisions on unreliable data and inappropriately recommending the need for further remediation. Relevant performance and/or acceptance criteria will be determined for QA/QC purposes and comparison of soil analytical results to appropriate assessment criteria. The Data Quality Indicators (DQIs) are described in **Section 6.5** and the adopted validation criteria are described in **Section 6.0**.
7. Optimise the Design	Based on the previous Steps 1 to 6 of the DQO process, the design (i.e scope of works or sample and analysis quality plan) for obtaining the required data (i.e. proposed field and laboratory programs) is presented below in **Section 6.3.**

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6.3 Soil Sampling Methodology

The general methodology for soil sampling required during pipeways excavation works is presented in **Table 8**. Soil sampling should be undertaken by an appropriately qualified and experienced field scientist wearing appropriate PPE for working with asbestos.

Table 8 Soil Field Sampling Methodology

Task	Description
Soil Sample Collection	· Guidance from the DOH document advises that samples should be collected from each wall of the excavation per 5 m length of strata or per 1 m depth. · Given the size and length of the removal works AECOM propose sampling along the removal areas at 20 m intervals based on the basis that a large data set will be collected and the entire length of the excavation areas will be visually inspected thoroughly by licensed removal contractors. · Samples will be collected via grab sampling from hand auger following the visual removal inspection. Soil will be collected directly from the hand auger for each sampling interval and for quantification sieved with a mesh size of <7 mm before being placed into a 500 ml plastic ziplock bag. For asbestos absence / presence a smaller ziplock bag will be used. Discretionary samples will also be taken if the sampler suspects there may be asbestos present.
Soil Sample Labelling, Storage and Transport	· Soil samples will be labelled numerically and remain consistent with previous investigation labelling systems · Once samples are collected they will be stored in rigid storage containers and transported to the laboratory via courier for analysis.
Field logging	· Soil logging will be undertaken in general accordance with the Unified Soil Classification System and the AECOM documented standard field procedures. Samples will be logged and information recorded in the field (e.g. soil type, colour, grain size, inclusions, moisture conditions, staining and odour etc.).
Decontamination	· The hand auger will be cleaned between boreholes by brushing off excess soil and washing. Two rinsate samples will be collected: one from the decontaminated hand auger and one from a clean nitrile glove.

6.4 Pipeways Validation Works

The table below outlines the approximate number of validation samples to be taken from each area of the pipeways based on collecting samples every 20 m. Area C did not have any asbestos found deeper than 0.2 m and thus there is no deeper samples anticipated for that area.

Table 9 Approximate sample number and analyses

Area	Sample Depth	Number of samples for asbestos presence / absence	Number of samples for asbestos quantification
Area A	0-0.2 m	26	8
Area A	0.5-0.6 m	6	1
Area B	0-0.2 m	79	24
Area B	0.5-0.6 m	8	2
Area C	0-0.2 m	8	2
Totals	0-0.2	**113**	**34**
	0.5-0.6	**14**	**3**

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6.4.1 Confirmation of ACS Removal

- Soil that has been classified in situ as GSW, RSW or HSW – Special Waste will be removed from the pipeways and placed into the designed containment cell.
- A visual inspection by licenced removal contractors to remove any remaining visible fragments within the top 10 cm of soil will be undertaken following the initial removal of affected soil.
- If visible fragments are observed the nearby area will be excavated a further 20 cm deeper (if possible) followed by another visual inspection.
- Validation sampling will be undertaken following the visible inspection, with 1 sample collected every 20 m along the pipeways in areas identified as containing asbestos. At locations where removal has been undertaken to 0.5 m depth, samples will also be collected on each side wall to validate the extent at depth.
- The primary method for validating friable asbestos is sampling for presence/absence. Samples will be collected for presence / absence and quantification purposes.
- To supplement the friable asbestos sampling, quantification sampling will be undertaken to identify whether bonded asbestos is present (at a lower sampling frequency e.g. 30% of the total sample locations).
- An independent hygienist will then certify the area clear of asbestos and issue a clearance certificate.
- Once a clearance certificate is supplied and asbestos analytical sampling returns no asbestos presence or a concentration less than 0.001 % w/w then the area will be considered validated. Asbestos quantification sampling frequency will be approximately 30% of the number of samples collected for presence / absence which is considered the most appropriate method to identify potential bonded presence of asbestos and is consistent with the frequency used during the characterisation investigations.

6.4.2 Validation of ex-Situ Soils

At this time, it is understood that excavated soils will be disposed of in an onsite containment cell. The soils from the pipeways have been classified in-situ therefore no additional validation of ex-situ soils will be undertaken.

6.4.3 Characterisation of Imported Material

If imported materials are brought to the Site for the purpose of re-grading the pipeways as drainage lines, imported materials will be virgin excavated natural material (VENM). VENM refers to natural material (e.g. clay, gravel, sand, soil or rock fines):

- That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities
- That does not contain sulfidic ores or soils, or any other waste.

Visual inspection of imported fill should take place at the source location or at another offsite storage area (where possible) before importing fill materials directly to Site prior to verification sampling. Material should also be inspected as it comes onto Site to make sure it is the same material and no evidence of visual contamination. If VENM certification is not provided, the sampling and analysis requirements of any imported material are provided in **Table 10**.

Table 10 Validation of Imported Fill

Item	Description
Sample Collection	Samples collected using a trowel
Field Screening	Use a calibrated photoionisation detector (PID).
Rate / Frequency	1 sample per 100 m^3

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Item	Description
Analytical Suite	· Heavy metals (Cu, Cr, As, Pb, Ni, Zn, Hg and Cd); · TPH, BTEXN, VOC, PAH, OCP/OPP, herbicides and OPP; and · Asbestos.
Performance Criteria	Certified Virgin Excavated Natural Material (VENM)

6.5 Quality Assurance and Quality Control Programme

A quality assurance/quality control (QA/QC) program has been developed intended to ensure that data collected is sufficiently accurate, precise and reproducible to be used for the purposes of the validation works. All stages of the remedial works (data gathering, sample handling, laboratory analysis etc.) will be conducted in accordance with the QA/QC program outlined in the following sections.

The objective of the QA/QC program is to provide an assessment of the reliability of the data presented for interpretation for the project in terms of DQOs required for the works.

The project data quality indicators (DQIs) have been established to set acceptance limits on field and laboratory data collected as part of the remediation programme. For both field and laboratory procedures acceptance limits are set at different levels for different projects and by the laboratories. The DQIs for this RAP are presented in **Table 11**.

Table 11 Summary of Data Quality Indicators

DQI	Field	Laboratory	Acceptability Limits
Completeness	· All critical locations sampled · All samples collected · Standard Operating Procedures (SOPs) appropriate and complied with · Experienced sampler · Documentation correct	· All critical samples analysed and for all COPCs · Appropriate methods implemented · Appropriate Laboratory limits of reporting · Sample documentation complete · Sample holding times complied	· As per ASC NEPM (2013) · < nominated RAC · As per ASC NEPM (2013)
Comparability	· Sample SOPs used on each occasion · Experienced sampler · Climatic conditions	· Same analytical methods used (including clean-up) · Sample LORs (justify/quantify if different) · Same laboratories (NATA accredited) · Consistent reported units of measurement	· As per ASC NEPM (2013) · < nominated RAC
Representativeness	· Appropriate media sampled (soil)	· All critical samples analysed and for all COPCs as required for the project objectives.	· Appropriately selected samples analysed

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DQI	Field	Laboratory	Acceptability Limits
Precision	· SOPs appropriate and complied with	· Internal Lab QC measures for asbestos analysis are complied with	· Verification of correct procedures applied
Accuracy	· SOPs appropriate and complied with	· Compliance with internal lab QC measures	· Verification of correct procedures applied

RAC = Remediation Acceptance Criteria

Table 12 below provides additional information on specific requirements of the QA/QC programmed.

Table 12 Details of QA/QC Requirements

Item	Description
Sample Collection, Handling and Preservation	Soil samples will be collected in 500 ml laboratory supplied plastic bags and glass jars for presence / absence. Sample numbers, dates, preservation and analytical requirements will be recorded on Chain of Custody (COC) documentation, which will also be delivered to the analytical laboratories.
Chain of Custody Protocols	CoC records shall include the following information: · Project number. · Name(s) of sampler. · Time and date of collection. · Depth of sample (for soils). · Number and type of containers. · Sample type and identification. · Receiving analytical laboratory. · Required analyses. · Preservatives used. · Names and signatures documenting relinquishment of the samples to the laboratory. · Courier. · Change of sample custody. · Consultant. CoC records will accompany samples at all times once the samples are collected. When transferring possession of the samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of transfer on the CoC record. The environmental consultant, prior to dispatch to the laboratory, will review all CoCs. The laboratory will be contacted to return (by email) appropriately signed CoC records to confirm sample delivery.
Calibration	Onsite screening of samples for VOCs in the field will be undertaken using a portable PID equipped with a 10.6 eV lamp. The PID will be calibrated at least once daily (at the start of each sampling day) with 100 ppm isobutylene.

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Item	Description
Laboratory Data Quality Objectives	Listed below is the predetermined laboratory DQOs defined for the assessment of the laboratory analytical data: · maximum acceptable sample holding time is 14 days for organic analyses and six months for metals · samples to be appropriately preserved and handled · laboratory LOR to be less than the adopted assessment criteria.
Corrective Actions	Analytical data that fail to meet the predetermined data quality objectives and acceptable limits of accuracy and precision will be managed using the following corrective actions on a case-by-case basis: · reanalyse suspect samples, provided sample or extract is within holding time · evaluate and amend sampling and/or analytical procedures · resampling and reanalysis · accept the data as an estimate with an acknowledged level of bias and imprecision · discard the data. · In the event that data of questionable reliability are used, restrictions and limitations associated with the use of such data will be clearly identified. Failure to meet the DQOs will be reported and the significance to the outcome of the program will be addressed.

6.6 Reporting

The following reports, as outlined in **Table 13** are anticipated as being required to document the works proposed above and to meet the remediation objectives.

Table 13 Reporting Requirements

Task	Description
Asbestos Removal to containment cell	· Validation Report documenting the removal process and the validation procedure.

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7.0 Site Management during Works

This section details the requirements to control potential risk to Occupational Health and Safety during the remediation works.

Works as defined under the *Work Health and Safety Regulation 2011* will be undertaken by licensed experts.

7.1 Regulatory Guidance

The *Caltex Operational Excellence and Risk Guidance Document: Management of Asbestos, Asbestos Containing Materials and Synthetic Mineral Fibres Hazardous Materials Management Plan (Doc Number: HM001, Version: 1.3)* (the *Asbestos Management Plan*) will be implemented for the remediation works.

To ensure the appropriate management of asbestos is conducted the following guidelines are referenced and should be reviewed prior to implementation of impacted soil removal:

- Guidelines for the Assessment, Remediation and Management of Asbestos -Contaminated Sites in Western Australia - May 2009.
- Working with Asbestos Guidelines 2008, WorkCover NSW.
- How to Safely Remove Asbestos Code of Practice (Safe Work Australia 2011b).
- Code of Practice for the Safe Removal of Asbestos 2nd Edition (NOHSC: 2002 (2005).
- The National Model Work Health and Safety Regulations Safe Work Australia.

The following information is presented to manage asbestos impacts identified onsite. An **Asbestos Removal Control Plan** will be prepared by the licenced asbestos removal contractor (Giovenco) prior to remediation works commencing. The Asbestos Removal Control Plan will be prepared in accordance with the Safe Work Australia code of practice ‘How to Safely Remove Asbestos’. The Asbestos Removal Control Plan should be read in conjunction with the RAP, and the RAP updated as necessary.

7.2 Conditions of the RAP

7.2.1 Hours of Operation

The following details provide typical hours of operation for the remediation works. The hours may change dependant on the conditions of consent for SSD 5544 MOD2.

The working hours would be in line with the Conditions of Consent for SSD 5544 and SSD 5544 MOD1, in particular Conditions C18 and C19. In summary:

- Construction to be completed between 7.00 am and 10.00 pm seven days a week (Condition C18).
- High noise generating works would be confined to less sensitive times of the day, and shall not be undertaken on Sundays or public holidays or outside the hours of 7.00 am to 6.00 pm Monday to Saturday (Condition C19).

High noise generating works are not expected.

7.2.2 Site Communications

Details of the onsite communication numbers for key personnel for the Site are listed as follows ***(details will be updated following development consent and appointment of the contractor)***:

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Table 14 Key contacts and Community relations (TBC)

Incident	Company Name / Location	Contact Number
Caltex Demolition Works Manager	The property owner or developer details	Business Hours: After Hours:
Site Manager	Contractor managing the works.	Business Hours: After Hours:
Site Contractor/Foreman	Onsite Offsite	Business Hours: After Hours:
Asbestos Contractor	Onsite Offsite	Business Hours: After Hours:
Site Health Safety and Environment Officer	Onsite Offsite	Business Hours: After Hours:
Caltex Occupational Health & Hygiene Specialist	Onsite Offsite	Business Hours: After Hours:

7.2.3 Community Consultation

Consultation undertaken by Caltex is detailed in the Demolition Environmental Management Plan (DEMP). The DEMP identifies a number of processes for consultation with the community including regular community meetings (quarterly), the use of the 24 Hour Community Concerns Hotline and providing further information to the community via letter drops.

A complaints register is maintained onsite and would be maintained and managed in line with the existing feedback process at the Site during the remediation works.

7.3 Emergency Procedures

A comprehensive Emergency Management System is currently implemented at the Kurnell Terminal, with associated response and safety equipment (i.e. spill kits, firefighting equipment and first aid kits) held on Site. The Terminal is fully fenced and has 24hr security to prevent unauthorised access to work areas. Key personnel are trained to support the implementation of the system. Regular training exercises are carried out by Caltex.

Caltex will continue to implement its existing incident management procedures, including response to, investigation and reporting of incidents.

Refer to the DEMP for an overview of the emergency response procedures for the terminal, including response to pollution incidents.

7.4 Contamination Management

Based on previous investigations, TRH impacts in soil have been identified and there is the potential for these other contaminants to be encountered during excavation and removal of the asbestos impacted soil.

The potential exposure pathways for remaining impacts are therefore included in **Table 15**.

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Table 15 Potential Exposure Pathways for Other Contaminants of Concern

Contaminant of Concern	Potential Exposure Pathways
TRHs/BTEXN	Breathing in dust from soil materials (inhalation). Breathing in organic vapours generated from soil and/or groundwater (inhalation). Soil contacting the skin (dermal contact) when handling soil or potentially impacted tools\equipment or clothing. Swallowing potentially impacted soil and groundwater (ingestion) (e.g. through eating, drinking or smoking during and following works activities if hands are not washed).
Metals	Breathing in dust from soil materials (inhalation). Soil contacting the skin (dermal contact) when handling soil or potentially impacted tools\equipment or clothing; Swallowing potentially impacted soil and groundwater (ingestion) (e.g. through eating, drinking or smoking during and following works activities if hands are not washed).

Other known contaminants in the soil which could be encountered might be indicated by:

- Discoloured soils;
- Odorous soils; or
- The presences of other foreign materials, such as drums, waste or building rubble which could be a secondary source of impacts.
- Screening for COPCs whilst on site will be through the monitoring of a photoionisation detector (PID) and LEL meter.
  - Soil sub-samples will be placed in snap-lock plastic bags and the vapour headspace screened in the field for volatile organic compounds (VOCs) using a calibrated PID equipped with a 10.6 eV lamp.
  - Air quality monitoring will also be used during the removal process to ensure appropriate control measures are effective in minimising airborne dust that may contain asbestos fibres.

The proposed soil excavation works will involve intrusive works to a maximum depth of 0.5 m, during which impacted soil may be exposed. As such, where excavation of soil is proposed or undertaken the following protocols should be adopted.

7.4.1 Odours

The remediation works will happen in an area also impacted with petroleum hydrocarbons which may expose odorous soils. The protocols for handling and management of hydrocarbon contaminated soil are as follows:

- P3 level of protection half or full face respirators that can provide asbestos fibre and hydrocarbon protection will be needed until the hygienists establish the level of protection required.
- The air monitoring for hydrocarbons will also include locations in the exclusion zone to establish if PPE with hydrocarbon removal is required to be worn at the exclusion zone.

7.4.2 Excavation Security Control

Security of the ACS excavation area is the responsibility of the appointed contractor. Security to the excavation zone should be maintained by use of perimeter fences. Fences should be visually inspected daily by the Contractor and maintained as necessary, to prevent access to the works area. Signs should be erected during excavation works to warn other site workers not to enter the excavation area. Several standard signs should be provided (as per WorkCover requirements) which indicate:

- Access by authorised personnel only; and
- Excavations. KEEP OUT.

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7.4.3 Excavation of Suspected Soil Contamination

The area has been previously characterised. The soil in some locations is likely to be impacted with TRH and heavy metals. As such, appropriate PPE must be worn for working with these analytes to prevent exposure. The PPE and hygiene requirements adopted should be specified in a Site specific health and safety plan.

7.4.4 Decontamination and PPE

A decontamination area should be established onsite for the use of the personnel conducting the asbestos related works. The decontamination area should comprise a segregated area where the contaminated work clothing and respirators are removed and discarded. This area is to be connected to the wet decontamination unit and all access to and from work area should be done via this ‘change room’ area.

The Change Area is the area in which potentially contaminated PPE must be removed prior to leaving the Designated Work Area. It is to be located at the entry to the Designated Work Area. It must not be used for purposes other than decontamination. It must not be used as a materials storage area. All personnel leaving the Designated Work Area must use the Change Area prior to leaving. Personnel will remove disposable protective clothing prior and will be required to ensure that no asbestos soiled clothes or PPE leave the decontamination area to the ‘clean end’ of the area.

PPE is to be provided to all personnel working in the Designated Work Areas and must be available within the decontamination area. The PPE which is required will be to the standards required for the asbestos removal work.

Where personnel are working on the ground within the designated asbestos areas and are required to handle, or are likely to come into direct contact with asbestos material the following minimum PPE is required:

- High visibility vests
- Disposable coveralls with booties
- Safety boots with rubber soles
- Safety glasses
- Gloves
- Hard hats
- Respirators - half or full face P3 including organic vapour filter (where other contamination is identified in the soil)

The protective clothing will be required to be provided daily to employees at the commencement of their work shift at the Change Area. Protective clothing is only for use in the Designated Work Area and will not be used outside of this area (in relation to the works described in SSD 5544 MOD2).

Once workers are inside the Work Zones, they are not permitted outside of that area without proceeding through the appropriate decontamination procedures.

No employee is permitted to remove any disposable protective clothing from the Site. Contaminated overalls and PPE is to be disposed of with the asbestos contaminated waste materials in appropriately labelled waste bins or bags.

7.4.5 Occupational Hygiene

Consultant to advise on appropriate control strategies, where necessary:

- After clean up works have been completed, a further visual inspection will be undertaken by the Occupational Hygiene Consultant. Further clearance air monitoring shall be conducted to ensure that asbestos exposure levels are at an acceptable level (i.e. <0.01 fibre/mL); and
- Subsequent to completion of successful investigation of the cause of the elevated readings, a successful visual inspection and monitoring results must be <0.01 fibres/ml before an ‘all clear’ can be given.

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8.0 Environment Management

This section details the requirements to control potential risk to the environment during the remediation works.

The remediation works must be undertaken in accordance with the DEMP and the following sub plans:

- Containment Cell Management Plan
- Soil and Water Management Plan
- Noise Management Plan
- Air Quality Management Plan
- Traffic Management Plan
- Demolition Waste & Resource Management Plan
- Biodiversity and Weed Management Plan

Each plan details the measures to mitigate and/or reduce the risks associated with the works.

8.1 Air Quality and Noise Management

The remediation works must be carried out in accordance with the Air Quality Management Plan and Noise Management Plan. A summary of the controls included in these plans, as applicable to the remediation works, is provided below.

8.1.1 Noise

- Noise generation will be managed in accordance with regulatory and EPL requirements. Where an activity results in noise levels that exceed the limits based on Caltex monitoring (currently undertaken as part of the demolition works), corrective actions will be implemented in accordance with SSD 5544 MOD1 and the Management and Mitigation Measures, to the satisfaction of the Caltex Environmental Representative (ER).
- Works will only be undertaken during the hours specific in **Section 7.2.1**.
- Low-noise plant and equipment would be selected, where practicable, in order to minimise potential for noise and vibration.
- Vehicles, plant and equipment would be maintained in good working order to minimise noise. Regular maintenance of vehicles, plant and equipment will be scheduled and performed by the relevant Contractor to ensure that mufflers and other noise reduction equipment are working correctly. Machinery would be turned off when not in use.

8.1.2 Air Quality

Airborne Asbestos Monitoring

The following section presents an overview of the recommended air monitoring program for the remediation works:

- Sample collection and analysis should be conducted in accordance with the National Occupational Health and Safety Commission (NOHSC) “Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Dust [NOHSC: 3003 (2005)].
- Sampling should be done with portable asbestos air monitoring pumps fitted with a sampling cartridge housing the asbestos sampling filter.
- The sampling filters should be analysed in a NATA accredited laboratory for asbestos fibre concentration on the filters over the known volume of air sampled, expressed as fibres/mL (of air).
- Samples should be analysed by way of phase contrast microscopy (PCM) with a detection limit of <0.01 fibres/mL of air collected.

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Exposure Criteria

The Safe Work Australia occupational exposure standard for all forms of asbestos is 0.1 fibres/mL in accordance with the "Workplace Exposure Standards for Airborne Contaminants", 2011.

All exposure sampling should be compared to this criteria, however all personnel that are sampled are required to wear appropriate respirators. All workers inside the asbestos removal work area are required to wear the proper respirator for the asbestos concentration in the work environment.

Control air monitoring would be carried out outside the asbestos removal area at the boundary to the remediation site/zones and/or the overall site boundary as well as at other strategic sampling locations as required.

The concentration of fibres at these control sampling locations should not exceed <0.01fibres/mL of air (i.e. the detection limit).

Truck and Equipment Movements

- Vehicles will only travel on designated roads to the maximum extent possible. The speed will be limited to 10km/hr in off-road areas 25 km/hr in all other areas.
- All soil loads will be covered and all tailgates will be securely fastened. Vehicles will not be loaded higher than the sides and tailboard.
- All plant will be maintained and operated in line with the manufacturer's specifications in order to minimise the emission of air pollutants and offensive odours. Plant and construction vehicles will be turned off when not in use.
- Vehicle wheels will be washed down when leaving the designated works area.

Excavation Activities

- Limiting potentially dust generating activities during high wind events (i.e. >8m/s hourly average or in severe wind gust conditions) using methods including wetting down soils (as per Management and Mitigation Measure H16 of SSD 5544 MOD1).
- Excavation of contaminated soils will not commence prior to 8am nor after 4pm as weather conditions are these times are generally conducive to adverse odour air quality situations from fugitive emissions.
- Wetting of soils during excavation works to minimise the generation of dust.
- Air monitoring will occur in accordance with the requirements detailed within Section 8.8 of the *Model Work Health and Safety Regulations 2011* for asbestos during excavations and stockpiling. The disturbance area will be monitored daily for asbestos using four monitors (one upwind and three downwind). The results of the air monitoring will be provided to the relevant internal stakeholders. Refer also to the Soil and Water Management Plan and the Asbestos Management Plan.
- Preparation of an asbestos monitoring and management plan to account for the activities that may liberate asbestos into the atmosphere. Dust and aerosol monitoring would occur in areas of the Site where asbestos in soil has been identified or is suspected to occur (including the pipeways) together with monitoring and analysis methods, exposure and control criteria and contingencies that will be implemented in the event specific exposure control criteria are exceeded.
- VOC and odour monitoring will be undertaken by demolition workers (i.e. visual and olfactory monitoring) and where required, using portable monitoring equipment (PID or similar) during excavation activities where potential hydrocarbon contaminated soil is present. If any significant odours of VOCs (observable odours at the Site boundary) are identified during demolition, measures outlined in Section 4.1 of the Air Quality Management Plan will be implemented. Further, if mitigation measures do not work, works will be stopped until suitable measures can be employed to manage this issue.

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The following information is provided as a guide to control asbestos dust during earthworks activities. The Asbestos Removal Control Plan will provide the methodology for removal of ACS from the pipeways, including appropriate exclusion zones and control measures:

- Use of portable enclosure that surrounds the work areas. The enclosure is designed to prevent wind from impacting on the work zone and provides a Safe work area. The enclosures would provide an environment free of air currents so that water fogging would maintain a saturated condition of the ACM.
- The bucket would then be emptied into the dump truck. Continuous water fogging/ misting would occur over the body of the excavator and dump truck during this step. These steps would be completed until the dump truck is filled.
- The wheels of the dump truck and the sides of the body would be washed down before the truck leaves the end of the enclosure through an opening that would be immediately closed after the dump truck has passed out of the enclosure.

While the travel of the dump truck is occurring or until a second truck is ready to enter through the same end of the enclosure, the excavated surface would again be saturated. This process would continue until the ACSs have been excavated.

The above method relies on the following factors:

- A defined work zone and cells within the work zones.
- A work area protected from wind.
- Prevention of the spread of asbestos generation of asbestos dust or possible release of asbestos fibres.
- High level of effectiveness of preventing generation of asbestos dust or possible release of asbestos fibres.
- Use of water fogging nozzles.
- Constant vigilance of trained operators and occupational hygienists.

Containment Cell

The Containment Cell Management Plan includes management and mitigation measures to reduce impacts from dust, these include:

- Dust deposition monitoring would be undertaken during the demolition works (as per AS/NZS 3580). This would include monitoring points in appropriate locations on the Site boundary.
- A Soil Acceptance Criteria which identifies:
  - Only soil contaminated with airborne asbestos[2] (referred to in the ACS Modification works as ACS) from the Site (as defined by Figure 1-2 in the SEE for SSD 5544 MOD2) would be accepted into the containment cell
  - Soils entering the containment cell from the Site but outside of the pipeways must be classified in accordance with the NSW EPA Waste Classification Guidelines 2014, as either special general solid waste or special restricted solid waste.
  - All soils, regardless of their classification under the NSW EPA Waste Classification Guidelines 2014 from the pipeways on the Site (as shown on Figure 1.2 of the SEE) would be disposed of in the containment cell.
  - The total volume of ACS would be limited by the design specifications final landform.

[2] *Airborne asbestos* means any fibres of asbestos small enough to be made airborne (Safe Work Australia, April 2016, Code of Practice: How to Safely Remove Asbestos)

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- Prior to the commencement of filling activities dust and aerosol monitoring stations would be placed at a minimum of six locations around the working area with the objective of monitoring prevalent upwind and downwind locations.
- Soil moisture content will be managed in order to minimise potential particulate matter and asbestos emissions to the maximum extent practicable by wetting of soils during filling of cell to minimise the generation of dust.
- Directed water sprays will be used when required throughout ACS handling operations.
- A spray cover would be placed over ACS in the containment cell as a daily cover to minimise the generation of dust.
- Stockpiles will be maintained in a moist condition, and covered if not in use or left overnight.
- Completed areas of the works area will be revegetated with native grasses as soon as is practicable.

8.2 Soil and Water Management

The Soil and Water Management Plan and Containment Cell Management Plan provide an extensive list of controls which must be implemented during the remediation works.

All works required during the construction, filling and closure of the containment cell will be undertaken in a bunded area. All waste water from the containment cell and excavation works will be directed to the Site's Oily Water Sewer System (OWSS) and on to the Site's WWTP for treatment prior to discharge offsite in accordance with EPL 837.

8.3 Environmental Monitoring

During the excavation activities, environmental monitoring of the activities shall include the monitoring shown in **Table 16**. Additional monitoring may be undertaken as required.

Table 16 Environmental Monitoring Summary

Media	Parameter	Frequency	Action Level	Response When Action Level Exceeded
Ground	Erosion & Sedimentation	During and after heavy rain	Assess adequacy of sedimentation/ environmental controls on-site.	If sedimentation/ environmental controls have failed or are considered inadequate, cease works immediately and repair to an acceptable standard.
Air	Dust	Continual	Visual assessment during site works.	If dust is visible implement additional dust suppression techniques (wetting down area) and/or assess weather conditions and if necessary temporarily cease works until conditions ease.
Air	Dust	Weekly	2g/m2/month criteria will be used when baseline data on deposited dust levels exists, while the 4g/m2/month criteria is used when no baseline data exists.	The results from this monitoring will result in additional/different management and mitigation measures being implemented

Media	Parameter	Frequency	Action Level	Response When Action Level Exceeded
Air	Asbestos	Daily during soil disturbance works	Refer to **Section 7.0.**	Refer to **Section 7.0.**
Air	Hydrocarbon Vapour (petrol)	Continual monitoring with using PID	> 50 ppm in the immediate breathing zone for up to 5 minutes	Stop work; move upwind while vapours dissipate. Investigate source if safe to do so. Use a half face respirator with an 'A' cartridge to continue work
Ground-water	Quality and levels	Quarterly	Assess impacts from containment cell / leaks in liner	If groundwater impacts are identified investigate source of impacts such as integrity of liner (leak detection system).

8.4 Environmental Management Contingency

Should unexpected conditions arise; contingency measures will be required to resolve the resulting problems. **Table 17** summarises conditions that might reasonably be encountered, the resulting problems they may be cause, and how these problems may be resolved within the context of the unexpected conditions.

Table 17 Contingency Measures

Potential Issue	Evidence/Signs	Corrective Action
Excessive dust	dust onsite and/or off-site complaints from neighbours results of dust monitoring indicate levels above acceptable.	increase wetting of excavation and/or stockpile surfaces cover excavation and stockpile surfaces where appropriate minimise exposed surfaces review materials handling procedures if required cease dust-generating activity until better dust control can be achieved install dust deposition gauges to monitor effectiveness of dust controls implemented at the Site
Excessive odour	Odour complaints from neighbours	use odour suppressant and/ or neutralizer technology
Breach of sediment fencing (at containment cell)	discoloured water and/or sediment in stormwater	stop work and repair

8.5 Asbestos Waste Management

Asbestos contaminated waste will be disposed of in accordance with the *Demolition Waste and Resource Recovery Waste Plan* and the *Asbestos Management Plan*. These are currently being implemented and require that:

- All asbestos waste is contained and labelled in accordance with the GHS (Globally Harmonised System of Classification and Labelling of Chemicals) as detailed within the Model Cost of Practice: How to Safely Remove Asbestos;
- All asbestos waste must be disposed of at a licensed asbestos waste disposal site;

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- A copy of the disposal certificate must be obtained from the licensed asbestos removalist. A copy shall be sent to the Caltex Hazmat Administrator for upload into the Caltex online HazHat Management System.
- The Caltex Asbestos Removal Checklist must be used to ensure that all critical steps and information have been obtained and recorded.
- Asbestos removal activities shall be audited periodically.
- Special waste removed from the Site would be transported in accordance to Part 7 Transportation and Management of Asbestos Waste of the POEO (Waste) Regulation 2014. This outlines the requirements for waste transporters to record and monitor the movement of more than 100 kilograms of asbestos waste or more than 10 m^2 of asbestos sheeting from the Site of generation to the final disposal point using the NSW EPA online system called WasteLocate. The removal and disposal of asbestos wastes would be undertaken by a licenced asbestos contractor.

8.6 Long Term Environmental Management Plan

A Containment Cell Long Term Environmental Management Plan (CCLTEMP) will be prepared in consultation with the EPA prior to the closure of the containment cell. The CCLTEMP would detail the ongoing environmental management of containment cell, including maintenance of the capping and drainage, groundwater monitoring (including groundwater quality and levels), and land use restrictions that will apply to the containment cell. The CCLTEMP would be attached to the positive covenant for the land where the containment cell is located, if required.

D R A F T

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10.0 Standard Limitations

The conclusions and all information in this Report is provided strictly in accordance with and subject to the following limitations:

a. This Report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by AECOM for use of any part of this Report in any other context.

b. This Report was prepared between May and June 2017. This Report and conclusion is based solely on the information and findings contained in this Report and/or any Pre-Existing Reports, and on the conditions encountered and information reviewed at the time of preparation of the Report and/or any Pre-Existing Reports. AECOM accepts no responsibility for any events arising from any changes in site conditions or in the information reviewed that have occurred after this period of time.

c. This Report should be read in conjunction with any Pre-Existing Reports and is subject to all limitations and recommendations included in any Pre-Existing Reports.

d. This conclusion is based solely on the scope of work agreed between AECOM and Caltex and described in **Section 1.2** and **Section 1.3** of this Report.

e. Except as required by law, no third party may use or rely on, this Report unless otherwise agreed by AECOM in writing. Where such agreement is provided, AECOM will provide a letter of reliance to the agreed third party in the form required by AECOM.

f. To the extent permitted by law, AECOM expressly disclaims and excludes liability for any loss, damage, cost or expenses suffered by any third party relating to or resulting from the use of, or reliance on, any information contained in this Report. AECOM does not admit that any action, liability or claim may exist or be available to any third party.

g. AECOM does not represent that this Report is suitable for use by any third party in deciding whether to enter a transaction in relation to the Property or to put the Property to a particular use.

h. Except as specifically stated in this section, AECOM does not authorise the use of this Report by any third party.

i. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the Property.

j. AECOM has been retained to prepare this Report as an independent contractor of Caltex and not as an agent of Caltex. Caltex is not to be taken as making under any circumstances whatsoever or on any account whatsoever, any statement, representation, warranty or endorsement as to the adequacy or otherwise of the Report.

k. The assessments and/or investigations carried out for the purposes of the Report have been undertaken, and the Report has been prepared, in accordance with current professional practice and by reference to applicable environmental regulatory authority and industry standards, guidelines and assessment criteria in existence at the date of this Report and any Pre-Existing Reports.

l. Where this Report indicates that information has been provided to AECOM, or prepared by third parties, AECOM has made no independent verification of this information except as expressly stated in the Report.

m. AECOM has considered and/or tested for only those chemicals specifically referred to in this Report. AECOM makes no statement or representation as to the existence (or otherwise) of any other chemicals.

n. Assessments and/or investigations undertaken in respect of this Report are constrained by the particular site conditions, such as the location of buildings, infrastructure, services and vegetation. As a result, not all relevant site features and contamination may have been identified in this Report.

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o. Unless otherwise expressly stated in the Report, no investigations have been undertaken into and/or assessments made of any offsite conditions, or whether any adjoining sites may have been impacted by contamination or other conditions originating from this site.

p. Surface and sub-surface conditions can vary across a particular site and cannot be exhaustively defined by the assessments and/or investigations described in this Report. The results expressed in this Report represent conditions at the specific locations of investigation and/or assessment only and are not necessarily representative of conditions across the whole site.

q. Except as otherwise expressly stated in this Report, AECOM makes no warranty or representation as to the presence or otherwise of asbestos and/or asbestos containing materials (“ACM”) on the site. Even if asbestos was tested for and those test results did not reveal the presence of asbestos at specific points of sampling, if fill has been imported on to the Site at any time, or if any buildings constructed prior to 1970 have been demolished on the Site or materials from such buildings disposed of on the site, the Site may contain asbestos or ACM.

r. Except as otherwise expressly stated is this report, AECOM makes no warranty, statement or representation of any kind concerning the suitability of the Site for any purpose or the permissibility of any use, development or re-development of the site.

s. AECOM offers no opinion as to whether the current site use has any or all planning, environmental, accredited site auditor or other approvals required, is operating in accordance with any such approvals, the likelihood of obtaining any such approvals, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environmental works. The ongoing use of the Site and/or use of the Site for any different purpose may also require the owner/user to manage and/or remediate site conditions, such as contamination and other conditions, including but not limited to conditions referred to in this Report.

t. AECOM makes no determination or recommendation regarding a decision to provide or not to provide financing with respect to the site.

u. Any estimates of potential costs which have been provided are presented as estimates only as at the date of the Report. Any cost estimates that have been provided may therefore vary from actual costs at the time of expenditure.

v. Nothing in this section or in this Report in any way affects, limits or qualifies AECOM's obligations and liabilities, or Caltex's rights and benefits under the agreement “National Contract Arrangement for the Procurement of Services (and Related Goods) ES/2015/URS” between Caltex Australia Limited and AECOM, formerly URS Australia Pty Ltd (as amended, varied, supplemented, novated or replaced).

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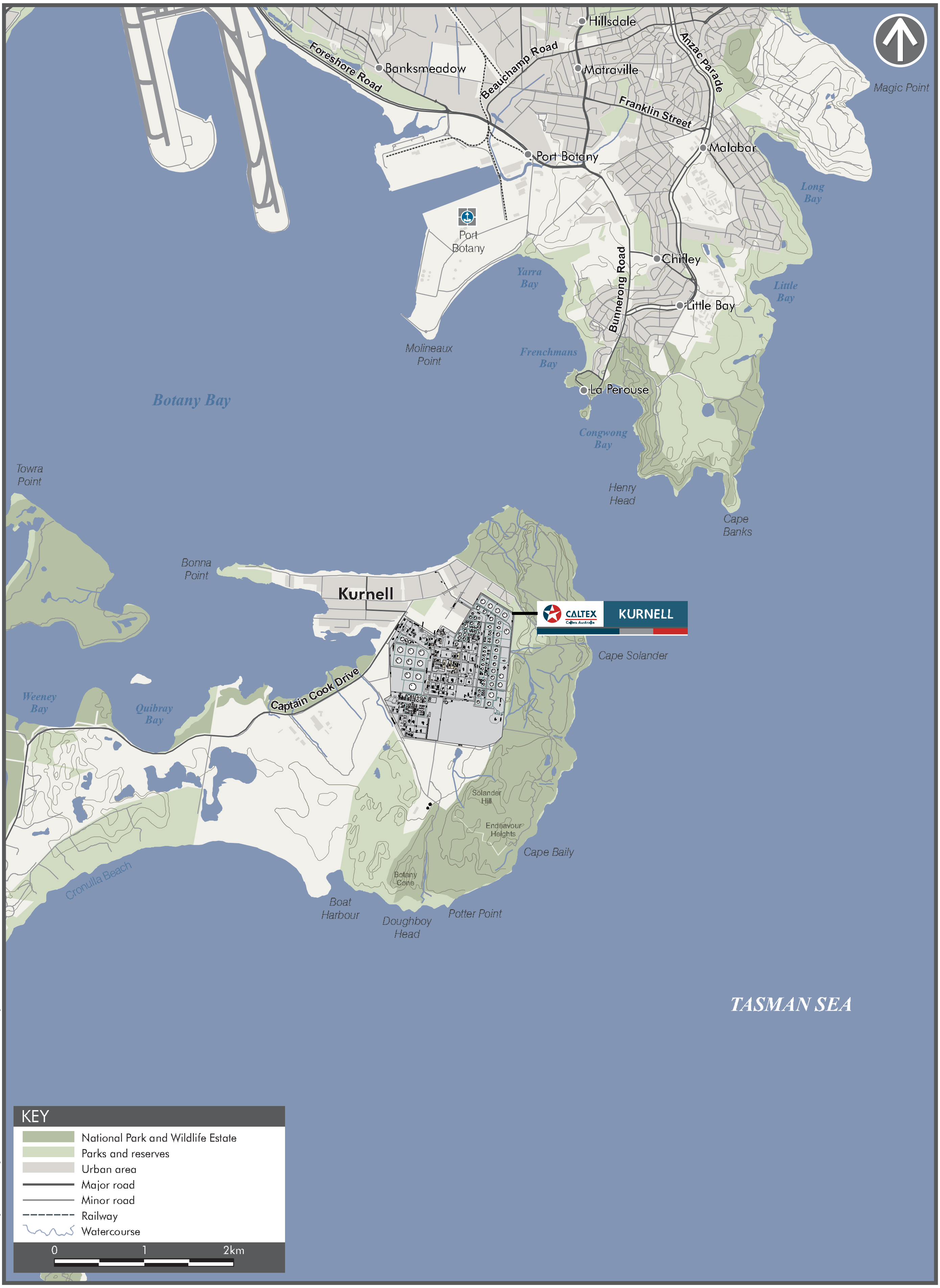
Appendix A

Figures



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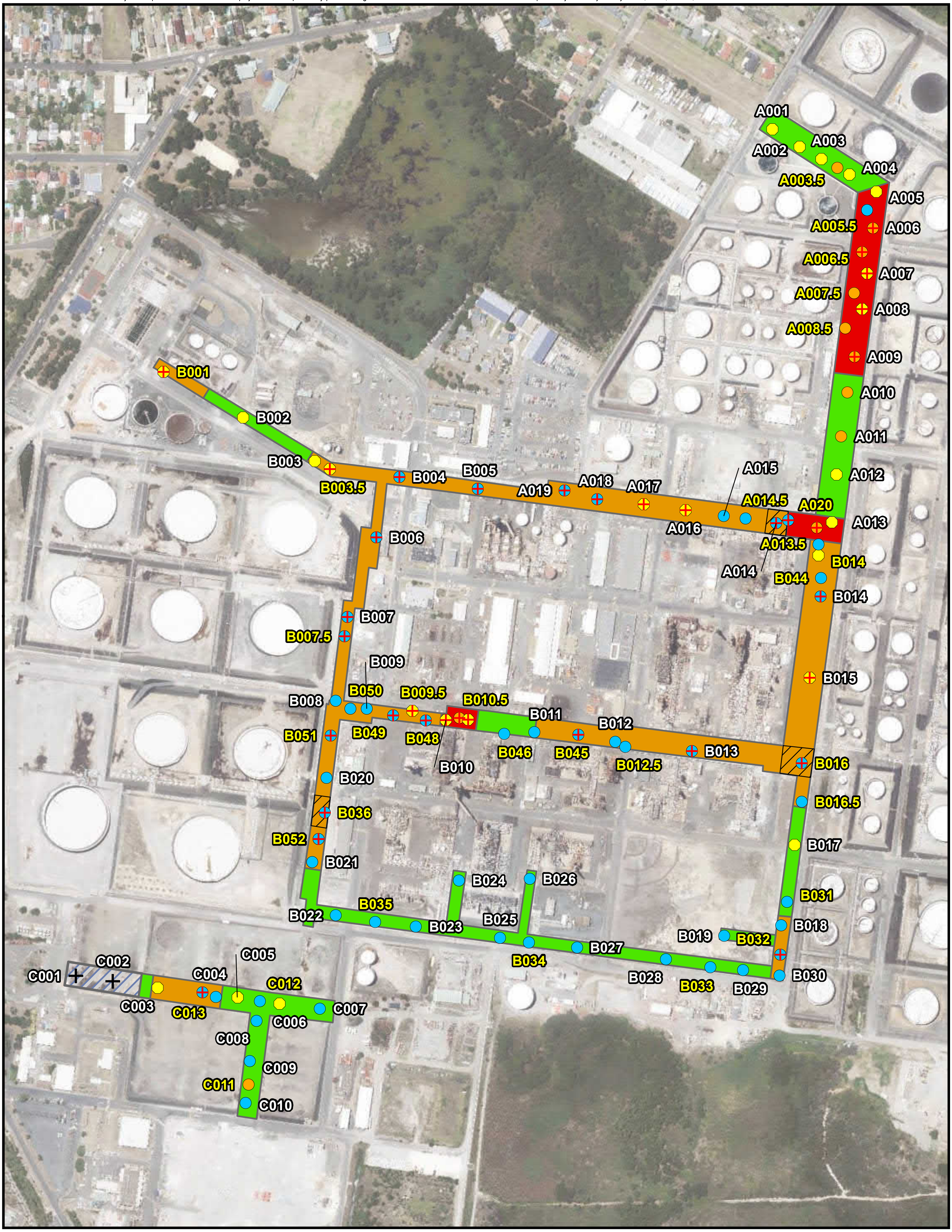
AECOM

SITE LOCATION
Caltex Refinery
Kurnell, New South Wales

FIGURE 1



PROJECT ID 60488804
CREATED BY BR
LAST MODIFIED SC 09 DEC 2016

AECOM
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DATUM GDA 1994, PROJECTION MGA ZONE 56

0 50 100 150 200
metres

1:6,000 when printed at A4

LEGEND

- Asbestos present
- General solid waste
- Restricted solid waste
- Hazardous soild waste
- Not sampled
- Excavate to 0.5m
- Leave in-situ
- On-site Contaminent Cell
- Treatment and/or Disposal
- Concrete slab
- B001 2016 sample locations
- B001 2013 sample locations

Sampling Locations and Characterisation Extent

Caltex Petroleum Australia Pty Ltd

Caltex Kurnell Asbestos Contaminated Waste Cell

Additional Pipeway Soil Characterisation

Figure

2

Map Document: P:\604X\60488804\4. Tech work area\4.6 GIS\02_Maps\G015_01_SamplingLocations_161206.mxd

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Appendix B

Historic Sampling Results

AECOM

Kurnell Asbestos Contaminated Soils Management Project

Caltex Petroleum Australia Pty Ltd

17-Mar-2017

Doc No. 2

Pipeways Asbestos Contaminated Soils Waste Classification Report

Caltex Kurnell (ID 535)

Pipeways Asbestos Contaminated Soils Waste Classification Report

Caltex Kurnell (ID 535)

Client: Caltex Petroleum Australia Pty Ltd

ABN: 17 000 007 876

Prepared by

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17-Mar-2017

Job No.: 60488804

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

Quality Information

Document	Pipeways Asbestos Contaminated Soils Waste Classification Report
Ref	60488804
Date	17-Mar-2017
Prepared by	Kate McGrath, Senior Scientist, and Stephen Randall, Senior Environmental Scientist
Reviewed by	Scott Robinson, Technical Director

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	22-Mar-2016	Final	William Miles Project Manager	
B	17-Mar-2017	Updated with additional sampling to further delineate waste classification areas	William Miles Project Manager	

Table of Contents

Executive Summary

Introduction

AECOM Services Pty Ltd (AECOM) was engaged by Caltex Australia Pty Ltd (Caltex) for approval, environmental, geotechnical and design services associated with the Kurnell Asbestos Contaminated Soils Management Project (the Project) at the Kurnell Terminal (535), Kurnell, NSW 2231 (the Site).

The NSW Environment Protection Authority (EPA) agreed in principle with Caltex that asbestos contaminated soils from the Site, predominantly from below the former pipeways, can be disposed of within a purpose built 'containment cell' also to be located on the Site. As part of the approvals for the proposed cell and to inform the cell design, the quantity of asbestos contaminated soils that are suitable to be placed within the cell needed to be further characterised.

Objectives

The overall objectives were as follows:

- Characterise the soil for the presence of asbestos.
- Classify the soil in accordance with the *NSW EPA Waste Classification Guidelines* (2014).
- Estimate the volume of waste that could be placed directly in the cell, and the volume that would require treatment before being placed in the cell.

Discussion of Results

Based on the review of the new and existing data, the areas of soil required to be placed in the on-site containment cell, treated and disposed off-site or left in-situ have been calculated in the table below.

As described in Section 1.3 additional sampling was undertaken to further delineate the pipeways. As a result the soil to remain in-situ increased by 1,869 m^2, the area to be placed in the containment cell increased by 1,166 m^2 and the area of hazardous special waste decreased by 3,036 m^2. The extent of each of these areas is shown on Figure 2 in Appendix A.

Soil Category		Area (m^2)	Volume[1] (m^3)
1.	Remain in-situ (asbestos not detected)	36,642	7,330
2.	On-site asbestos containment cell [Special Waste (Asbestos)/ General Solid Waste (GSW) or Restricted Waste (RSW)]	48,380	10,500
3.	Special Waste (Asbestos)/Hazardous Waste (requires treatment before being placed in containment cell)	11,365	2,275
Total volume for containment cell (2+3)		**59,745**	**12,775**

1 Bank Cubic Meters (BCM) have been provided to measure the volume of material in the ground prior to excavation

The leachate results indicated that the potential for concentrations of metals and benzo(a)pyrene to be detected in leachate at concentrations greater than the NSW EPA *Waste Classification Guidelines* (2014) toxicity characteristic leaching procedure (TCLP) limit for general solid waste is low.

Conclusions

The soil has been characterised to estimate:

- the extent of the asbestos contaminated soils in the pipeways
- the volumes of asbestos waste to be contained directly in the proposed asbestos containment cell
- the volume of asbestos waste requiring treatment before containment.

The material classified as special waste (asbestos)/hazardous waste will require treatment to reduce concentrations to the levels for restricted or general solid waste prior to placement in the containment cell.

1.0 Introduction

AECOM Services Pty Ltd (AECOM) was engaged by Caltex Australia Pty Ltd (Caltex) for approval, environmental, geotechnical and design services associated with the Kurnell Asbestos Contaminated Soils Management Project (the Project) at the Kurnell Terminal (535), Kurnell, NSW 2231 (the Site). The location of the Site is shown on Figure 1 in Appendix A.

1.1 Background

The NSW Environment Protection Authority (EPA) agreed in principle with Caltex that asbestos contaminated soils from the Site, predominantly from below the former pipeways, can be disposed of within a purpose built 'containment cell' also to be located on the Site. The removal of these asbestos contaminated soils from the pipeways and other areas will remove a hygiene risk from the Site and also remove the need to renew the Safework NSW exemption for working in the pipeways.

As part of the approvals and to inform the cell design, the quantity of contaminated soils that are suitable to be placed within the cell requires further assessment. Only soil that is classified as Special Waste (Asbestos) and General Solid Waste (GSW) or Restricted Solid Waste (RSW) in accordance with the NSW EPA *Waste Classification Guidelines* (NSW EPA, 2014) can be placed in the proposed cell. Soil classified as Special Waste (Asbestos) and Hazardous Waste would require treatment prior to being placed within the cell.

Previous soil characterisation works within the pipeways were undertaken by AECOM in 2013 and were reported in *'Caltex Kurnell (535) Pipeways Contamination Assessment / Characterisation - Stage 2 Report'* (AECOM, 2013). This work included investigating pipeway areas from the Caltex Oil Refinery (COR) and Caltex Lubricating Oil Refinery (CLOR). The report provided preliminary estimates of the quantity of asbestos contaminated waste likely to be generated from the proposed works. The AECOM 2013 report classified volumes of Special Waste (Asbestos) and then as GSW, RSW or Hazardous Waste for three areas: Area A, Area B pipeways, and Area C pipeways across the COR and CLOR.

1.2 Objectives

The overall objectives of this investigation were as follows:

- Characterise the soil for the presence of asbestos.
- Classify the soil in accordance with the *NSW EPA Waste Classification Guidelines* (2014).
- Estimate the volume of waste that could be placed directly in the cell, and the volume that would require treatment before being placed in the cell.

The specific objectives of the additional soil characterisation for each area based on the review of the results of the AECOM 2013 data were:

- Area A: assess the leachability of soils through TCLP analysis where higher total petroleum hydrocarbon (TPH) concentrations [exceeding the NSW EPA (2014) *Waste Classification Guidelines*] and asbestos were reported.
- Area B: assess the absence or presence of asbestos in the southern portion of Area B and undertake further leachability testing through TCLP analysis.
- Area C: further assess the absence or presence of asbestos.

1.3 Scope of Works

AECOM and Caltex subcontractors Giovenco Industries Pty Limited (Giovenco) completed the soil sampling works in accordance with the sampling plan and recommended sampling methodologies.

The following scope of works was completed:

- A Site walkover with the Giovenco field personnel to confirm the sampling plan and outline recommended sampling methodologies. Due to significant access constraints within the pipeways, Giovenco's onsite experience and technical expertise was relied on to confirm that the sampling works could be undertaken safely and in a manner that would avoid disturbance of the pipelines and lagging materials within the pipeways.
- Marking of locations and use of a Global Positioning System (GPS) to electronically record each sampling location.
- Sampling of soil with a hand auger from a total of 27 locations along the pipeways in Area A, Area B and Area C.
- Collection of quality assurance and quality control (QAQC) samples.
- Interpretation and assessment of the results and preparation of this report.

Following the sampling in early 2016 an additional round of sampling was undertaken in November 2016 to:

- Increase sampling density.
- Further delineate the areas where special hazardous waste was previously suspected as part of the earlier sampling works.

The work was conducted with reference to relevant parts of the following guidelines:

- NSW Department of Environment and Conservation (DEC), 2006. *Guidelines for the Site Auditor Scheme (2nd Edition).*
- National Environment Protection (Assessment of Site contamination) Measure (NEPC), 1999. *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (National Environment Protection Council) – considered throughout the investigation.*
- NSW OEH, 2011. *Guidelines for Consultants Reporting on Contaminated Sites.*
- NSW Environment Protection Authority (NSW EPA), 2014. *Waste Classification Guidelines.*

2.0 Previous Characterisation

The AECOM 2013 soil characterisation works included the collection of soil from samples from 57 locations along the length of the pipelines.

The sampling locations from 2013 are shown on Figure 2 in Appendix A. All of the samples were analysed for asbestos, 18 metals, total recoverable hydrocarbons (TRH), BTEX (benzene, toluene, ethylbenzene and xylenes), polycyclic aromatic hydrocarbons (PAHs) and phenols. Selected samples were analysed for volatile organic compounds (VOCs), volatile halogenated compounds (VHCs), polychlorinated biphenyls (PCBs), organochlorine pesticides (OCP), organophosphorus pesticides (OPP) and by toxicity characteristic leaching procedure (TCLP) for lead, nickel and benzo(a)pyrene.

The sample and results for each area are summarised in Table 1 below.

Table 1 Summary of AECOM 2013 results

Area	Samples	Results
A	A001 to A019, soil samples collected at depths of 0.0-0.2 m below ground surface (bgs) and 0.4 to 0.5 m bgs.	Asbestos was detected in 10 out of 28 samples and exceeded the ASC NEPM (2013) health screening level (HSL) for commercial/industrial land use (HSL D) of 0.001% w/w of FA/AF in 8 of the 28 samples.
B	B001 to B030, soil samples collected at depths of 0.0-0.2 metres below ground surface (m bgs) and 0.4 to 0.5 m bgs.	Asbestos was detected in 11 out of 33 samples and exceeded the ASC NEPM (2013) health screening level (HSL) for commercial/industrial land use (HSL D) of 0.001% w/w of FA/AF in 8 of the 28 samples.
C	C003 to C010, soils samples collected at depths of 0.0-0.2 m bgs and in some locations depths between 0.4 to 2.0 m bgs.	Asbestos was detected and exceeded the ASC NEPM (2013) health screening level (HSL) for commercial/industrial land use (HSL D) of 0.001% w/w in 1 out of 23 samples.

The results were also compared to the NSW EPA (2009) *Waste Classification Guidelines* since revised in 2014. The tabulated analytical results from AECOM 2013 are provided in Appendix B.

3.0 Sampling Methodology

3.1 Data Quality Objectives

The Data Quality Objectives (DQOs) steps for these works are described below.

Table 2 Data Quality Objectives

DQO Steps	Details of DQO Process
1. State the Problem	Certain pipes within the Site contained friable asbestos lagging and gaskets. This asbestos contaminated the underlying soils and as such these soils require removal. It is proposed to excavate the asbestos contaminated soil and place it in an on-site containment cell. Further characterisation of the volume and extent of the asbestos contaminated soil for different waste classifications was required.
2. Identify the Decisions	Based on the objectives listed in Section 1.1 of this report, the principal decisions that need to be made are: · What is the quantity and extent of soil: - Classified as Special Waste (Asbestos) and GSW or RSW? - Classified as Special Waste (Asbestos) and Hazardous Waste? - Suitable to remain *in situ* (i.e. no Asbestos)? · What is the leachability of the soils to be placed within the containment cell?
3. Identify the information inputs	The primary inputs required include: · Field results/observations including previous AECOM 2013 report. · Laboratory soil and leachate analytical results. · Assessment of the suitability of the data through the assessment of data quality indicators (DQIs), namely precision, accuracy, representativeness, completeness and comparability (PARCC) parameters (see Section 2.2).
4. Define the Study Boundaries	· Lateral: the boundary of the characterisation works are shown on Figure 2 in Appendix A. · Vertical: the maximum depth of investigation was 2 m. · Temporal: Historical soil and leachate analytical data from the previous sampling conducted in October 2013.
5. Develop an Analytical Approach	Site specific data was utilised to focus on potential sources of contamination and likely chemicals of potential concern (COPC). · Sampling ratios, quality assurance/quality control (QA/QC) sampling and laboratory analysis were based on Australian Standards and National Environmental Protection Measure (NEPM) guidelines. · AECOM standard sampling methodology was followed for sample collection and preservation. · Laboratories utilised were National Association of Testing Authorities (NATA) approved for the analyses undertaken. The decision rules for the investigation was the comparison of the soil results to the NSW EPA (2014) *Waste Classification Guidelines* and asbestos quantification results to the ASC NEPM (2013) investigation levels.

DQO Steps	Details of DQO Process
6. Specify Limits on Decision Errors	There are two types of decision errors: · Sampling errors, which occur when samples collected are not representative of the conditions within the investigation area; and · Measurement errors, which occur during sampling collection, handling, preparation, analysis and data reduction. An assessment was made as to the likelihood of a decision error being made based on the results of a QA/QC assessment and the closeness of the data to assessment criteria. Decision criteria for QA/QC measures are defined in Appendix D. A decision on the acceptance of the analytical data was made on the basis of the data quality indicators (DQI) in the context of the precision, accuracy, representativeness, completeness and comparability (PARCC) parameters as follows. · Precision: A quantitative measure of the variability (or reproducibility) of data; · Accuracy: A quantitative measure of the closeness of reported data to the "true" value; · Representativeness: The confidence (expressed qualitatively) that data are representative of each media present on site; · Completeness: A measure of the amount of useable data from a data collection activity; and · Comparability: The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event. Specific limits for this project are in accordance with the appropriate guidance in NEPM (2013), appropriate indicators of data quality, and standard procedures for field sampling and handling and are summarised in Section 3.3. The step also examines the certainty of conclusive statements based on the available site data collected.
7. Optimise the Design	Based on the previous Steps 1 to 6 of the DQO process, the design (i.e. scope of works or sample and analysis quality plan) for obtaining the required data (i.e. proposed field and laboratory programs) is presented below in Section 3.2.

3.2 Sample and Analysis Quality Plan (SAQP)

The scope of works undertaken for this investigation is detailed in the following sub-sections.

3.2.1 Soil Sample Analytical Plan and Rationale

The detailed soil sample analytical plan and the rationale for the sampling locations completed are included in Table 1 in Appendix C. The following soil analyses were completed:

- 47 primary samples, 5 intra-laboratory duplicates and 4 inter-laboratory duplicates were analysed for metals (arsenic, beryllium, cadmium, chromium, lead, molybdenum, nickel, selenium, silver and mercury), BTEXN (benzene, toluene, ethylbenzene, xylenes and naphthalene), total petroleum hydrocarbons (TPH), benzo(a)pyrene (BaP) and asbestos (absence/presence).
- 14 primary samples were analysed for asbestos quantification.
- 17 primary samples were analysed by Toxicity Characteristics Leaching Procedure (TCLP) selectively for chromium, lead, nickel, mercury or benzo(a)pyrene.

3.2.2 Soil Sampling Methodology

The soil sampling methodology undertaken for the investigation is summarised in Table 3 below.

Table 3 Soil Investigation Methodology Summary

Activity/Item	Details
Field Activities	· 14 to 16 March 2016 - soil sampling was completed Giovenco and supervised by Kate Pigram a qualified and experienced environmental scientist. · 9 November 2016 - soil sampling was completed by Giovenco and supervised Pedro Balbachevsky and Katherine Dodd two qualified and experienced environmental scientists.
Sampling Method	· Hand augers and hand trowel were used for the collection of samples.
Target Depth	· 24 hand augers were advanced to depths ranging between 0.2 and 0.6 m bgs. 12 samples were taken using hand trowels from the top 0.2 m.
Soil Logging	· Soil logging was undertaken in general accordance with the Unified Soil Classification System and the AECOM documented standard field procedures. Samples were logged and information was recorded in the field (e.g. soil type, colour, grain size, inclusions, moisture conditions, staining and odour etc.).
Soil Screening	· Soil sub-samples were placed in snap-lock plastic bags and the vapour headspace screened in the field for volatile organic compounds (VOCs) using a calibrated photoionisation detector (PID) equipped with a 10.6 eV lamp. Calibration details are provided in Appendix D.
Soil Sampling	· Soil was collected directly from the hand auger for each sampling interval and placed into laboratory prepared glass jars with Teflon-lined lids for chemical analysis and a zip lock bag for asbestos analysis. A new pair of disposable nitrile sampling gloves was used to collect each sample.
Quality Control Sampling	· Field duplicates or triplicates were collected and analysed at a rate of 1 sample per twenty primary samples as part of the soil investigation. Two rinsate samples and three soil trip blank samples were analysed.
Sample Preservation	· Soil samples were placed into insulated rigid storage containers chilled with ice. No preservatives were required to be used in the laboratory supplied sampling jars.
Decontamination Procedures	· The hand auger was cleaned between boreholes by brushing off excess soil and washing. Soil samples were collected by hand, using single use, disposable nitrile gloves. Two rinsate samples were collected: one from the decontaminated hand auger and one from a clean nitrile glove.
Disposal of Soil Cuttings	· Excess soil cuttings from the hand auger were reinstated in the hole.

3.3 Quality Assurance / Quality Control

Quality assurance and control measures (QA /QC) were incorporated into the sampling and analysis works to ensure that the specified data quality objectives could be achieved and to demonstrate accuracy, precision, comparability, representativeness and completeness with regard to the data generated.

The Data Quality Indicators (DQIs) listed in Table 4 below are adopted based upon data validation guidance documents published by Standards Australia (SA), National Environmental Protection Council (NEPC) and United States Environmental Protection Agency (US EPA). These include *Standard guide to the investigation and sampling of sites with potentially contaminated soil* (AS 4482.1-2005) Schedule B2 *Site Characterisation* (NEPC 1999, amended 2013), Schedule B3 *Laboratory Analysis of Potentially Contaminated Soils* (NEPC 1999, amended 2013), the US EPA

Contract Laboratory Program for Organic Data Review, October 1999; US EPA Contract Laboratory Program for Inorganic Data Review, July 2002; and the US EPA Guidance on Environmental Data Verification and Data Validation, November 2002. The process involves the checking of analytical procedure compliance and an assessment of the accuracy and precision of analytical data from a range of quality control measurements, generated from both the field sampling and analytical programs.

Table 4 DQI Program

DQI	Field	Laboratory	Acceptability Limits
Precision	· Standard Operating Procedures (SOPs) were appropriate and were complied with · Collection of blind and split duplicate samples	Analysis of: · Blind duplicate samples (1 in 20 samples) · Split duplicate samples (1 in 20 samples) · Laboratory duplicate samples	· RPD of 0 to 30% · RPD of 0 to 30% · <10x LOR = No Limit · 10-20x LOR = RPD 0% - 30% · >20x LOR = RPD 0% - 30%
Accuracy	· SOPs appropriate and were complied with · Collection of rinsate blanks	Analysis of: · Method blanks · Matrix spikes · Matrix spike duplicates · Surrogate spikes · Laboratory control samples · Laboratory prepared spikes	· Non-detect for COPC · 70 to 130% · 70 to 130% · 70 to 130% · Dynamic recovery limits are based on statistical evaluation of processed LCS. · 70 to 130%
Representativeness	· Appropriate media sampled according to SOP · All relevant media sampled	All samples analysed according to SOP	N/A
Completeness	· All critical locations sampled · All critical samples collected · SOPs appropriate and complied with · Experienced sampler · Documentation correct	· All critical samples analysed and all analytes analysed according to SOPs · Appropriate methods · Appropriate LOR · Sample documentation complete · Sample holding times as per ASC NEPM (2013)	· As per ASC NEPM (2013) · < nominated criteria · As per ASC NEPM (2013)

DQI	Field	Laboratory	Acceptability Limits
Comparability	· Sample SOPs used on each occasion · Experienced sampler · Climatic conditions · Same types of samples collected	· Same analytical methods used (including clean-up) · Sample LORs · Same laboratories (NATA accredited) · Same units	· As per ASC NEPM (2013) · < nominated criteria

4.0 Assessment Criteria

The soil analytical results have been assessed against the *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA, 2014):

- Contaminant Threshold (CT) for General Solid Waste (without leaching data) (CT1) and Restricted Solid Waste (RSW) (CT2)
- Specific Contaminant Concentration (SCC) and TCLP for General Solid Waste (with leaching data) (SCC1 and TCLP1) and Restricted Solid Waste (RSW) (SCC2 and TCLP2)
- For classification of special waste (asbestos), the detection or observation of asbestos is the classification criteria.

The results of soil samples analysed for asbestos quantification were compared to the health screening levels (HSLs) for commercial/industrial land use (HSL D) from the *National Environment Protection (Assessment of Contaminated Land) Measure (NEPM) 1999, National Environment Protection Council Amendment 2013. Schedule B1, Guideline on Investigation Levels for Soil and Groundwater* (ASC NEPM, 2013).

5.0 Results

5.1 Field Screening and Observations

The VOC field readings from each sample are provided in Table 1 in Appendix C. The VOC readings in the majority of the samples taken were less than 20 ppm with the exception of sample A013.5_0.4-0.5 (63.8 ppm), A014.5_0.4-0.5 (47.8 ppm), BH014_0.0-0.2 (22.2 ppm) and B047_0.0-0.2 (256 ppm).

The soil descriptions are provided in Table 1 in Appendix C.

5.2 Analytical Results

The results are tabulated in the following tables in Appendix C and summarised on Figure 2 (Appendix A):

- Table 2a: Soil Analytical Results – March 2016
- Table 2b: Soil Analytical Results – November 2016
- Table 3: Asbestos Quantification Results
- Table 4: Soil Field QA/QC Results
- Table 5: Field Rinsate Results

Laboratory analytical reports are provided in Appendix E.

5.3 Quality of Analytical Data

A detailed review of the data is provided in the data validation summary reports in Appendix F. No QA/QC issues were identified in the field or laboratory datasets that could have a material implication to decision-making on the project.

6.0 Discussion and Conclusions

6.1 Asbestos Quantification

Friable asbestos and asbestos fines exceeded the ASC NEPM (2013) HSL D criteria of 0.001% in 67% of all samples analysed that had detections of asbestos in 2013 and 2016 (Figure 2 in Appendix A). The results therefore confirm that all areas along the pipeway where asbestos was detected require removal to reduce the risk posed to site workers and visitors.

6.2 Volume Estimates

The main objective of this report was to estimate the volume of asbestos contaminated soil that would be placed in the containment cell. The containment cell will only be able to take asbestos contaminated soil classified as Special Waste (Asbestos)/GSW or RSW. Asbestos contaminated soils classified as Hazardous Waste would require treatment to reduce hydrocarbon concentrations to meet RSW or GSW levels or would require removal from the Site. Soils not containing asbestos would remain *in-situ*.

As described in Section 1.3 additional sampling was undertaken to further delineate the pipeways. As a result the soil to remain in-situ increased by 1,869 m^2, the area to be placed in the containment cell increased by 1,166 m^2 and the area of hazardous special waste decreased by 3,036 m^2. The extent of each of these areas is shown on Figure 2 in Appendix A. The calculated areas and volumes are provided in **Table 5**.

Table 5 Volume estimates

Soil Category		Area (m^2)	Volume[1] (m^3)
1.	Remain in-situ (asbestos not detected)	36,642	7,330
2.	On-site asbestos containment cell [Special Waste (Asbestos)/ General Solid Waste (GSW) or Restricted Waste (RSW)]	48,380	10,500
3.	Special Waste (Asbestos)/Hazardous Waste (requires treatment before being placed in containment cell)	11,365	2,275
Total volume for containment cell (2+3)		**59,745**	**12,775**

1 Bank Cubic Meters (BCM) have been provided to measure the volume of material in the ground prior to excavation

6.3 Leachability

The leachability data from AECOM 2013 and the AECOM 2016 data is summarised in Table 6 below. Detections of lead and nickel at specific contaminant concentrations (SCC) above the laboratory LOR were detected in less than 19 to 28 % of samples analysed respectively. The maximum concentrations of lead and nickel were ten times less than the NSW EPA (2014) TCLP limit for general solid waste. Leachate concentrations of chromium, mercury and benzo(a)pyrene were not detected at concentrations above the laboratory LOR.

Based on these results the potential for concentrations of metals and benzo(a)pyrene to be detected in leachate at concentrations greater than the NSW EPA (2014) TCLP limit for general solid waste is low and acceptable.

Table 6 2013 and 2016 Leachability Results

Contaminant	Number of TCLP Tests Undertaken	TCLP1 Screening Criteria (mg/L)*	Range of TCLP Results (mg/L)	SCC1 Screening Criteria (mg/kg)**	Range of SCC Results (mg/kg)	Number of Detections Over GSW TCLP/SCC1 Screening Criteria
Chromium	2	5	<0.1	1,900	107 to 152	0
Lead	27	5	<0.1 to 0.5	1,500	102 to 753	0
Nickel	11	2	<0.1 to 0.2	1,050	41 to 158	0
Mercury	7	0.2	<0.001	50	5.2 to 58.6	2 (SCC only)
Benzo(a)-pyrene	10	0.04	<0.0005 to 0.002.4	10	1 to 51.2	3 (SCC only)

NOTES:
*as per the NSW EPA Waste Classification Guidelines, Table 2, General Solid Waste TCLP1 leachable concentration limit
** as per the NSW EPA Waste Classification Guidelines, Table 2, General Solid Waste SCC1 specific contaminant concentration

7.0 References

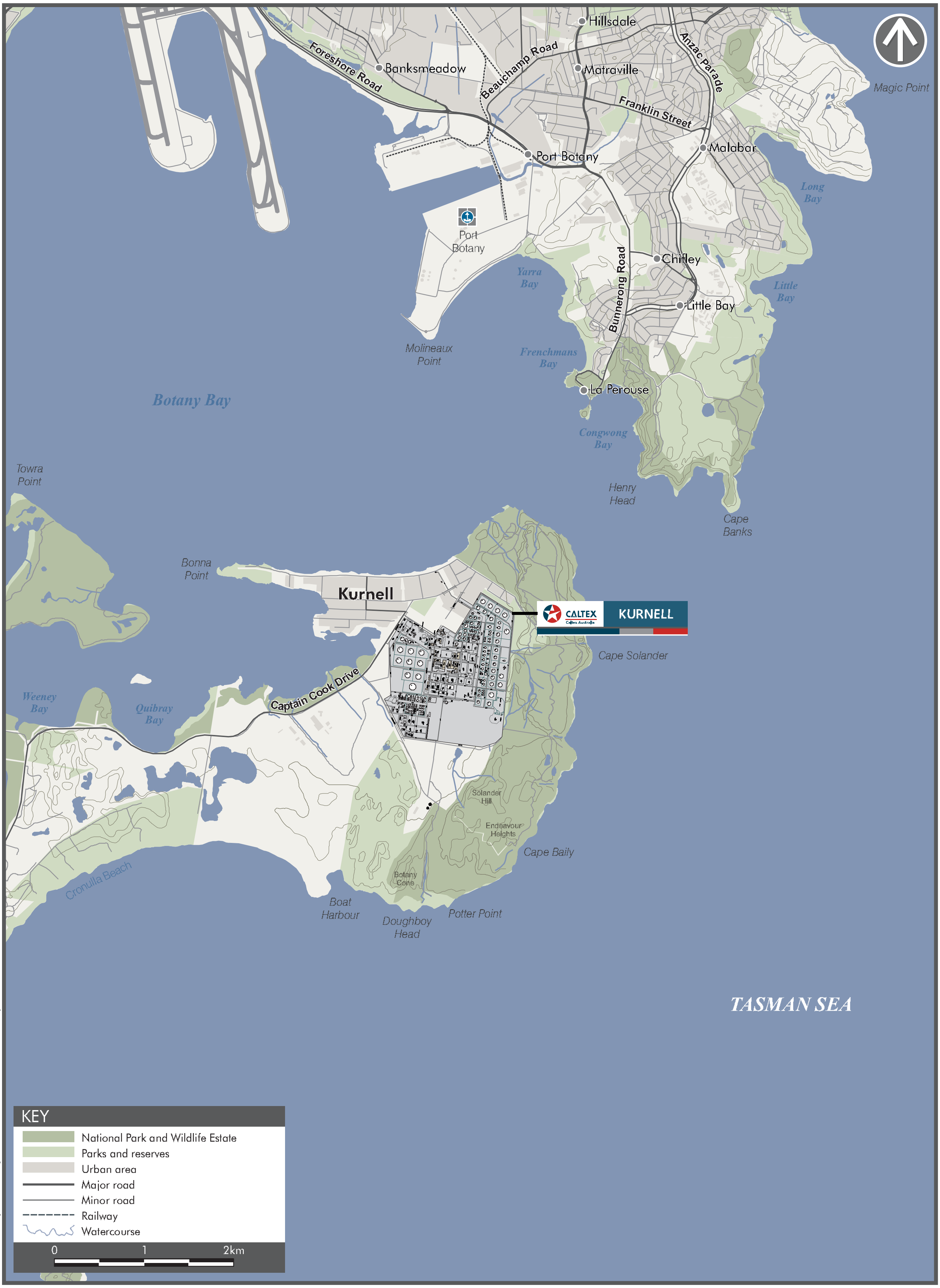
AECOM, 2013. *Caltex Kurnell (535) Pipeways Contamination Assessment / Characterisation - Stage 2 Report.*

ASC NEPM, 2013. National Environment Protection (Assessment of Contaminated Land) Measure (NEPM) 1999, National Environment Protection Council Amendment 2013. Schedule B1, Guideline on Investigation Levels for Soil and Groundwater.

NSW Environment Protection Authority (EPA), 2014. *Waste Classification Guidelines.*

Appendix A

Figures

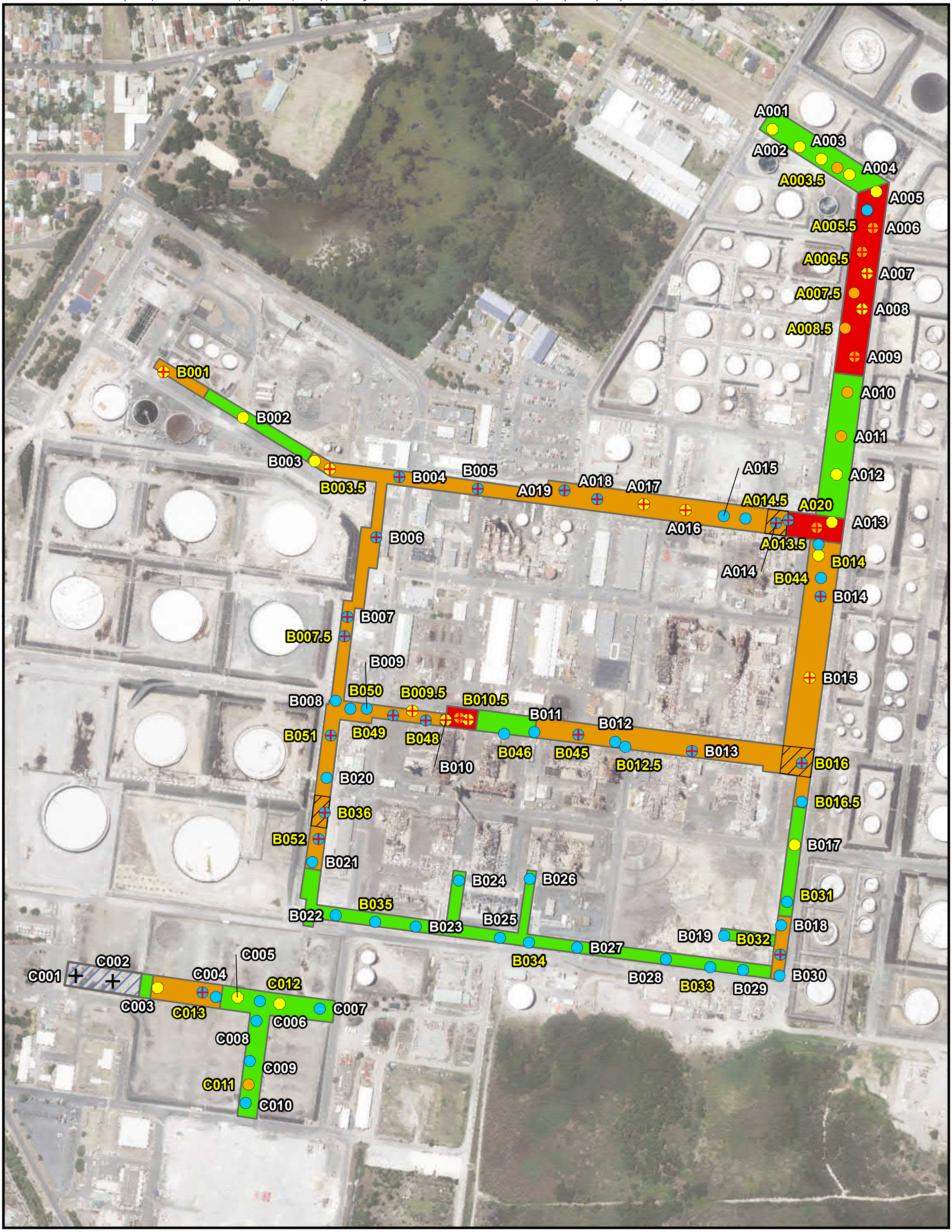


G:\ENV\GIS\Projects\603 Projects\60309877 Caltex Kurnell Refinery\FIGURES\60309877 F1 Site Location 31 10 2013 TO

AECOM

SITE LOCATION
Caltex Refinery
Kurnell, New South Wales

FIGURE 1



PROJECT ID 60488804
CREATED BY BR
LAST MODIFIED SC 09 DEC 2016

AECOM
www.aecom.com

N

DATUM GDA 1994, PROJECTION MGA ZONE 56

0 50 100 150 200
metres

1:6,000 when printed at A4

LEGEND

Asbestos present	Leave in-situ
General solid waste	On-site Contaminent Cell
Restricted solid waste	Treatment and/or Disposal
Hazardous soild waste	Concrete slab
Not sampled	B001 2016 sample locations
Excavate to 0.5m	B001 2013 sample locations

Sampling Locations and Characterisation Extent

Caltex Petroleum Australia Pty Ltd

Caltex Kurnell Asbestos Contaminated Waste Cell

Additional Pipeway Soil Characterisation

Figure
2

Appendix B

2013 Results Tables

Table T1
Waste Classification (Non-leach)
Soil Analytical Results

						A001		A002		A003		A004		A005		A006		A007		A008	
Field_ID						A001_0.0-0.2	A001_0.4-0.5	A002_0.0-0.2	A002_0.4-0.5	A003_0.0-0.2	A003_0.4-0.5	A004_0.0-0.2	A004_0.4-0.5	A005_0.0-0.2	A005_0.4-0.5	A006_0.0-0.2	A006_0.4-0.5	A007_0.0-0.2	A007_0.4-0.5	A008_0.0-0.2	A008_0.4-0.5
Sample_Depth_Range						0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5
Location_Code						A001	A001	A002	A002	A003	A003	A004	A004	A005	A005	A006	A006	A007	A007	A008	A008
Sampled_Date_Time						21/10/2013	23/10/2013	21/10/2013	23/10/2013	21/10/2013	23/10/2013	21/10/2013	23/10/2013	21/10/2013	23/10/2013	19/10/2013	23/10/2013	19/10/2013	23/10/2013	19/10/2013	23/10/2013
SDG						ES1322813	ES1323052	ES1322813	ES1323052	ES1322813	ES1323052	ES1322813	ES1323052	ES1322813	ES1323052	ES1322746	ES1323052	ES1322746	ES1323052	ES1322746	ES1323052
Sample_Type						Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Chem_Group	**ChemName**	**output unit**	**LOR**	**NSW 2014 GSW (CT1)**	**NSW 2014 RSW (CT2)**																
TRH (NEPM	TRH C6-C9	mg/kg	10	650	2600	<10	128	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	19
	TRH C10-36 (Total)	mg/kg	50	10,000	40,000	5710	13,900	12,200	1090	23,000	<50	34,100	14,900	17,000	<50	42,600	<50	19,700	490	2800	5320
PAHs	Benzo(a) pyrene	mg/kg	0.05	0.8	3.2	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	1	<0.5	<0.5	<0.5	4.2	<0.5	0.5	<0.5	<0.5	<0.5
	Sum of PAHs	mg/kg	-	200	800	2.9	43.3	7.9	nc	17	nc	61.6	36.1	17	nc	72.2	nc	12.8	nc	9	6.7
Phenols	2-methylphenol	mg/kg	0.5	4000	16000	<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
CAHs	Tetrachloroethene	mg/kg	0.5	14	56	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	Trichloroethene	mg/kg	0.5	10	40	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	Vinyl chloride	mg/kg	5	4	16	-	**<5**	-	-	-	-	-	-	-	-	-	-	<5	-	-	<5
BTEX	Benzene	mg/kg	0.2	10	40	<0.2	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	600	2400	<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
	Toluene	mg/kg	0.5	288	1152	<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
Metals	Arsenic	mg/kg	4	100	400	<5	<5	<5	<5	<5	<5	<5	<5	18	<5	22	<5	10	<5	9	<5
	Beryllium	mg/kg	1	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Cadmium	mg/kg	0.4	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	100	400	<0.5	<0.5	<2.5	<0.5	2.1	<0.5	0.9	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Lead	mg/kg	1	100	400	292	<5	17	<5	55	<5	23	<5	28	<5	22	<5	243	30	151	10
	Mercury	mg/kg	0.1	4	16	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.5	<0.1
	Molybdenum	mg/kg	1	100	400	4	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	6	<2	<2	<2
	Nickel	mg/kg	1	40	160	8	<2	<2	<2	2	<2	6	<2	<2	<2	2	<2	12	<2	4	<2
	Selenium	mg/kg	2	20	80	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Silver	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
OCP	a-BHC	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	Aldrin	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	b-BHC	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	chlordane	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	d-BHC	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	DDT+DDE+DDD	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	Dieldrin	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	Endosulfan	mg/kg	0.05	60	240	-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	Endrin	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	Endrin aldehyde	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	g-BHC (Lindane)	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	Heptachlor	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	Heptachlor epoxide	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	<0.25
	Sum Scheduled Chemicals	mg/kg	-	<50	<50	-	nc	-	-	-	-	-	-	-	-	-	-	nc	-	-	nc
OPP	Chlorpyrifos	mg/kg	0.05	4	16	-	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25
	Chlorpyrifos-methyl	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25
	Diazinon	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25
	Dichlorvos	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25
	Dimethoate	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25
	Ethion	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25
	Fenthion	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25
	Malathion	mg/kg	0.05			-	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25
	Methyl parathion	mg/kg	0.2			-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2
SVOC	Pentachlorophenol	mg/kg	2			<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Sum Moderately Harmful Pesticides	mg/kg	-	250	1000	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
PCBs	PCBs (Sum of total)	mg/kg	0.1	<50	<50	-	<0.1	-	-	-	-	-	-	-	-	-	-	<0.2	-	-	<0.1
SVOCs	2,4,5-trichlorophenol	mg/kg	0.5	8000	32000	<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
	2,4,6-trichlorophenol	mg/kg	0.5	40	160	<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
	Methyl Ethyl Ketone	mg/kg	5	4000	16000	-	<5	-	-	-	-	-	-	-	-	-	-	<5	-	-	<5
VOCs	1,1,1,2-tetrachloroethane	mg/kg	0.5	200	800	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	1,1,1-trichloroethane	mg/kg	0.5	600	2400	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	1,1,2,2-tetrachloroethane	mg/kg	0.5	26	104	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	1,1,2-trichloroethane	mg/kg	0.5	24	96	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	1,1-dichloroethene	mg/kg	0.5	14	56	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	1,2-dichlorobenzene	mg/kg	0.5	86	344	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	1,2-dichloroethane	mg/kg	0.5	10	40	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	1,4-dichlorobenzene	mg/kg	0.5	150	600	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	Carbon tetrachloride	mg/kg	0.5	10	40	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	Chlorobenzene	mg/kg	0.5	2000	8000	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	Chloroform	mg/kg	0.5	120	480	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5
	Styrene	mg/kg	0.5	60	240	-	<0.5	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5

Notes:
NSW DECCW (2008 and 2009) - New South Wales Department of Climate Change and Water *Waste Classification Guidelines*
TRH = Total Recoverable Hydrocarbons
CT = Contaminant Threshold
GSW = General Solid Waste
RSW = Restricted Solid Waste
mg/kg = milligrams per kilogram
PERCENT_WW = percentage weight per weight
Shading denotes exceedence of NSW EPA 2014 General Solid Waste Criteria (Contaminant Threshold 1, non-leach)
Shading dneotes exceedence of NSW 2014 Restricted Solid Waste Criteria (Contaminant Threshold 2, non-leach)
Bold LOR exceeds criteria

Table T1
Waste Classification (Non-leach)
Soil Analytical Results

						A009	A010	A011		A012		A013		A014		A015		A016		A017	
					Field_ID	A009_0.0-0.2	A010_0.0-0.2	A011_0.0-0.2	A011_0.4-0.5	A012_0.0-0.2	A012_0.4-0.5	A013_0.0-0.2	A013_0.4-0.5	A014_0.0-0.2	A014_0.4-0.5	A015_0.0-0.2	A015_0.4-0.5	A016_0.0-0.2	A016_0.4-0.5	A017_0.0-0.2	A017_0.4-0.5
					Sample_Depth_Range	0-0.2	0-0.2	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0.4-0.5
					Location_Code	A009	A010	A011	A011	A012	A012	A013	A013	A014	A014	A015	A015	A016	A016	A017	A017
					Sampled_Date_Time	19/10/2013	19/10/2013	19/10/2013	22/10/2013	19/10/2013	22/10/2013	19/10/2013	22/10/2013	19/10/2013	21/10/2013	19/10/2013	21/10/2013	19/10/2013	21/10/2013	19/10/2013	21/10/2013
					SDG	ES1322746	ES1322746	ES1322746	ES1323052	ES1322746	ES1323052	ES1322746	ES1323052	ES1322746	ES1322899	ES1322746	ES1322899	ES1322746	ES1322899	ES1322746	ES1322899
					Sample_Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Chem_ Group	**ChemName**	**output unit**	**LOR**	**NSW 2014 GSW (CT1)**	**NSW 2014 RSW (CT2)**																
TRH	TRH C6-C9	mg/kg	10	650	2600	<10	<10	<10	<10	<10	21	<10	10	<10	<10	<10	<10	<10	36	<10	<10
(NEPM	TRH C10-36 (Total)	mg/kg	50	10,000	40,000	144,000	132,000	29,300	<50	20,100	5270	11,200	7480	220	<50	340	3940	1680	16,600	<50	<50
PAHs	Benzo(a) pyrene	mg/kg	0.05	0.8	3.2	**<4**	51.2	31.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
	Sum of PAHs	mg/kg	-	200	800	91.4	1505.3	3000.5	nc	151.7	57.9	60.5	19.2	nc	nc	nc	nc	3.9	216.2	nc	nc
Phenols	2-methylphenol	mg/kg	0.5	4000	16000	<4	<4	<4	<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
CAHs	Tetrachloroethene	mg/kg	0.5	14	56	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	Trichloroethene	mg/kg	0.5	10	40	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	Vinyl chloride	mg/kg	5	4	16	-	-	-	-	<5	<5	<5	<5	-	-	-	-	-	<5	<5	-
BTEX	Benzene	mg/kg	0.2	10	40	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	600	2400	<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
	Toluene	mg/kg	0.5	288	1152	<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
Metals	Arsenic	mg/kg	4	100	400	9	14	<5	<5	6	<5	12	<5	13	<5	8	<5	12	<5	10	20
	Beryllium	mg/kg	1	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Cadmium	mg/kg	0.4	20	80	3	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	4	<1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	100	400	18.7	14.2	<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
	Lead	mg/kg	1	100	400	332	131	<5	<5	<5	<5	20	<5	42	<5	<5	<5	753	<5	135	<5
	Mercury	mg/kg	0.1	4	16	0.3	0.4	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	1.2	<0.1	<0.1	<0.1	0.4	<0.1	0.2	<0.1
	Molybdenum	mg/kg	1	100	400	5	4	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	3	<2	3	<2
	Nickel	mg/kg	1	40	160	23	27	<2	<2	<2	<2	4	<2	10	<2	2	<2	26	<2	14	<2
	Selenium	mg/kg	2	20	80	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Silver	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
OCP	a-BHC	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	Aldrin	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	b-BHC	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	chlordane	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	d-BHC	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	DDT+DDE+DDD	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	Dieldrin	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	Endosulfan	mg/kg	0.05	60	240	-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	Endrin	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	Endrin aldehyde	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	g-BHC (Lindane)	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	Heptachlor	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	Heptachlor epoxide	mg/kg	0.05			-	-	-	-	<2.5	<0.25	<0.05	<0.05	-	-	-	-	-	<0.25	<0.05	-
	Sum Scheduled Chemicals	mg/kg	-	<50	<50	-	-	-	-	nc	nc	nc	nc	-	-	-	-	-	nc	nc	-
OPP	Chlorpyrifos	mg/kg	0.05	4	16	-	-	-	-	-	<0.25	-	<0.05	-	-	-	-	-	-	-	-
	Chlorpyrifos-methyl	mg/kg	0.05			-	-	-	-	-	<0.25	-	<0.05	-	-	-	-	-	-	-	-
	Diazinon	mg/kg	0.05			-	-	-	-	-	<0.25	-	<0.05	-	-	-	-	-	-	-	-
	Dichlorvos	mg/kg	0.05			-	-	-	-	-	<0.25	-	<0.05	-	-	-	-	-	-	-	-
	Dimethoate	mg/kg	0.05			-	-	-	-	-	<0.25	-	<0.05	-	-	-	-	-	-	-	-
	Ethion	mg/kg	0.05			-	-	-	-	-	<0.25	-	<0.05	-	-	-	-	-	-	-	-
	Fenthion	mg/kg	0.05			-	-	-	-	-	<0.25	-	<0.05	-	-	-	-	-	-	-	-
	Malathion	mg/kg	0.05			-	-	-	-	-	<0.25	-	<0.05	-	-	-	-	-	-	-	-
	Methyl parathion	mg/kg	0.2			-	-	-	-	-	<0.2	-	<0.2	-	-	-	-	-	-	-	-
SVOC	Pentachlorophenol	mg/kg	2			<8	<8	<8	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Sum Moderately Harmful Pesticides	mg/kg	-	250	1000	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
PCBs	PCBs (Sum of total)	mg/kg	0.1	<50	<50	-	-	-	-	<0.2	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	-
SVOCs	2,4,5-trichlorophenol	mg/kg	0.5	8000	32000	<4	<4	<4	<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
	2,4,6-trichlorophenol	mg/kg	0.5	40	160	<4	<4	<4	<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
	Methyl Ethyl Ketone	mg/kg	5	4000	16000	-	-	-	-	<5	<5	<5	<5	-	-	-	-	-	<5	<5	-
VOCs	1,1,1,2-tetrachloroethane	mg/kg	0.5	200	800	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	1,1,1-trichloroethane	mg/kg	0.5	600	2400	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	1,1,2,2-tetrachloroethane	mg/kg	0.5	26	104	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	1,1,2-trichloroethane	mg/kg	0.5	24	96	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	1,1-dichloroethene	mg/kg	0.5	14	56	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	1,2-dichlorobenzene	mg/kg	0.5	86	344	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	1,2-dichloroethane	mg/kg	0.5	10	40	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	1,4-dichlorobenzene	mg/kg	0.5	150	600	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	Carbon tetrachloride	mg/kg	0.5	10	40	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	Chlorobenzene	mg/kg	0.5	2000	8000	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	Chloroform	mg/kg	0.5	120	480	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-
	Styrene	mg/kg	0.5	60	240	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	-

Notes:
NSW DECCW (2008 and 2009) - New South Wales Department of Climate Change and Water *Waste Classification Guidelin*
TRH = Total Recoverable Hydrocarbons
CT = Contaminant Threshold
GSW = General Solid Waste
RSW = Restricted Solid Waste
mg/kg = milligrams per kilogram
PERCENT_WW = percentage weight per weight
Shading denotes exceedence of NSW EPA 2014 General Solid Waste Criteria (Contaminant Threshold 1, non-le
Shading dneotes exceedence of NSW 2014 Restricted Solid Waste Criteria (Contaminant Threshold 2, non-leac
Bold LOR exceeds criteria

Table T1
Waste Classification (Non-leach)
Soil Analytical Results

						A018		A019	
					Field_ID	A018_0.0-0.2	A018_0.4-0.5	A019_0.0-0.2	A019_0.4-0.5
					Sample_Depth_Range	0-0.2	0.4-0.5	0-0.2	0.4-0.5
					Location_Code	A018	A018	A019	A019
					Sampled_Date_Time	19/10/2013	21/10/2013	19/10/2013	21/10/2013
					SDG	ES1322746	ES1322899	ES1322746	ES1322899
					Sample_Type	Normal	Normal	Normal	Normal
Chem_ Group	**ChemName**	**output unit**	**LOR**	**NSW 2014 GSW (CT1)**	**NSW 2014 RSW (CT2)**				
TRH	TRH C6-C9	mg/kg	10	650	2600	<10	<10	<10	<10
(NEPM	TRH C10-36 (Total)	mg/kg	50	10,000	40,000	<50	<50	<50	<50
PAHs	Benzo(a) pyrene	mg/kg	0.05	0.8	3.2	<0.5	<0.5	<0.5	<0.5
	Sum of PAHs	mg/kg	-	200	800	nc	nc	nc	nc
Phenols	2-methylphenol	mg/kg	0.5	4000	16000	<0.5	<0.5	<0.5	<0.5
CAHs	Tetrachloroethene	mg/kg	0.5	14	56	-	-	-	-
	Trichloroethene	mg/kg	0.5	10	40	-	-	-	-
	Vinyl chloride	mg/kg	5	4	16	-	-	-	-
BTEX	Benzene	mg/kg	0.2	10	40	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	600	2400	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	288	1152	<0.5	<0.5	<0.5	<0.5
Metals	Arsenic	mg/kg	4	100	400	7	<5	17	6
	Beryllium	mg/kg	1	20	80	<1	<1	<1	<1
	Cadmium	mg/kg	0.4	20	80	<1	<1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	100	400	<0.5	<0.5	<0.5	<0.5
	Lead	mg/kg	1	100	400	58	18	24	<5
	Mercury	mg/kg	0.1	4	16	<0.1	<0.1	0.1	<0.1
	Molybdenum	mg/kg	1	100	400	<2	<2	<2	<2
	Nickel	mg/kg	1	40	160	4	<2	5	<2
	Selenium	mg/kg	2	20	80	<5	<5	<5	<5
	Silver	mg/kg	1	100	400	<2	<2	<2	<2
OCP	a-BHC	mg/kg	0.05			-	-	-	-
	Aldrin	mg/kg	0.05			-	-	-	-
	b-BHC	mg/kg	0.05			-	-	-	-
	chlordane	mg/kg	0.05			-	-	-	-
	d-BHC	mg/kg	0.05			-	-	-	-
	DDT+DDE+DDD	mg/kg	0.05			-	-	-	-
	Dieldrin	mg/kg	0.05			-	-	-	-
	Endosulfan	mg/kg	0.05	60	240	-	-	-	-
	Endrin	mg/kg	0.05			-	-	-	-
	Endrin aldehyde	mg/kg	0.05			-	-	-	-
	g-BHC (Lindane)	mg/kg	0.05			-	-	-	-
	Heptachlor	mg/kg	0.05			-	-	-	-
	Heptachlor epoxide	mg/kg	0.05			-	-	-	-
	Sum Scheduled Chemicals	mg/kg	-	<50	<50	-	-	-	-
OPP	Chlorpyrifos	mg/kg	0.05	4	16	-	-	-	-
	Chlorpyrifos-methyl	mg/kg	0.05			-	-	-	-
	Diazinon	mg/kg	0.05			-	-	-	-
	Dichlorvos	mg/kg	0.05			-	-	-	-
	Dimethoate	mg/kg	0.05			-	-	-	-
	Ethion	mg/kg	0.05			-	-	-	-
	Fenthion	mg/kg	0.05			-	-	-	-
	Malathion	mg/kg	0.05			-	-	-	-
	Methyl parathion	mg/kg	0.2			-	-	-	-
SVOC	Pentachlorophenol	mg/kg	2			<2	<2	<2	<2
	Sum Moderately Harmful Pesticides	mg/kg	-	250	1000	nc	nc	nc	nc
PCBs	PCBs (Sum of total)	mg/kg	0.1	<50	<50	-	-	-	-
SVOCs	2,4,5-trichlorophenol	mg/kg	0.5	8000	32000	<0.5	<0.5	<0.5	<0.5
	2,4,6-trichlorophenol	mg/kg	0.5	40	160	<0.5	<0.5	<0.5	<0.5
	Methyl Ethyl Ketone	mg/kg	5	4000	16000	-	-	-	-
VOCs	1,1,1,2-tetrachloroethane	mg/kg	0.5	200	800	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.5	600	2400	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.5	26	104	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.5	24	96	-	-	-	-
	1,1-dichloroethene	mg/kg	0.5	14	56	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.5	86	344	-	-	-	-
	1,2-dichloroethane	mg/kg	0.5	10	40	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.5	150	600	-	-	-	-
	Carbon tetrachloride	mg/kg	0.5	10	40	-	-	-	-
	Chlorobenzene	mg/kg	0.5	2000	8000	-	-	-	-
	Chloroform	mg/kg	0.5	120	480	-	-	-	-
	Styrene	mg/kg	0.5	60	240	-	-	-	-

Notes:
NSW DECCW (2008 and 2009) - New South Wales Department of Climate Change and Water *Waste Classification Guidelin*
TRH = Total Recoverable Hydrocarbons
CT = Contaminant Threshold
GSW = General Solid Waste
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Shading denotes exceedence of NSW EPA 2014 General Solid Waste Criteria (Contaminant Threshold 1, non-le
Shading dneotes exceedence of NSW 2014 Restricted Solid Waste Criteria (Contaminant Threshold 2, non-leac
Bold LOR exceeds criteria

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Table T1
Waste Classification (Non-leach)
Soil Analytical Results

						B001		B002	B003		B004	B005	B006		B007	B008		B009	B010		B011
					Field_ID	B001_0.0-0.2	B001_0.4-0.5	B002_0.0-0.2	B003_0.0-0.2	B003_0.4-0.5	B004_0.0-0.2	B005_0.0-0.2	B006_0.0-0.2	B006_0.4-0.5	B007_0.0-0.2	B008_0.0-0.2	B008_0.4-0.5	B009_0.0-0.2	B010_0.0-0.2	B010_0.4-0.5	B011_0.0-0.2
					Sample_Depth_Range	0-0.2	0.4-0.5	0-0.2	0-0.2	0.4-0.5	0-0.2	0-0.2	0-0.2	0.4-0.5	0-0.2	0-0.2	0.4-0.5	0-0.2	0-0.2	0.4-0.5	0-0.2
					Location_Code	B001	B001	B002	B003	B003	B004	B005	B006	B006	B007	B008	B008	B009	B010	B010	B011
					Sampled_Date_Time	21/10/2013	23/10/2013	21/10/2013	21/10/2013	23/10/2013	21/10/2013	19/10/2013	21/10/2013	24/10/2013	21/10/2013	21/10/2013	24/10/2013	21/10/2013	21/10/2013	24/10/2013	21/10/2013
					SDG	ES1322813	ES1323052	ES1322813	ES1322813	ES1323052	ES1322813	ES1322746	ES1322813	ES1323080	ES1322813	ES1322813	ES1323080	ES1322813	ES1322813	ES1323080	ES1322813
					Sample_Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Chem_ Group	**ChemName**	**output unit**	**LOR**	**NSW 2014 GSW (CT1)**	**NSW 2014 RSW (CT2)**																
TRH	TRH C6-C9	mg/kg	10	650	2600	401	<10	14	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
(NEPM	TRH C10-36 (Total)	mg/kg	50	10,000	40,000	45,200	1390	7200	<50	<50	5060	<50	<50	<50	<50	<50	<50	<50	870	110	1170
PAHs	Benzo(a) pyrene	mg/kg	0.05	0.8	3.2	6.7	<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
	Sum of PAHs	mg/kg	-	200	800	504.7	16	8.2	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Phenols	2-methylphenol	mg/kg	0.5	4000	16000	<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
CAHs	Tetrachloroethene	mg/kg	0.5	14	56	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trichloroethene	mg/kg	0.5	10	40	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	Vinyl chloride	mg/kg	5	4	16	<5	<5	<5	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX	Benzene	mg/kg	0.2	10	40	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	600	2400	3.8	<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
	Toluene	mg/kg	0.5	288	1152	7.2	<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
Metals	Arsenic	mg/kg	4	100	400	<5	<5	<5	<5	<5	13	<5	<5	<5	<5	<5	<5	<5	19	<5	<5
	Beryllium	mg/kg	1	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Cadmium	mg/kg	0.4	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	100	400	<2.5	<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
	Lead	mg/kg	1	100	400	55	<5	278	238	137	80	49	<5	<5	45	64	14	14	102	<5	9
	Mercury	mg/kg	0.1	4	16	0.7	<0.1	0.5	0.2	0.4	0.9	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.7	0.1	0.2
	Molybdenum	mg/kg	1	100	400	<2	<2	<2	6	2	<2	<2	<2	<2	<2	<2	<2	<2	6	<2	26
	Nickel	mg/kg	1	40	160	5	<2	7	14	5	19	13	<2	<2	4	6	<2	12	46	<2	3
	Selenium	mg/kg	2	20	80	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Silver	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
OCP	a-BHC	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aldrin	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	b-BHC	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	chlordane	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	d-BHC	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan	mg/kg	0.05	60	240	<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin aldehyde	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg	0.05			<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sum Scheduled Chemicals	mg/kg	-	<50	<50	nc	nc	nc	-	-	-	-	-	-	-	-	-	-	-	-	-
OPP	Chlorpyrifos	mg/kg	0.05	4	16	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorpyrifos-methyl	mg/kg	0.05			-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Diazinon	mg/kg	0.05			-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dichlorvos	mg/kg	0.05			-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dimethoate	mg/kg	0.05			-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethion	mg/kg	0.05			-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fenthion	mg/kg	0.05			-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Malathion	mg/kg	0.05			-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Methyl parathion	mg/kg	0.2			-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SVOC	Pentachlorophenol	mg/kg	2			<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Sum Moderately Harmful Pesticides	mg/kg	-	250	1000	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
PCBs	PCBs (Sum of total)	mg/kg	0.1	<50	<50	<0.2	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2,4,5-trichlorophenol	mg/kg	0.5	8000	32000	<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
	2,4,6-trichlorophenol	mg/kg	0.5	40	160	<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
	Methyl Ethyl Ketone	mg/kg	5	4000	16000	<5	<5	<5	-	-	-	-	-	-	-	-	-	-	-	-	-
VOCs	1,1,1,2-tetrachloroethane	mg/kg	0.5	200	800	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.5	600	2400	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.5	26	104	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.5	24	96	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	0.5	14	56	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.5	86	344	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichloroethane	mg/kg	0.5	10	40	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.5	150	600	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon tetrachloride	mg/kg	0.5	10	40	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorobenzene	mg/kg	0.5	2000	8000	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	0.5	120	480	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	Styrene	mg/kg	0.5	60	240	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
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Bold LOR exceeds criteria

Table T1
Waste Classification (Non-leach)
Soil Analytical Results

						B012		B013	B014		B015	B016		B017	B018		B019	B020
	Field_ID					B012_0.0-0.2	B012_0.4-0.5	B013_0.0-0.2	B014_0.0-0.2	B014_0.4-0.5	B015_0.0-0.2	B016_0.0-0.2	B016_0.4-0.5	B017_0.0-0.2	B018_0.0-0.2	B018_0.4-0.5	B019_0.0-0.2	B020_0.0-0.2
	Sample_Depth_Range					0-0.2	0.4-0.5	0-0.2	0-0.2	0.4-0.5	0-0.2	0-0.2	0.4-0.5	0-0.2	0-0.2	0.4-0.5	0-0.2	0-0.2
	Location_Code					B012	B012	B013	B014	B014	B015	B016	B016	B017	B018	B018	B019	B020
	Sampled_Date_Time					21/10/2013	24/10/2013	21/10/2013	18/10/2013	24/10/2013	18/10/2013	18/10/2013	24/10/2013	18/10/2013	18/10/2013	24/10/2013	18/10/2013	18/10/2013
	SDG					ES1322813	ES1323080	ES1322813	ES1322746	ES1323080	ES1322746	ES1322746	ES1323080	ES1322746	ES1322746	ES1323080	ES1322746	ES1322746
	Sample_Type					Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Chem_Group	**ChemName**	**output unit**	**LOR**	**NSW 2014 GSW (CT1)**	**NSW 2014 RSW (CT2)**													
TRH	TRH C6-C9	mg/kg	10	650	2600	<10	<10	<10	<10	4320	<10	<10	<10	<10	<10	<10	<10	<10
(NEPM	TRH C10-36 (Total)	mg/kg	50	10,000	40,000	<50	<50	<50	170	410	350	19,000	770	<50	<50	<50	<50	<50
PAHs	Benzo(a) pyrene	mg/kg	0.05	0.8	3.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Sum of PAHs	mg/kg	-	200	800	nc	nc	nc	nc	nc	nc	159.6	7.9	nc	nc	nc	nc	nc
Phenols	2-methylphenol	mg/kg	0.5	4000	16000	<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
CAHs	Tetrachloroethene	mg/kg	0.5	14	56	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	Trichloroethene	mg/kg	0.5	10	40	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	Vinyl chloride	mg/kg	5	4	16	-	-	-	-	<5	-	<5	-	-	-	-	-	-
BTEX	Benzene	mg/kg	0.2	10	40	<0.2	<0.2	<0.2	<0.2	0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	600	2400	<0.5	<0.5	<0.5	<0.5	1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	288	1152	<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
Metals	Arsenic	mg/kg	4	100	400	<5	<5	18	7	<5	22	<5	<5	9	<5	<5	<5	<5
	Beryllium	mg/kg	1	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Cadmium	mg/kg	0.4	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	100	400	<0.5	<0.5	0.5	<0.5	<2.5	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Lead	mg/kg	1	100	400	32	8	50	44	<5	207	11	<5	220	45	6	11	7
	Mercury	mg/kg	0.1	4	16	0.9	0.2	0.3	0.4	<0.1	1.4	<0.1	<0.1	0.2	<0.1	0.1	<0.1	<0.1
	Molybdenum	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	<2	<2	3	<2	<2	<2	7
	Nickel	mg/kg	1	40	160	5	<2	4	6	<2	24	3	<2	25	19	3	<2	4
	Selenium	mg/kg	2	20	80	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Silver	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
OCP	a-BHC	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	Aldrin	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	b-BHC	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	chlordane	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	d-BHC	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	Dieldrin	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	Endosulfan	mg/kg	0.05	60	240	-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	Endrin	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	Endrin aldehyde	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	Heptachlor	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg	0.05			-	-	-	-	<0.05	-	<0.25	-	-	-	-	-	-
	Sum Scheduled Chemicals	mg/kg	-	<50	<50	-	-	-	-	nc	-	nc	-	-	-	-	-	-
OPP	Chlorpyrifos	mg/kg	0.05	4	16	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorpyrifos-methyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-
	Diazinon	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-
	Dichlorvos	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-
	Dimethoate	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-
	Fenthion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-
	Malathion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-
	Methyl parathion	mg/kg	0.2			-	-	-	-	-	-	-	-	-	-	-	-	-
SVOC	Pentachlorophenol	mg/kg	2			<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Sum Moderately Harmful Pesticides	mg/kg	-	250	1000	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
PCBs	PCBs (Sum of total)	mg/kg	0.1	<50	<50	-	-	-	-	<0.1	-	<0.1	-	-	-	-	-	-
SVOCs	2,4,5-trichlorophenol	mg/kg	0.5	8000	32000	<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
	2,4,6-trichlorophenol	mg/kg	0.5	40	160	<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
	Methyl Ethyl Ketone	mg/kg	5	4000	16000	-	-	-	-	<5	-	<5	-	-	-	-	-	-
VOCs	1,1,1,2-tetrachloroethane	mg/kg	0.5	200	800	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.5	600	2400	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.5	26	104	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.5	24	96	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	0.5	14	56	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.5	86	344	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	1,2-dichloroethane	mg/kg	0.5	10	40	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.5	150	600	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	Carbon tetrachloride	mg/kg	0.5	10	40	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	Chlorobenzene	mg/kg	0.5	2000	8000	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	Chloroform	mg/kg	0.5	120	480	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-
	Styrene	mg/kg	0.5	60	240	-	-	-	-	<0.5	-	<0.5	-	-	-	-	-	-

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Waste Classification (Non-leach)
Soil Analytical Results

						B021		B022	B023		B024	B025	B026		B027		B028	B029		B030
					Field_ID	B021_0.0-0.2	B021_0.4-0.5	B022_0.0-0.2	B023_0.0-0.2	B023_0.4-0.5	B024_0.0-0.2	B025_0.0.-0.2	B026_0.0-0.2	B026_0.4-0.5	B027_0.0-0.2	B027_0.4-0.5	B028_0.0-0.2	B029_0.0-0.2	B029_0.4-0.5	B030_0.0-0.2
					Sample_Depth_Range	0-0.2	0.4-0.5	0-0.2	0-0.2	0.4-0.5	0-0.2	0-0.2	0-0.2	0.4-0.5	0-0.2	0.4-0.5	0-0.2	0-0.2	0.4-0.5	0-0.2
					Location_Code	B021	B021	B022	B023	B023	B024	B025	B026	B026	B027	B027	B028	B029	B029	B030
					Sampled_Date_Time	18/10/2013	24/10/2013	18/10/2013	18/10/2013	24/10/2013	18/10/2013	18/10/2013	18/10/2013	24/10/2013	18/10/2013	24/10/2013	18/10/2013	18/10/2013	24/10/2013	18/10/2013
					SDG	ES1322746	ES1323080	ES1322746	ES1322746	ES1323080	ES1322746	ES1322746	ES1322746	ES1323080	ES1322746	ES1323080	ES1322746	ES1322746	ES1323080	ES1322746
					Sample_Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Chem_ Group	**ChemName**	**output unit**	**LOR**	**NSW 2014 GSW (CT1)**	**NSW 2014 RSW (CT2)**															
TRH	TRH C6-C9	mg/kg	10	650	2600	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
(NEPM	TRH C10-36 (Total)	mg/kg	50	10,000	40,000	<50	<50	<50	<50	<50	<50	120	<50	<50	<50	<50	1620	<50	<50	1970
PAHs	Benzo(a) pyrene	mg/kg	0.05	0.8	3.2	<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
	Sum of PAHs	mg/kg	-	200	800	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.7
Phenols	2-methylphenol	mg/kg	0.5	4000	16000	<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
CAHs	Tetrachloroethene	mg/kg	0.5	14	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trichloroethene	mg/kg	0.5	10	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Vinyl chloride	mg/kg	5	4	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX	Benzene	mg/kg	0.2	10	40	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	600	2400	<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
	Toluene	mg/kg	0.5	288	1152	<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
Metals	Arsenic	mg/kg	4	100	400	<5	<5	<5	6	<5	<5	<5	<5	<5	<5	<5	<5	8	<5	<5
	Beryllium	mg/kg	1	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Cadmium	mg/kg	0.4	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	100	400	<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
	Lead	mg/kg	1	100	400	20	<5	<5	58	12	24	31	10	<5	<5	<5	21	66	9	75
	Mercury	mg/kg	0.1	4	16	<0.1	<0.1	<0.1	<0.1	<0.1	1	0.1	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	<0.1
	Molybdenum	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Nickel	mg/kg	1	40	160	9	<2	<2	5	2	16	9	22	<2	2	<2	5	15	4	41
	Selenium	mg/kg	2	20	80	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Silver	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
OCP	a-BHC	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aldrin	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	b-BHC	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	chlordane	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	d-BHC	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan	mg/kg	0.05	60	240	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin aldehyde	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sum Scheduled Chemicals	mg/kg	-	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OPP	Chlorpyrifos	mg/kg	0.05	4	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorpyrifos-methyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Diazinon	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dichlorvos	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dimethoate	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fenthion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Malathion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Methyl parathion	mg/kg	0.2			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SVOC	Pentachlorophenol	mg/kg	2			<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Sum Moderately Harmful Pesticides	mg/kg	-	250	1000	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
PCBs	PCBs (Sum of total)	mg/kg	0.1	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2,4,5-trichlorophenol	mg/kg	0.5	8000	32000	<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
	2,4,6-trichlorophenol	mg/kg	0.5	40	160	<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
	Methyl Ethyl Ketone	mg/kg	5	4000	16000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VOCs	1,1,1,2-tetrachloroethane	mg/kg	0.5	200	800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.5	600	2400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.5	26	104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.5	24	96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	0.5	14	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.5	86	344	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichloroethane	mg/kg	0.5	10	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.5	150	600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon tetrachloride	mg/kg	0.5	10	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorobenzene	mg/kg	0.5	2000	8000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	0.5	120	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Styrene	mg/kg	0.5	60	240	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
NSW DECCW (2008 and 2009) - New South Wales Department of Climate Change and Water *Waste Classification Guidelir*
TRH = Total Recoverable Hydrocarbons
CT = Contaminant Threshold
GSW = General Solid Waste
RSW = Restricted Solid Waste
mg/kg = milligrams per kilogram
PERCENT_WW = percentage weight per weight
Shading denotes exceedence of NSW EPA 2014 General Solid Waste Criteria (Contaminant Threshold 1, non-le
Shading dneotes exceedence of NSW 2014 Restricted Solid Waste Criteria (Contaminant Threshold 2, non-leac
Bold LOR exceeds criteria

Table T1
Waste Classification (Non-leach)
Soil Analytical Results

						C003			C004			C005			C006			C007		
					Field_ID	C003_0.0-0.2	C003_0.4-0.5	C003_0.9-1.0	C004_0.0-0.2	C004_0.4-0.5	C004_0.9-1.0	C005_0.0-0.2	C005_0.4-0.5	C005_0.8-0.9	C006_0.0-0.2	C006_0.9-1.0	C006_1.2-1.3	C007_0.4-0.5	C007_0.7-0.8	C008_0.0-0.2
					Sample_Depth_Range	0-0.2	0.4-0.5	0.9-1	0-0.2	0.4-0.5	0.9-1	0-0.2	0.4-0.5	0.8-0.9	0-0.2	0.9-0	1.2-1.3	0.4-0.5	0.7-0.8	0-0.2
					Location_Code	C003	C003	C003	C004	C004	C004	C005	C005	C005	C006	C006	C006	C007	C007	C008
					Sampled_Date_Time	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013
					SDG	ES1323052	ES1323052	ES1323052	ES1323052	ES1323052	ES1323052	ES1323052	ES1323052	ES1323052	ES1322899	ES1322899	ES1322899	ES1322899	ES1322899	ES1322899
					Sample_Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Chem_Group	**ChemName**	**output unit**	**LOR**	**NSW 2014 GSW (CT1)**	**NSW 2014 RSW (CT2)**															
TRH	TRH C6-C9	mg/kg	10	650	2600	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
(NEPM	TRH C10-36 (Total)	mg/kg	50	10,000	40,000	29,400	20,400	590	920	<50	<50	3900	<50	2820	20,700	500	1860	310	250	290
PAHs	Benzo(a) pyrene	mg/kg	0.05	0.8	3.2	<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
	Sum of PAHs	mg/kg	-	200	800	nc	nc	nc	nc	nc	nc	nc	nc	nc	5	nc	nc	nc	nc	nc
Phenols	2-methylphenol	mg/kg	0.5	4000	16000	<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
CAHs	Tetrachloroethene	mg/kg	0.5	14	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trichloroethene	mg/kg	0.5	10	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Vinyl chloride	mg/kg	5	4	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX	Benzene	mg/kg	0.2	10	40	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	600	2400	<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
	Toluene	mg/kg	0.5	288	1152	<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
Metals	Arsenic	mg/kg	4	100	400	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Beryllium	mg/kg	1	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Cadmium	mg/kg	0.4	20	80	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	100	400	<2.5	<2.5	<2.5	<2.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Lead	mg/kg	1	100	400	55	<5	<5	40	38	<5	184	<5	42	64	6	14	6	<5	36
	Mercury	mg/kg	0.1	4	16	<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
	Molybdenum	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	2	<2	<2	10	<2	<2	<2	<2	<2
	Nickel	mg/kg	1	40	160	4	<2	<2	4	<2	<2	14	<2	13	3	4	6	<2	12	3
	Selenium	mg/kg	2	20	80	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Silver	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
OCP	a-BHC	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aldrin	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	b-BHC	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	chlordane	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	d-BHC	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan	mg/kg	0.05	60	240	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin aldehyde	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sum Scheduled Chemicals	mg/kg	-	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OPP	Chlorpyrifos	mg/kg	0.05	4	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorpyrifos-methyl	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Diazinon	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dichlorvos	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dimethoate	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fenthion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Malathion	mg/kg	0.05			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Methyl parathion	mg/kg	0.2			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SVOC	Pentachlorophenol	mg/kg	2			<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Sum Moderately Harmful Pesticides	mg/kg	-	250	1000	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
PCBs	PCBs (Sum of total)	mg/kg	0.1	<50	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2,4,5-trichlorophenol	mg/kg	0.5	8000	32000	<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
	2,4,6-trichlorophenol	mg/kg	0.5	40	160	<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
	Methyl Ethyl Ketone	mg/kg	5	4000	16000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VOCs	1,1,1,2-tetrachloroethane	mg/kg	0.5	200	800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.5	600	2400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.5	26	104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.5	24	96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	0.5	14	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.5	86	344	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichloroethane	mg/kg	0.5	10	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.5	150	600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon tetrachloride	mg/kg	0.5	10	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chlorobenzene	mg/kg	0.5	2000	8000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	0.5	120	480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Styrene	mg/kg	0.5	60	240	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
NSW DECCW (2008 and 2009) - New South Wales Department of Climate Change and Water *Waste Classification Guidelin*
TRH = Total Recoverable Hydrocarbons
CT = Contaminant Threshold
GSW = General Solid Waste
RSW = Restricted Solid Waste
mg/kg = milligrams per kilogram
PERCENT_WW = percentage weight per weight
Shading denotes exceedence of NSW EPA 2014 General Solid Waste Criteria (Contaminant Threshold 1, non-le
Shading dneotes exceedence of NSW 2014 Restricted Solid Waste Criteria (Contaminant Threshold 2, non-leac
Bold LOR exceeds criteria

Table T1
Waste Classification (Non-leach)
Soil Analytical Results

						C008		C009			C010		
					Field_ID	C008_0.4-0.5	C008_0.9-1.0	C009_0.0-0.2	C009_0.9-1.0	C009_1.9-2.0	C010_0.0-0.2	C010_0.4-0.5	C010_0.9-1.0
					Sample_Depth_Range	0.4-0.5	0.9-1	0-0.2	0.9-1	1.9-2	0-0.2	0.4-0.5	0.9-1
					Location_Code	C008	C008	C009	C009	C009	C010	C010	C010
					Sampled_Date_Time	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013
					SDG	ES1322899	ES1322899	ES1322899	ES1322899	ES1322899	ES1322899	ES1322899	ES1322899
					Sample_Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Chem_ Group	**ChemName**	**output unit**	**LOR**	**NSW 2014 GSW (CT1)**	**NSW 2014 RSW (CT2)**								
TRH	TRH C6-C9	mg/kg	10	650	2600	<10	<10	<10	<10	<10	<10	<10	<10
(NEPM	TRH C10-36 (Total)	mg/kg	50	10,000	40,000	<50	<50	2880	<50	<50	6660	<50	2330
PAHs	Benzo(a) pyrene	mg/kg	0.05	0.8	3.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Sum of PAHs	mg/kg	-	200	800	nc	nc	nc	nc	nc	nc	nc	nc
Phenols	2-methylphenol	mg/kg	0.5	4000	16000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CAHs	Tetrachloroethene	mg/kg	0.5	14	56	-	-	-	-	-	-	<0.5	-
	Trichloroethene	mg/kg	0.5	10	40	-	-	-	-	-	-	<0.5	-
	Vinyl chloride	mg/kg	5	4	16	-	-	-	-	-	-	**<5**	-
BTEX	Benzene	mg/kg	0.2	10	40	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	600	2400	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5	288	1152	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Metals	Arsenic	mg/kg	4	100	400	<5	<5	<5	<5	<5	<5	<5	8
	Beryllium	mg/kg	1	20	80	<1	<1	<1	<1	<1	<1	<1	<1
	Cadmium	mg/kg	0.4	20	80	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	100	400	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Lead	mg/kg	1	100	400	<5	<5	7	<5	<5	<5	<5	<5
	Mercury	mg/kg	0.1	4	16	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Molybdenum	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	<2	<2
	Nickel	mg/kg	1	40	160	<2	<2	<2	<2	<2	<2	<2	<2
	Selenium	mg/kg	2	20	80	<5	<5	<5	<5	<5	<5	<5	<5
	Silver	mg/kg	1	100	400	<2	<2	<2	<2	<2	<2	<2	<2
OCP	a-BHC	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	Aldrin	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	b-BHC	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	chlordane	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	d-BHC	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	DDT+DDE+DDD	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	Dieldrin	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	Endosulfan	mg/kg	0.05	60	240	-	-	-	-	-	-	<0.05	-
	Endrin	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	Endrin aldehyde	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	g-BHC (Lindane)	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	Heptachlor	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	Heptachlor epoxide	mg/kg	0.05			-	-	-	-	-	-	<0.05	-
	Sum Scheduled Chemicals	mg/kg	-	<50	<50	-	-	-	-	-	-	nc	-
OPP	Chlorpyrifos	mg/kg	0.05	4	16	-	-	-	-	-	-	-	-
	Chlorpyrifos-methyl	mg/kg	0.05			-	-	-	-	-	-	-	-
	Diazinon	mg/kg	0.05			-	-	-	-	-	-	-	-
	Dichlorvos	mg/kg	0.05			-	-	-	-	-	-	-	-
	Dimethoate	mg/kg	0.05			-	-	-	-	-	-	-	-
	Ethion	mg/kg	0.05			-	-	-	-	-	-	-	-
	Fenthion	mg/kg	0.05			-	-	-	-	-	-	-	-
	Malathion	mg/kg	0.05			-	-	-	-	-	-	-	-
	Methyl parathion	mg/kg	0.2			-	-	-	-	-	-	-	-
SVOC	Pentachlorophenol	mg/kg	2			<2	<2	<2	<2	<2	<2	<2	<2
	Sum Moderately Harmful Pesticides	mg/kg	-	250	1000	nc	nc	nc	nc	nc	nc	nc	nc
PCBs	PCBs (Sum of total)	mg/kg	0.1	<50	<50	-	-	-	-	-	-	<0.1	-
SVOCs	2,4,5-trichlorophenol	mg/kg	0.5	8000	32000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2,4,6-trichlorophenol	mg/kg	0.5	40	160	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Methyl Ethyl Ketone	mg/kg	5	4000	16000	-	-	-	-	-	-	<5	-
VOCs	1,1,1,2-tetrachloroethane	mg/kg	0.5	200	800	-	-	-	-	-	-	<0.5	-
	1,1,1-trichloroethane	mg/kg	0.5	600	2400	-	-	-	-	-	-	<0.5	-
	1,1,2,2-tetrachloroethane	mg/kg	0.5	26	104	-	-	-	-	-	-	<0.5	-
	1,1,2-trichloroethane	mg/kg	0.5	24	96	-	-	-	-	-	-	<0.5	-
	1,1-dichloroethene	mg/kg	0.5	14	56	-	-	-	-	-	-	<0.5	-
	1,2-dichlorobenzene	mg/kg	0.5	86	344	-	-	-	-	-	-	<0.5	-
	1,2-dichloroethane	mg/kg	0.5	10	40	-	-	-	-	-	-	<0.5	-
	1,4-dichlorobenzene	mg/kg	0.5	150	600	-	-	-	-	-	-	<0.5	-
	Carbon tetrachloride	mg/kg	0.5	10	40	-	-	-	-	-	-	<0.5	-
	Chlorobenzene	mg/kg	0.5	2000	8000	-	-	-	-	-	-	<0.5	-
	Chloroform	mg/kg	0.5	120	480	-	-	-	-	-	-	<0.5	-
	Styrene	mg/kg	0.5	60	240	-	-	-	-	-	-	<0.5	-

Notes:
NSW DECCW (2008 and 2009) - New South Wales Department of Climate Change and Water *Waste Classification Guidelin*
TRH = Total Recoverable Hydrocarbons
CT = Contaminant Threshold
GSW = General Solid Waste
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mg/kg = milligrams per kilogram
PERCENT_WW = percentage weight per weight
Shading denotes exceedence of NSW EPA 2014 General Solid Waste Criteria (Contaminant Threshold 1, non-le
Shading dneotes exceedence of NSW 2014 Restricted Solid Waste Criteria (Contaminant Threshold 2, non-leac
Bold LOR exceeds criteria

Table T2
Waste Classification (Leachable)
Soil Analytical Results

								A001		A004		A006		A007		A009	
	Field_ID							A001_0.0-0.2	A001_0.0-0.2	A004_0.0-0.2	A004_0.0-0.2	A006_0.0-0.2	A006_0.0-0.2	A007_0.0-0.2	A007_0.0-0.2	A009_0.0-0.2	A009_0.0-0.2
	Sample_Depth_Range							0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
	Location_Code							A001	A001	A004	A004	A006	A006	A007	A007	A009	A009
	Sampled_Date_Time							21/10/2013	21/10/2013	21/10/2013	21/10/2013	19/10/2013	19/10/2013	19/10/2013	19/10/2013	19/10/2013	19/10/2013
	Matrix Type							SOIL	TCLP	SOIL	TCLP	SOIL	TCLP	SOIL	TCLP	SOIL	TCLP
	SDG							ES1322813	ES1322813	ES1322813	ES1322813	ES1322746	ES1322746	ES1322746	ES1322746	ES1322746	ES1322746
	Sample_Type							Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
	Chemical Name	**SOIL LOR**	**TCLP LOR**	**NSW EPA 2014 GSW (SCC1) (mg/kg)**	**NSW EPA 2014 GSW (TCLP1) (µg/L)**	**NSW EPA 2014 RSW (SCC2) (mg/kg)**	**NSW EPA 2014 RSW (TCLP2) (µg/L)**										
TRH (NEPM 1999)	TRH C6-C9	10		650		2600		<10		<10		<10		<10		<10	
	TRH C10-36 (Total)	50		10000		40000		5710		34,100		42,600		19,700		144,000	
PAHs	Benzo(a) pyrene	0.05	0.5	10	40	23	160	<0.5		1	<0.5	4.2	<0.5	0.5		<4	
	Sum of PAHs	0.5	0.5	200		800		2.9		61.6	7	72.2	1.5	12.8		91.4	
TCLP for Non & Semivolatile Analytes	pH (Final)		0.1						4.9		5.1		4.9		4.9		5
	pH (Initial)		0.1						6.1		8.8		5.7		5.6		6.7
	pH (after HCL)		0.1						1.7		1.7		1.7		1.7		1.7
	TCLP Fluid		1						1		1		1		1		1
Phenols	2-methylphenol	0.5		7200	200	28800	800	<0.5		<0.5		<0.5		<0.5		<4	
	Phenol	0.5		518	14.4	2073	57.6	<0.5		<0.5		<0.5		<0.5		<4	
CAHs	Tetrachloroethene	0.5		25.2	0.7	100.8	2.8	-		-		-		<0.5		-	
	Trichloroethene	0.5		18	0.5	72	2	-		-		-		<0.5		-	
	Vinyl chloride	5		7.2	0.2	28.8	0.8	-		-		-		<5		-	
BTEX	Total Xylene (ESDAT)	0.5		1800	50	7200	200	<0.5		0.5		<0.5		<0.5		<0.5	
	Benzene	0.2		18	0.5	72	2	<0.2		<0.2		<0.2		<0.2		<0.2	
	Ethylbenzene	0.5		1080	30	4320	120	<0.5		<0.5		<0.5		<0.5		<0.5	
	Toluene	0.5		518	1.4	2073	57.6	<0.5		<0.5		<0.5		<0.5		<0.5	
Metals	Antimony	5						<5		<5		<5		<5		<5	
	Arsenic	4		500	5	2000	20	<5		<5		22		10		9	
	Beryllium	1		100	1	400	4	<1		<1		<1		<1		<1	
	Cadmium	0.4		100	1	400	4	<1		<1		<1		<1		3	
	Chromium (hexavalent)	0.5		1900	5	7600	20	<0.5		0.9		<0.5		<0.5		18.7	
	Lead	1	100	1500	5000	6000	20,000	292	400	23		22		243	300	332	<100
	Mercury	0.1		50	0.2	200	0.8	0.2		<0.1		<0.1		0.2		0.3	
	Molybdenum	1		1000	5	4000	20	4		<2		<2		6		5	
	Nickel	1	100	1050	2000	4200	8000	8		6		2		12		23	
	Selenium	2		50	1	200	4	<5		<5		<5		<5		<5	
	Silver	1		180	5	720	20	<2		<2		<2		<2		<2	
OCPs	a-BHC	0.05						-		-		-		<0.25		-	
	Aldrin	0.05						-		-		-		<0.25		-	
	b-BHC	0.05						-		-		-		<0.25		-	
	chlordane	0.05						-		-		-		<0.25		-	
	d-BHC	0.05						-		-		-		<0.25		-	
	DDT+DDE+DDD	0.05						-		-		-		<0.25		-	
	Dieldrin	0.05						-		-		-		<0.25		-	
	Endrin	0.05						-		-		-		<0.25		-	
	Endrin aldehyde	0.05						-		-		-		<0.25		-	
	g-BHC (Lindane)	0.05						-		-		-		<0.25		-	
	Heptachlor	0.05						-		-		-		<0.25		-	
	Heptachlor epoxide	0.05						-		-		-		<0.25		-	
	Sum Scheduled Chemicals	-		<50				-		-		-		nc		-	
OPPs	Chlorpyrifos	0.05		7.5	0.2	30	0.8	-		-		-		-		-	
SVOC	Pentachlorophenol	2						<2		<2		<2		<2		<8	
	Sum Moderately Harmful Pesticides	-		250				nc		nc		nc		nc		nc	
PCBs	PCBs (Sum of total)	0.1		50	N/A	50	N/A	-		-		-		<0.2		-	
SVOCs	2,4,5-trichlorophenol	0.5		14400	400	57600	1600	<0.5		<0.5		<0.5		<0.5		<4	
	2,4,6-trichlorophenol	0.5		72	2	288	8	<0.5		<0.5		<0.5		<0.5		<4	
	Methyl Ethyl Ketone	5		7200	200	28800	800	-		-		-		<5		-	
VOCs	1,1,1,2-tetrachloroethane	0.5		360	10	1440	40	-		-		-		<0.5		-	
	1,1,1-trichloroethane	0.5		1080	30	4320	120	-		-		-		<0.5		-	
	1,1,2,2-tetrachloroethane	0.5		46.8	1.3	187.2	5.2	-		-		-		<0.5		-	
	1,1,2-trichloroethane	0.5		43.2	30	172.8	120	-		-		-		<0.5		-	
	1,1-dichloroethene	0.5		25	0.7	100	2.8	-		-		-		<0.5		-	
	1,2-dichlorobenzene	0.5		155	7.5	620	30	-		-		-		<0.5		-	
	1,2-dichloroethane	0.5		18	0.5	72	2	-		-		-		<0.5		-	
	1,4-dichlorobenzene	0.5		270	7.5	1080	30	-		-		-		<0.5		-	
	Carbon tetrachloride	0.5		18	0.5	72	2	-		-		-		<0.5		-	
	Chlorobenzene	0.5		3600	100	14400	400	-		-		-		<0.5		-	
	Chloroform	0.5		216	6	864	24	-		-		-		<0.5		-	
	Styrene	0.5		108	3	432	12	-		-		-		<0.5		-	

Notes:
NSW DECCW (2008 and 2009) - New South Wales Department of Climate Change and Water *Waste Classification Guidelines*
TRH = Total Recoverable Hydrocarbons
TCLP = Toxicity Characteristic Leaching Procedure
GSW = General Solid Waste
RSW = Restricted Solid Waste
mg/kg = milligrams per kilogram
µg/L = micrograms per litre
PERCENT_WW = percentage weight per weight
Shading denotes exceedence of NSW 2008 General Solid Waste - Specific Contaminant Concentration 1
Shading denotes exceedence of NSW 2008 General Solid Waste - Toxicity Characteristics Leaching Procedure 1
Shading denotes exceedenc of NSW 2008 Restricted Solid Waste - Specific Contaminant Concentration 2
Shading denotes exceedence of NSW 2008 Restricted Solid Waste - Toxicity Characteristics Leaching Procedure 2

AECOM

Table T2
Waste Classification (Leachable)
Soil Analytical Results

	Chemical Name	SOIL LOR	TCLP LOR	NSW EPA 2014 GSW (SCC1) (mg/kg)	NSW EPA 2014 GSW (TCLP1) (µg/L)	NSW EPA 2014 RSW (SCC2) (mg/kg)	A010		A011		A016		B001		B002		B003	
							A010_0.0-0.2	A010_0.0-0.2	A011_0.0-0.2	A011_0.0-0.2	A016_0.0-0.2	A016_0.0-0.2	B001_0.0-0.2	B001_0.0-0.2	QC016	QC016	B003_0.0-0.2	B003_0.0-0.2
							0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
							A010	A010	A011	A011	A016	A016	B001	B001	B002	B002	B003	B003
							19/10/2013	19/10/2013	19/10/2013	19/10/2013	19/10/2013	19/10/2013	21/10/2013	21/10/2013	21/10/2013	21/10/2013	21/10/2013	21/10/2013
							SOIL	TCLP	SOIL	TCLP	SOIL	TCLP	SOIL	TCLP	SOIL	TCLP	SOIL	TCLP
							ES1322746	ES1322746	ES1322746	ES1322746	ES1322746	ES1322746	ES1322813	ES1322813	ES1322813	ES1322813	ES1322813	ES1322813
							Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Field_D	Field_D	Normal	Normal
TRH (NEPM 1999)	TRH C6-C9	10		650		2600	<10		<10		<10		401		14		<10	
	TRH C10-36 (Total)	50		10000		40000	132,000		29,300		1680		45,200		6280		<50	
PAHs	Benzo(a) pyrene	0.05	0.5	10	40	23	51.2	<2.4	31.9	<2.2	<0.5		6.7	<2.4	<0.5		<0.5	
	Sum of PAHs	0.5	0.5	200		800	1500	48.1	3000	262	3.9		473	116	8		<0.5	
TCLP for Non & Semivolatile Analytes	pH (Final)		0.1					5		4.9		5		5.4		5.2		5
	pH (Initial)		0.1					6.2		6.4		8.2		8.9		8.8		8.4
	pH (after HCL)		0.1					1.7		1.6		1.7		1.8		1.7		1.7
	TCLP Fluid		1					1		1		1		1		1		1
Phenols	2-methylphenol	0.5		7200	200	28800	<4		<4		<0.5		<0.5		<0.5		<0.5	
	Phenol	0.5		518	14.4	2073	<4		<4		<0.5		<0.5		<0.5		<0.5	
CAHs	Tetrachloroethene	0.5		25.2	0.7	100.8	-		-		-		<0.5		<0.5		-	
	Trichloroethene	0.5		18	0.5	72	-		-		-		<0.5		<0.5		-	
	Vinyl chloride	5		7.2	0.2	28.8	-		-		-		<5		<5		-	
BTEX	Total Xylene (ESDAT)	0.5		1800	50	7200	<0.5		<0.5		<0.5		66.1		<0.5		<0.5	
	Benzene	0.2		18	0.5	72	<0.2		<0.2		<0.2		<0.5		<0.2		<0.2	
	Ethylbenzene	0.5		1080	30	4320	<0.5		<0.5		<0.5		3.8		<0.5		<0.5	
	Toluene	0.5		518	1.4	2073	<0.5		<0.5		<0.5		7.2		<0.5		<0.5	
Metals	Antimony	5					<5		<5		8		<5		<5		<5	
	Arsenic	4		500	5	2000	14		<5		12		<5		<5		<5	
	Beryllium	1		100	1	400	<1		<1		<1		<1		<1		<1	
	Cadmium	0.4		100	1	400	1		<1		4		<1		<1		<1	
	Chromium (hexavalent)	0.5		1900	5	7600	14.2		<0.5		<0.5		<2.5		<0.5		<0.5	
	Lead	1	100	1500	5000	6000	131		<5		753	<100	55		250	<100	238	<100
	Mercury	0.1		50	0.2	200	0.4		<0.1		0.4		0.7		0.3		0.2	
	Molybdenum	1		1000	5	4000	4		<2		3		<2		2		6	
	Nickel	1	100	1050	2000	4200	27		<2		26		5		8		14	
	Selenium	2		50	1	200	<5		<5		<5		<5		<5		<5	
	Silver	1		180	5	720	<2		<2		<2		<2		<2		<2	
OCPs	a-BHC	0.05					-		-		-		<0.25		<0.25		-	
	Aldrin	0.05					-		-		-		<0.25		<0.25		-	
	b-BHC	0.05					-		-		-		<0.25		<0.25		-	
	chlordane	0.05					-		-		-		<0.25		<0.25		-	
	d-BHC	0.05					-		-		-		<0.25		<0.25		-	
	DDT+DDE+DDD	0.05					-		-		-		<0.25		<0.25		-	
	Dieldrin	0.05					-		-		-		<0.25		<0.25		-	
	Endrin	0.05					-		-		-		<0.25		<0.25		-	
	Endrin aldehyde	0.05					-		-		-		<0.25		<0.25		-	
	g-BHC (Lindane)	0.05					-		-		-		<0.25		<0.25		-	
	Heptachlor	0.05					-		-		-		<0.25		<0.25		-	
	Heptachlor epoxide	0.05					-		-		-		<0.25		<0.25		-	
	Sum Scheduled Chemicals	-		<50			-		-		-		nc		nc		-	
OPPs	Chlorpyrifos	0.05		7.5	0.2	30	-		-		-		-		-		-	
SVOC	Pentachlorophenol	2					<8		<8		<2		<2		<2		<2	
	Sum Moderately Harmful Pesticides	-		250			nc		nc		nc		nc		nc		nc	
PCBs	PCBs (Sum of total)	0.1		50	N/A	50	-		-		-		<0.2		<0.1		-	
SVOCs	2,4,5-trichlorophenol	0.5		14400	400	57600	<4		<4		<0.5		<0.5		<0.5		<0.5	
	2,4,6-trichlorophenol	0.5		72	2	288	<4		<4		<0.5		<0.5		<0.5		<0.5	
	Methyl Ethyl Ketone	5		7200	200	28800	-		-		-		<5		<5		-	
VOCs	1,1,1,2-tetrachloroethane	0.5		360	10	1440	-		-		-		<0.5		<0.5		-	
	1,1,1-trichloroethane	0.5		1080	30	4320	-		-		-		<0.5		<0.5		-	
	1,1,2,2-tetrachloroethane	0.5		46.8	1.3	187.2	-		-		-		<0.5		<0.5		-	
	1,1,2-trichloroethane	0.5		43.2	30	172.8	-		-		-		<0.5		<0.5		-	
	1,1-dichloroethene	0.5		25	0.7	100	-		-		-		<0.5		<0.5		-	
	1,2-dichlorobenzene	0.5		155	7.5	620	-		-		-		<0.5		<0.5		-	
	1,2-dichloroethane	0.5		18	0.5	72	-		-		-		<0.5		<0.5		-	
	1,4-dichlorobenzene	0.5		270	7.5	1080	-		-		-		<0.5		<0.5		-	
	Carbon tetrachloride	0.5		18	0.5	72	-		-		-		<0.5		<0.5		-	
	Chlorobenzene	0.5		3600	100	14400	-		-		-		<0.5		<0.5		-	
	Chloroform	0.5		216	6	864	-		-		-		<0.5		<0.5		-	
	Styrene	0.5		108	3	432	-		-		-		<0.5		<0.5		-	

Notes:
NSW DECCW (2008 and 2009) - New South Wales Department of Climate Change and Water *Waste Classification Guidelines*
TRH = Total Recoverable Hydrocarbons
TCLP = Toxicity Characteristic Leaching Procedure
GSW = General Solid Waste
RSW = Restricted Solid Waste
mg/kg = milligrams per kilogram
µg/L = micrograms per litre
PERCENT_WW = percentage weight per weight
Shading denotes exceedence of NSW 2008 General Solid Waste - Specific Contaminant Concentration 1
Shading denotes exceedence of NSW 2008 General Solid Waste - Toxicity Characteristics Leaching Procedure 1
Shading denotes exceedenc of NSW 2008 Restricted Solid Waste - Specific Contaminant Concentration 2
Shading denotes exceedence of NSW 2008 Restricted Solid Waste - Toxicity Characteristics Leaching Procedure 2

Table T2
Waste Classification (Leachable)
Soil Analytical Results

							B010		B015		B016		B017		B025		B030	
							B010_0.0-0.2	B010_0.0-0.2	B015_0.0-0.2	B015_0.0-0.2	B016_0.0-0.2	B016_0.0-0.2	B017_0.0-0.2	B017_0.0-0.2	B025_0.4-0.5	B025_0.4-0.5	B030_0.0-0.2	B030_0.0-0.2
							0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0.4-0.5	0.4-0.5	0-0.2	0-0.2
							B010	B010	B015	B015	B016	B016	B017	B017	B025	B025	B030	B030
							21/10/2013	21/10/2013	18/10/2013	18/10/2013	18/10/2013	18/10/2013	18/10/2013	18/10/2013	24/10/2013	24/10/2013	18/10/2013	18/10/2013
							SOIL	TCLP	SOIL	TCLP	SOIL	TCLP	SOIL	TCLP	SOIL	TCLP	SOIL	TCLP
							ES1322813	ES1322813	ES1322746	ES1322746	ES1322746	ES1322746	ES1322746	ES1322746	ES1323080	ES1323295	ES1322746	ES1322746
							Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
	Chemical Name	**SOIL LOR**	**TCLP LOR**	**NSW EPA 2014 GSW (SCC1) (mg/kg)**	**NSW EPA 2014 GSW (TCLP1) (µg/L)**	**NSW EPA 2014 RSW (SCC2) (mg/kg)**												
TRH (NEPM 1999)	TRH C6-C9	10		650		2600	<10		<10		<10		<10		<10		<10	
	TRH C10-36 (Total)	50		10000		40000	870		350		19,000		<50		1520		1970	
PAHs	Benzo(a) pyrene	0.05	0.5	10	40	23	<0.5		<0.5		8.1	<0.5	<0.5		1.1	<0.5	<0.5	
	Sum of PAHs	0.5	0.5	200		800	<0.5		<0.5		160	2	<0.5		8.1	nc	0.7	
TCLP for Non & Semivolatile Analytes	pH (Final)		0.1					5.5		4.9		5		4.9		6.3		5.7
	pH (Initial)		0.1					9		7.8		8.5		8		1.6		9.1
	pH (after HCL)		0.1					1.8		1.7		1.8		1.7		1		4.4
	TCLP Fluid		1					1		1		1		1		4.9		1
Phenols	2-methylphenol	0.5		7200	200	28800	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
	Phenol	0.5		518	14.4	2073	<0.5		<0.5		<0.5		<0.5				<0.5	
CAHs	Tetrachloroethene	0.5		25.2	0.7	100.8	-		-		<0.5		-				-	
	Trichloroethene	0.5		18	0.5	72	-		-		<0.5		-				-	
	Vinyl chloride	5		7.2	0.2	28.8	-		-		<5		-				-	
BTEX	Total Xylene (ESDAT)	0.5		1800	50	7200	<0.5		<0.5		<0.5		<0.5				<0.5	
	Benzene	0.2		18	0.5	72	<0.2		<0.2		<0.2		<0.2		<0.2		<0.2	
	Ethylbenzene	0.5		1080	30	4320	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
	Toluene	0.5		518	1.4	2073	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Metals	Antimony	5					<5		<5		<5		<5				<5	
	Arsenic	4		500	5	2000	19		22		<5		9		<5		<5	
	Beryllium	1		100	1	400	<1		<1		<1		<1		<1		<1	
	Cadmium	0.4		100	1	400	1		<1		<1		<1		<1		<1	
	Chromium (hexavalent)	0.5		1900	5	7600	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
	Lead	1	100	1500	5000	6000	102	<100	207	<100	11		220	<100	27		75	
	Mercury	0.1		50	0.2	200	4.7		1.4		<0.1		0.2		<0.1		<0.1	
	Molybdenum	1		1000	5	4000	6		<2		<2		3		<2		<2	
	Nickel	1	100	1050	2000	4200	46	200	24		3		25		5		41	<100
	Selenium	2		50	1	200	<5		<5		<5		<5		<5		<5	
	Silver	1		180	5	720	<2		<2		<2		<2		<2		<2	
OCPs	a-BHC	0.05					-		-		<0.25		-		-		-	
	Aldrin	0.05					-		-		<0.25		-		-		-	
	b-BHC	0.05					-		-		<0.25		-		-		-	
	chlordane	0.05					-		-		<0.25		-		-		-	
	d-BHC	0.05					-		-		<0.25		-		-		-	
	DDT+DDE+DDD	0.05					-		-		<0.25		-		-		-	
	Dieldrin	0.05					-		-		<0.25		-		-		-	
	Endrin	0.05					-		-		<0.25		-		-		-	
	Endrin aldehyde	0.05					-		-		<0.25		-		-		-	
	g-BHC (Lindane)	0.05					-		-		<0.25		-		-		-	
	Heptachlor	0.05					-		-		<0.25		-		-		-	
	Heptachlor epoxide	0.05					-		-		<0.25		-		-		-	
	Sum Scheduled Chemicals	-		<50			-		-		nc		-		-		-	
OPPs	Chlorpyrifos	0.05		7.5	0.2	30	-		-		-		-		-		-	
SVOC	Pentachlorophenol	2					<2		<2		<2		<2		<2		<2	
	Sum Moderately Harmful Pesticides	-		250			nc		nc		nc		nc		nc		nc	
PCBs	PCBs (Sum of total)	0.1		50	N/A	50	-		-		<0.1		-		-		-	
SVOCs	2,4,5-trichlorophenol	0.5		14400	400	57600	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
	2,4,6-trichlorophenol	0.5		72	2	288	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
	Methyl Ethyl Ketone	5		7200	200	28800	-		-		<5		-		-		-	
VOCs	1,1,1,2-tetrachloroethane	0.5		360	10	1440	-		-		<0.5		-		-		-	
	1,1,1-trichloroethane	0.5		1080	30	4320	-		-		<0.5		-		-		-	
	1,1,2,2-tetrachloroethane	0.5		46.8	1.3	187.2	-		-		<0.5		-		-		-	
	1,1,2-trichloroethane	0.5		43.2	30	172.8	-		-		<0.5		-		-		-	
	1,1-dichloroethene	0.5		25	0.7	100	-		-		<0.5		-		-		-	
	1,2-dichlorobenzene	0.5		155	7.5	620	-		-		<0.5		-		-		-	
	1,2-dichloroethane	0.5		18	0.5	72	-		-		<0.5		-		-		-	
	1,4-dichlorobenzene	0.5		270	7.5	1080	-		-		<0.5		-		-		-	
	Carbon tetrachloride	0.5		18	0.5	72	-		-		<0.5		-		-		-	
	Chlorobenzene	0.5		3600	100	14400	-		-		<0.5		-		-		-	
	Chloroform	0.5		216	6	864	-		-		<0.5		-		-		-	
	Styrene	0.5		108	3	432	-		-		<0.5		-		-		-	

Notes:

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TRH = Total Recoverable Hydrocarbons
TCLP = Toxicity Characteristic Leaching Procedure
GSW = General Solid Waste
RSW = Restricted Solid Waste
mg/kg = milligrams per kilogram
µg/L = micrograms per litre
PERCENT_WW = percentage weight per weight

	Shading denotes exceedence of NSW 2008 General Solid Waste - Specific Contaminant Concentration 1
	Shading denotes exceedence of NSW 2008 General Solid Waste - Toxicity Characteristics Leaching Procedure 1
	Shading denotes exceedenc of NSW 2008 Restricted Solid Waste - Specific Contaminant Concentration 2
	Shading denotes exceedence of NSW 2008 Restricted Solid Waste - Toxicity Characteristics Leaching Procedure 2

Table T2
Waste Classification (Leachable)
Soil Analytical Results

	Chemical Name	SOIL LOR	TCLP LOR	NSW EPA 2014 GSW (SCC1) (mg/kg)	NSW EPA 2014 GSW (TCLP1) (µg/L)	NSW EPA 2014 RSW (SCC2) (mg/kg)	C003		C005		C007	
							C003_0.4-0.5	C003_0.4-0.5	C005_0.0-0.2	C005_0.0-0.2	C007_0.0-0.2	C007_0.0-0.2
							0.4-0.5	0.4-0.5	0-0.2	0-0.2	0-0.2	0-0.2
							C003	C003	C005	C005	C005	C005
							22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013	22/10/2013
							SOIL	TCLP	SOIL	TCLP	SOIL	TCLP
							ES1323052	ES1323325	ES1323052	ES1323325		
							Normal	Normal	Normal	Normal	Normal	Normal
TRH (NEPM 1999)	TRH C6-C9	10		650		2600	<10		<10		<10	
	TRH C10-36 (Total)	50		10000		40000	20,400		3900		9170	
PAHs	Benzo(a) pyrene	0.05	0.5	10	40	23	<0.5		<0.5		<0.5	
	Sum of PAHs	0.5	0.5	200		800	<0.5		<0.5		nc	
TCLP for Non & Semivolatile Analytes	pH (Final)		0.1					4.9		4.9		7.3
	pH (Initial)		0.1					7.5		7.7		1.6
	pH (after HCL)		0.1					1.6		1.6		1
	TCLP Fluid		1					1		1		4.9
Phenols	2-methylphenol	0.5		7200	200	28800	<0.5		<0.5		<0.5	
	Phenol	0.5		518	14.4	2073	<0.5		<0.5		<0.5	
CAHs	Tetrachloroethene	0.5		25.2	0.7	100.8	-		-		-	
	Trichloroethene	0.5		18	0.5	72	-		-		-	
	Vinyl chloride	5		7.2	0.2	28.8	-		-		-	
BTEX	Total Xylene (ESDAT)	0.5		1800	50	7200	<0.5		<0.5		<0.5	
	Benzene	0.2		18	0.5	72	<0.2		<0.2		<0.2	
	Ethylbenzene	0.5		1080	30	4320	<0.5		<0.5		<0.5	
	Toluene	0.5		518	1.4	2073	<0.5		<0.5		<0.5	
Metals	Antimony	5					<5		8		8	
	Arsenic	4		500	5	2000	<5		<5		<5	
	Beryllium	1		100	1	400	<1		<1		<1	
	Cadmium	0.4		100	1	400	<1		<1		<1	
	Chromium (hexavalent)	0.5		1900	5	7600	<2.5		<0.5		<0.5	
	Lead	1	100	1500	5000	6000	<5	<100	184	<100	102	<100
	Mercury	0.1		50	0.2	200	<0.1		<0.1		<0.1	
	Molybdenum	1		1000	5	4000	<2		2		17	
	Nickel	1	100	1050	2000	4200	<2		14		8	
	Selenium	2		50	1	200	<5		<5		<5	
	Silver	1		180	5	720	<2		<2		<2	
OCPs	a-BHC	0.05					-		-		-	
	Aldrin	0.05					-		-		-	
	b-BHC	0.05					-		-		-	
	chlordane	0.05					-		-		-	
	d-BHC	0.05					-		-		-	
	DDT+DDE+DDD	0.05					-		-		-	
	Dieldrin	0.05					-		-		-	
	Endrin	0.05					-		-		-	
	Endrin aldehyde	0.05					-		-		-	
	g-BHC (Lindane)	0.05					-		-		-	
	Heptachlor	0.05					-		-		-	
	Heptachlor epoxide	0.05					-		-		-	
	Sum Scheduled Chemicals	-		<50			-		-		-	
OPPs	Chlorpyrifos	0.05		7.5	0.2	30	-		-		-	
SVOC	Pentachlorophenol	2					<2		<2		<2	
	Sum Moderately Harmful Pesticides	-		250			nc		nc		nc	
PCBs	PCBs (Sum of total)	0.1		50	N/A	50	-		-		-	
SVOCs	2,4,5-trichlorophenol	0.5		14400	400	57600	<0.5		<0.5		<0.5	
	2,4,6-trichlorophenol	0.5		72	2	288	<0.5		<0.5		<0.5	
	Methyl Ethyl Ketone	5		7200	200	28800	-		-		-	
VOCs	1,1,1,2-tetrachloroethane	0.5		360	10	1440	-		-		-	
	1,1,1-trichloroethane	0.5		1080	30	4320	-		-		-	
	1,1,2,2-tetrachloroethane	0.5		46.8	1.3	187.2	-		-		-	
	1,1,2-trichloroethane	0.5		43.2	30	172.8	-		-		-	
	1,1-dichloroethene	0.5		25	0.7	100	-		-		-	
	1,2-dichlorobenzene	0.5		155	7.5	620	-		-		-	
	1,2-dichloroethane	0.5		18	0.5	72	-		-		-	
	1,4-dichlorobenzene	0.5		270	7.5	1080	-		-		-	
	Carbon tetrachloride	0.5		18	0.5	72	-		-		-	
	Chlorobenzene	0.5		3600	100	14400	-		-		-	
	Chloroform	0.5		216	6	864	-		-		-	
	Styrene	0.5		108	3	432	-		-		-	

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µg/L = micrograms per litre
PERCENT_WW = percentage weight per weight

Shading denotes exceedence of NSW 2008 General Solid Waste - Specific Contaminant Concentration 1
Shading denotes exceedence of NSW 2008 General Solid Waste - Toxicity Characteristics Leaching Procedure 1
Shading denotes exceedenc of NSW 2008 Restricted Solid Waste - Specific Contaminant Concentration 2
Shading denotes exceedence of NSW 2008 Restricted Solid Waste - Toxicity Characteristics Leaching Procedure 2

Table T3
Asbestos in Soil Analytical Results

Area	Field_ID	Sample Depth Range (m bgs)	Approximate Sample Volume Collected	Sample Weight Analysed (g)	Sampled Date	Asbestos in Soil Analysis Results	
						Absence/Presence Asbestos Type if Detected	Concentration of asbestos in Soil (% w/w)
Area A	A001_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	A001_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A002_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	A002_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A003_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	A003_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A004_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	A004_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A005_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	A005_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A006_0.0-0.2	0.0-0.2	1 x 500ml	946	19/10/2013	Amosite asbestos detected	0.023
	A006_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A007_0.0-0.2	0.0-0.2	1 x 500ml	912	19/10/2013	Amosite asbestos detected	0.002
	A007_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A008_0.0-0.2	0.0-0.2	1 x 500ml	NA	19/10/2013	No asbestos detected	NA
	A008_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A009_0.0-0.2	0.0-0.2	1 x 500ml	853	19/10/2013	Amosite asbestos detected	0.023
	A010_0.0-0.2	0.0-0.2	1 x 500ml	NA	19/10/2013	No asbestos detected	NA
	A011_0.0-0.2	0.0-0.2	1 x 500ml	NA	19/10/2013	No asbestos detected	NA
	A011_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A012_0.0-0.2	0.0-0.2	1 x 500ml	NA	19/10/2013	No asbestos detected	NA
	A012_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A013_0.0-0.2	0.0-0.2	1 x 500ml	NA	19/10/2013	No asbestos detected	NA
	A013_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	A014_0.0-0.2	0.0-0.2	1 x 500ml	988	19/10/2013	Amosite asbestos detected	0.01
	A014_0.4-0.5	0.4-0.5	1 x 500ml	1220	21/10/2013	Amosite asbestos detected	0.0011
	A015_0.0-0.2	0.0-0.2	1 x 500ml	NA	19/10/2013	No asbestos detected	NA
	A015_0.4-0.5	0.4-0.5	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	A016_0.0-0.2	0.0-0.2	1 x 500ml	924	19/10/2013	Amosite asbestos detected	0.12
	A016_0.4-0.5	0.4-0.5	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	A017_0.0-0.2	0.0-0.2	1 x 500ml	958	19/10/2013	Amosite asbestos detected	0.004
	A017_0.4-0.5	0.4-0.5	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	A018_0.0-0.2	0.0-0.2	1 x 500ml	946	19/10/2013	Amosite asbestos detected	0.0007
	A018_0.4-0.5	0.4-0.5	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	A019_0.0-0.2	0.0-0.2	1 x 500ml	948	19/10/2013	Amosite asbestos detected	0.004
	A019_0.4-0.5	0.4-0.5	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
Area B	B001_0.0-0.2	0.0-0.2	1 x 500ml	562	21/10/2013	Amosite asbestos detected	0.0008
	B001_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	B002_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	B003_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	B003_0.4-0.5	0.4-0.5	1 x 500ml	NA	23/10/2013	No asbestos detected	NA
	B004_0.0-0.2	0.0-0.2	1 x 500ml	946	21/10/2013	Amosite asbestos detected	0.75
	B005_0.0-0.2	0.0-0.2	1 x 500ml	986	19/10/2013	Amosite asbestos detected	0.018
	B006_0.0-0.2	0.0-0.2	1 x 500ml	1405	21/10/2013	Amosite asbestos detected	0.01
	B006_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B007_0.0-0.2	0.0-0.2	1 x 500ml	1221	21/10/2013	Amosite asbestos detected	0.04
	B008_0.0-0.2	0.0-0.2	1 x 500ml	1119	21/10/2013	Amosite asbestos detected	0.0005
	B008_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B009_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	B010_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	Amosite asbestos detected	0.005
	B010_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B011_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	B012_0.0-0.2	0.0-0.2	1 x 500ml	NA	21/10/2013	No asbestos detected	NA
	B012_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B013_0.0-0.2	0.0-0.2	1 x 500ml	1285	21/10/2013	Amosite asbestos detected	0.005
	B014_0.0-0.2	0.0-0.2	1 x 500ml	1094	18/10/2013	Amosite asbestos detected	0.0008
	B014_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B015_0.0-0.2	0.0-0.2	1 x 500ml	872	18/10/2013	Amosite asbestos detected	0.0008

Table T3
Asbestos in Soil Analytical Results

Area	Field_ID	Sample Depth Range (m bgs)	Approximate Sample Volume Collected	Sample Weight Analysed (g)	Sampled Date	Asbestos in Soil Analysis Results	
						Absence/Presence Asbestos Type if Detected	Concentration of asbestos in Soil (% w/w)
	B016_0.0-0.2	0.0-0.2	1 x 500ml	857	18/10/2013	Amosite asbestos detected	0.0035
Area B	B016_0.4-0.5	0.4-0.5	1 x 500ml	936	24/10/2013	Chrysotile and Amosite asbestos detected	0.044
	B017_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B018_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B018_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B019_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B020_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B021_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B021_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B022_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B023_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B023_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B024_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B025_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B025_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B026_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B026_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B027_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B027_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B028_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B029_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
	B029_0.4-0.5	0.4-0.5	1 x 500ml	NA	24/10/2013	No asbestos detected	NA
	B030_0.0-0.2	0.0-0.2	1 x 500ml	NA	18/10/2013	No asbestos detected	NA
Area C	C003_0.0-0.2	0.0-0.2	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C003_0.4-0.5	0.4-0.5	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C003_0.9-1.0	0.9-1.0	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C004_0.0-0.2	0.0-0.2	1 x 500ml	1092	22/10/2013	Amosite asbestos detected	0.008
	C004_0.4-0.5	0.4-0.5	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C004_0.9-1.0	0.9-1.0	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C005_0.0-0.2	0.0-0.2	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C005_0.4-0.5	0.4-0.5	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C005_0.8-0.9	0.8-0.9	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C006_0.0-0.2	0.0-0.2	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C006_0.9-1.0	0.9-1.0	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C006_1.2-1.3	1.2-1.3	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C007_0.0-0.2	0.0-0.2	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C007_0.4-0.5	0.4-0.5	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C007_0.7-0.8	0.7-0.8	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C008_0.0-0.2	0.0-0.2	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C008_0.4-0.5	0.4-0.5	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C008_0.9-1.0	0.9-1.0	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C009_0.0-0.2	0.0-0.2	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C009_0.9-1.0	0.9-1.0	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C009_1.9-2.0	1.9-2.0	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C010_0.0-0.2	0.0-0.2	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C010_0.4-0.5	0.4-0.5	1 x 500ml	NA	22/10/2013	No asbestos detected	NA
	C010_0.9-1.0	0.9-1.0	1 x 500ml	NA	22/10/2013	No asbestos detected	NA

Notes:
% w/w = percentage weight per weight
ml = millilitres
m bgs = metres below ground surface
Shading indicates % w/w of asbestos detected is greater than NEPM (2013) criteria for fibrous asbestos (FA) and asbestos fibres (AF) at sites for all proposed uses 0.001% w/w

Appendix C

2016 Results Tables

Primary ID	Duplicate	Triplicate	PID (ppm)	Sample Description	Rationale	Analytical Suite						
						Metals	TPH	BTEXN	B(a)P	Asbestos (presence)	Asbestos (quantification)	TCLP
Area A												
A003.5_0.0-0.2	-	-	1.3	Silty SAND (Fill), dark brown, slightly moist, loose, fine-medium grained.	Location between A003 and A004 to confirm historical results of no asbestos	1	1	1	1	1	-	1
A005.5_0.0-0.2	-	QC155	0.3	Silty SAND (Fill), brown, dry, loose, fine-medium grained.	Location between A005 and A006. Asbestos was found at location A006 but not at A005. This sample should confirm delineation of asbestos and TCLP analysed to determine whether historical results at A006 (hazardous waste) may receive a lower classification	1	1	1	1	1	-	1
A006.5_0.0-0.2	-	-	3.3	Silty SAND (Fill), dark brown, slightly moist, loose, fine-medium grained.	Location between A006 and A007 sampled for confirmation of asbestos presence and TCLP to potentially reduce historical classification	1	1	1	1	1	1	1
A007.5_0.0-0.2	-	-	2.2	Silty SAND (Fill), dark brown, slightly moist, loose, fine-medium grained, tace gravels.	Location between A007 and A008 sampled for confirmation of asbestos presence and TCLP to potentially reduce historical classification	1	1	1	1	1	-	-
A008.5_0.0-0.2	-	-	16.6	Silty SAND (Fill), dark brown, slightly moist, loose, fine-medium grained, tace gravels.	Location between A008 and A009 sampled for confirmation of asbestos presence and TCLP to potentially reduce historical classification	1	1	1	1	1	-	-
A009.5_0.0-0.2	-	-	-	No sample collected due to concrete slab.	Location between A009 and A010 sampled to confirm delineation of asbestos (A010 has no asbestos) and TCLP to potentially reduce historical classification	-	-	-	-	-	-	-
A013.5_0.0-0.2	QC157	-	2	Silty SAND (Fill), dark brown to black, slightly moist to moist, loose to medium dense, minor clay.	Sampled between A013 and A014 to delineate asbestos (found in A014 and not A013)	1	1	1	1	1	1	-
A013.5_0.4-0.5	-	-	63.8	Silty SAND (Fill), dark brown to black, wet, loose to medium dense, minor clay.	Sampled to confirm delineation of asbestos at depth form A014	1	1	1	1	1	1	-
A014.5_0.4-0.5	-	QC158	47.8	Silty SAND (Fill), dark brown, loose, wet, fine to medium grained.	Sampled between A014 and A015 to delineate asbestos at depth historically found at A014	1	1	1	1	1	1	-
A020_0.0-0.2	-	-	3.3	Not assessed	Located between A014 and A013.5 sampled to confirm hazardous soil boundary	1	1	1	1	1	-	-
Area B												
B001_0.0-0.2	-	-	4.6	Silty SAND (Fill), dark brown, dry, loose, fine-medium grained, inlcusions of organic matter and paint chips.	Sampled to confirm historical results and TCLP to potentially lower classification if possible	1	1	1	1	1	1	-
B003.5_0.0-0.2	-	-	2.2	Silty SAND (Fill), dark brown, dry, loose, fine-medium grained, minor clay, inlcusions of organic matter and paint chips.	Sampled between B003 and B004 to delineate asbestos located at B004	1	1	1	1	1	1	-
B007.5_0.0-0.2	-	-	1.8	Silty SAND (Fill), dark brown, dry, loose, fine-medium grained, trace clay, inlcusions of organic matter and paint chips.	Sampled between B007 and B008 to delineate asbestos in B007	1	1	1	1	1	1	-
B009.5_0.0-0.2	-	-	3.6	Silty SAND (Fill), dark brown, dry, loose, fine-medium grained, trace clay, inlcusions of organic matter and paint chips.	Sampled between B009 and B010 to delineate asbestos in B010	1	1	1	1	1	1	-
B010.5_0.0-0.2	QC150	-	3.6	Sandy CLAY (Fill), black, slightly moist, medium stiff, low to medium plasticity, inclusions of organic matter.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	1	1
B012.5_0.0-0.2	-	-	4.5	Silty SAND (Fill), dark brown, dry, loose, fine-medium grained, trace clay, inlcusions of organic matter.	Sampled Between B012 and B013 to delineate asbestos presence in B013	1	1	1	1	1	-	1
BH014_0.0-0.2	-	-	22.2	Silty SAND (Fill), dark brown, wet, loose, fine-medium grained.	Sampled between B014 and A013 to delineate asbestos at B014	1	1	1	1	1	-	1
BH014_0.5-0.6	QC154	-	5.5	Silty SAND (Fill), dark brown, wet, loose, fine-medium grained.	Sampled to confirm historical concentration. TCLP to potentially lower classification	1	1	1	1	1	-	-
BH015.5_0.5-0.6	-	-	6.6	Silty SAND (Fill), dark brown, wet, loose, fine-medium grained.	Sampled to delineate asbestos located in B016 at depth	1	1	1	1	1	-	-
BH016_0.0-0.2	-	-	3.7	Silty SAND (Fill), dark brown, wet, loose, fine-medium grained, trace shells and ironstone gravels.	Sampled to delineate asbestos located in B016 at depth	1	1	1	1	1	1	1
BH016.5_0.4-0.5	-	-	4.1	Silty SAND (Fill), dark brown, wet, loose, fine-medium grained, trace silt.	Sampled to delineate asbestos located in B016 at depth	1	1	1	1	1	-	-
B016.5_0.0-0.2	-	-	7	SAND (Fill), grey brown,wet, loose, fine to coarse grained, trace silt.	Sampled to delineate asbestos located in B016 at depth	1	1	1	1	1	-	-
B031_0.0-0.2	-	-	3.9	Silty SAND (Fill), dark brown, moist, loose, fine-medium grained, trace silt.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	-	-
B031_0.5-0.6	-	-	2.1	SAND (Fill), white with grey, moist, loose, fine to coarse grained, trace silt.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	-	-
B032_0.0-0.2	QC152	-	4	Silty Clayey SAND(Fill), dark brown, wet, loose, fine to medium grained.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	1	1

Data Entry: KM KD
Data Review: 12/12/2016

Primary ID	Duplicate	Triplicate	PID (ppm)	Sample Description	Rationale	Analytical Suite						
						Metals	TPH	BTEXN	B(a)P	Asbestos (presence)	Asbestos (quantification)	TCLP
B032_0.5-0.6	-	-	4.6	SAND (Fill), grey brown, wet, loose, fine to medium grained, trace silt.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	-	-
B033_0.0-0.2	-	-	-	Sandy CLAY (Fill), grey brown, moist, low to medium plasticity, inclusions of organic matter.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	1	-
B033_0.5-0.6	-	-	4	Sandy CLAY (Fill), grey brown, moist, low to medium plasticity, inclusions of organic matter, black mottling possible hydrocarbon staining.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	-	-
B034_0.0-0.2	-	-	4.9	Sand (Fill), grey brown, moist, loose, fine to medium grained, trace silt, minor organic matter.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	-	-
B034_0.5-0.6	-	-	5	Sand (Fill), grey brown, moist, loose, fine to medium grained, trace silt, minor organic matter, black mottling possible hydrocarbon staining.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	-	-
B035_0.0-0.2	-	-	2.8	Sandy CLAY (Fill), grey brown, moist, low to medium plasticity, inclusions of organic matter.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	-	1
B035_0.5-0.6	-	QC151	3.6	Sandy CLAY (Fill), dark grey brown, moist, low to medium plasticity, inclusions of organic matter.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	-	-
B036_0.0-0.2	-	-	3.1	Silty SAND (Fill), grey brown, wet, loose, fine-medium grained, trace clay, inlcusions of organic matter.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	1	1
B036_0.5-0.6	-	-	0.7	Silty Clayey SAND (Fill), grey brown, wet, loose, fine-medium grained, trace clay, minor inlcusions of organic matter.	Sampled in southern portion of site to confirm historical results of no asbestos	1	1	1	1	1	1	-
B043_0.0-0.2	-	-	2.3	Not assessed	Located between A013.5 and B014 sampled to confirm hazardous soil boundary	1	1	1	1	1	-	-
B044_0.0-0.2	-	-	2.5	Not assessed	Located between B04 and B014 sampled to confirm hazardous soil boundary	1	1	1	1	1	-	1
B045_0.0-0.2	-	-	2.5	Not assessed	Located between B011 and B012 sampled to increase sampling density	1	1	1	1	1	-	1
B046_0.0-0.2	-	-	1.4	Not assessed	Located between B011 and B010.5 sampledto confirm hazardous soil boundary	1	1	1	1	1	-	1
B047_0.0-0.2	QAQC100	QAQC200	256	Not assessed	Located between B011 and B010.5 sampled to confirm hazardous soil boundary	1	1	1	1	1	-	1
B048_0.0-0.2	-	-	3.4	Not assessed	Located between B010 and B009.5 sampled to confirm hazardous soil boundary	1	1	1	1	1	-	1
B049_0.0-0.2	-	-	0.5	Not assessed	Located between B009 and B009.5 sampled to increase sampling density and potentially redefine containment cell inputs	1	1	1	1	1	-	1
B050_0.0-0.2	-	-	2.2	Not assessed	Located between B007.5 and B008 sampled to increase sampling density and potentially redefine containment cell inputs	1	1	1	1	1	-	1
B051_0.0-0.2	-	-	1.8	Not assessed	Located between B008 and B020 sampled to increase sampling density and potentially redefine containment cell inputs	1	1	1	1	1	-	-
B052_0.0-0.2	-	-	1.3	Not assessed	Located between B036 and B021 sampled to increase sampling density and potentially redefine containment cell inputs	1	1	1	1	1	-	-
Area C												
C011_0.0-0.2	-	-	0.9	Silty SAND (Fill), dark brown, loose, slightly moist, fine to medium grained.	Confirm / delineate the asbestos detection from TP30 sampled by PB	1	1	1	1	1	-	-
C012_0.0-0.2	-	-	1	Gravelly Silty SAND (Fill), dark brown, loose, slightly moist, fine to medium grained, fine ironstone and concrete gravels.	Confirm / delineate the asbestos detection from TP30 sampled by PB	1	1	1	1	1	-	-
C013_0.0-0.2	-	-	0.8	Not sampled due to 0.5m of pooled water within bund.	Not sampled previously due to concrete slab. If slab is removed sample to be taken	-	-	-	-	-	-	-
C013_0.4-0.5	-	-	-	Not sampled due to 0.5m of pooled water within bund.	Not sampled previously due to concrete slab. If slab is removed sample to be taken	-	-	-	-	-	-	-
C013_0.0-0.2	-	-	0.8	Not assessed	Located between C004 and C005 sampled to increase sampling density and potentially redefine containment cell inputs	1	1	1	1	1	-	-
					Total	47	47	47	47	47	14	17

Primary ID	Duplicate	Triplicate	PID (ppm)	Sample Description	Rationale	Analytical Suite						
						Metals	TPH	BTEXN	B(a)P	Asbestos (presence)	Asbestos (quantification)	TCLP

Notes:
PID = Photoionisation Detector (PID) volatile organic compound (VOC) reading in parts per million (ppm).
Metals = arsenic, beryllium, cadmium, chromium, lead, molybdenum, nickel, selenium, silver and mercury.
BTEXN = benzene, toluene, ethylbenzene, xylenes and naphthalene
TPH = total petroleum hydrocarbons
B(a)P = benzo(a)pyrene
TCLP = toxicity characteristic leaching procedure

Parameter	LOR	NSW EPA (2014) WASTE CLASSIFICATION GUIDELINES							Area A	Area A	Area A	Area A	Area A	Area A	Area A	Area A	Area A	Area A	Area A
								Sample ID	A003.5_0.0-0.2	A005.5_0.0-0.2	QC155	A006.5_0.0-0.2	A007.5_0.0-0.2	A008.5_0.0-0.2	A013.5_0.0-0.2	QC157	A013.5_0.4-0.5	A014.5_0.4-0.5	QC158
								Sample Date	16/03/2016	16/03/2016	16/03/2016	16/03/2016	16/03/2016	16/03/2016	16/03/2016	16/03/2016	16/03/2016	16/03/2016	16/03/2016
		CT1	SCC1	TCLP1	CT2	SCC2	TCLP2	Sample Type	P	P	FD	P	P	P	P	FD	P	P	FD
								Lab. Sample Ref.	ES1606083025	ES1606083026	S16-Ma18367	ES1606083027	ES1606083028	ES1606083029	ES1606083031	ES1606083041	ES1606083032	ES1606083033	S16-Ma18368
								Sample Classification	Hazardous	GSW	GSW	SW(A)/Hazardous	Hazardous	Hazardous	SW(A)/Hazardous	SW(A)/Hazardous	SW(A)/GSW	SW(A)/GSW	SW(A)/GSW
		mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L	Units											
Moisture Content	1	--			--			%	20.3	<1.0	< 1	3.2	10.4	7.9	27.5	43.1	19.1	19.6	21
Asbestos Detected	0.1	--			--			g/kg	No	No	--	Yes	No	No	Yes	--	Yes	Yes	--
Asbestos Type		--			--			--	-	-	--	Am	-	-	Am	--	Am	Am + Cr	--
Sample weight (dry)	0	--			--			g	501	684	--	553	510	387	287	--	761	832	--
Arsenic	5	100			400			mg/kg	7	6	6	6	8	<5	9	11	<5	<5	8.8
Barium	10	--			--			mg/kg	20	<10		20	20	30	20	40	<10	<10	
Beryllium	1	20			80			mg/kg	<1	<1	< 2	<1	<1	<1	<1	<1	<1	<1	< 2
Boron	50	--			--			mg/kg	<50	<50	< 10	<50	<50	<50	<50	<50	<50	<50	< 10
Cadmium	1	20			80			mg/kg	<1	<1	< 0.4	<1	<1	<1	<1	<1	<1	<1	< 0.4
Chromium	2	100			400			mg/kg	31	36	< 1	98	40	32	45	53	2	4	< 1
Chromium (TCLP)			**1900**	***5***		**7600**	***20***	*mg/L*	--	--	--	--	--	--	--	--	--	--	--
Cobalt	2	--			--			mg/kg	4	4	< 5	4	<2	5	3	5	<2	<2	< 5
Copper	5	--			--			mg/kg	69	94	84	95	40	47	34	46	<5	<5	8.3
Lead	5	100	**1500**		400	**6000**		mg/kg	99	160	140	348	85	95	47	58	<5	6	15
Lead (TCLP)				***5***			***20***	*mg/L*	--	*0.1*	--	*0.5*	--	--	--	--	--	--	--
Manganese	5	--			--			mg/kg	55	29	28	44	24	96	70	132	11	6	12
Nickel	2	40	**1050**		160	**4200**		mg/kg	11	5	5.6	8	7	13	12	24	<2	<2	< 5
Nickel (TCLP)				***2***			***8***	*mg/L*	--	--	--	--	--	--	--	--	--	--	--
Selenium	5	20			80			mg/kg	<5	<5	< 2	<5	0	<5	<5	<5	<5	<5	< 2
Vanadium	5	--			--			mg/kg	9	<5		6	8	13	10	14	<5	<5	
Zinc	5	--			--			mg/kg	407	713	700	932	206	911	415	581	<5	35	130
Mercury	0.1	4	**50**		16	**200**		mg/kg	0.2	<0.1	0.13	0.1	0.2	0.3	0.5	0.7	<0.1	0.1	0.3
Mercury (TCLP)				***0.2***			***0.8***	*mg/L*	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.5	0.8	**10**		3.2	**23**		mg/kg	<0.5	<0.5	< 0.5	17.2	<4.0	<0.5	<4.0	<4.0	<0.5	<0.5	< 0.5
Benzo(a)pyrene (TCLP)				***0.04***			***0.16***	*mg/L*	--	--	--	*<0.5*	--	--	--	--	--	--	--
C6 - C9 Fraction	10	**650**			**2600**			mg/kg	<10	<10	< 20	<10	12	<10	<10	<10	<10	<10	< 20
C10 - C14 Fraction	50	--			--			mg/kg	<50	<50	< 20	870	2740	1090	630	<50	<50	<50	65
C15 - C28 Fraction	100	--			--			mg/kg	65000	2480	2900	41000	98300	67800	61000	120000	230	750	1200
C29 - C36 Fraction	100	--			--			mg/kg	6740	260	390	13300	4760	4940	15800	28400	<100	<100	< 50
C10 - C36 Fraction (sum)*	50	**10000**			**40000**			mg/kg	**71700**	2740	3300	**55200**	**106000**	**73800**	**77400**	**148000**	230	750	1300
C10 - C36 Fraction (sum)**		**10000**			**40000**			mg/kg	**71790**	2790	3310	**55170**	**105800**	**73830**	**77430**	**148450**	380	900	1265
C6 - C10 Fraction	10	--			--			mg/kg	<10	<10	< 20	<10	20	<10	<10	<10	<10	<10	< 20
F1	10	--			--			mg/kg	<10	<10	< 20	<10	19	<10	<10	<10	<10	<10	< 20
>C10 - C16 Fraction	50	--			--			mg/kg	5390	100	< 50	2910	18100	7900	2440	3200	70	280	240
>C16 - C34 Fraction	100	--			--			mg/kg	65800	2590	3300	49400	86600	64600	72100	140000	200	530	1000
>C34 - C40 Fraction	100	--			--			mg/kg	3840	<100	200	6830	2960	2830	9120	16400	<100	<100	< 100
>C10 - C40 Fraction (sum)	50	--			--			mg/kg	75000	2690	3500	59100	108000	75300	83700	160000	270	810	--
F2	50	--			--			mg/kg	5390	100	< 50	2910	18100	7900	2440	3200	70	280	240
Benzene	0.2	10			40			mg/kg	<0.2	<0.2	< 0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	< 0.1
Toluene	0.5	288			1152			mg/kg	<0.5	<0.5	< 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.1
Ethylbenzene	0.5	600			2400			mg/kg	<0.5	<0.5	< 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.1
meta- & para-Xylene	0.5	--			--			mg/kg	<0.5	<0.5	< 0.2	<0.5	1.6	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.2
ortho-Xylene	0.5	--			--			mg/kg	<0.5	<0.5	< 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.1
Total Xylenes	0.5	1000			4000			mg/kg	<0.5	<0.5	< 0.3	<0.5	1.6	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.3
Sum of BTEX	0.2	--			--			mg/kg	<0.2	<0.2	--	<0.2	1.6	<0.2	<0.2	<0.2	<0.2	<0.2	--
Naphthalene	1	--			--			mg/kg	<1	<1	--	<1	<1	<1	<1	<1	<1	<1	--

Notes:

CT - Contaminant Threshold
SCC - Specific Contamaintant Concentration
TCLP - Toxicity Characteristic Leaching Procedure
GSW - General Solid Waste
SW(A) - Special Waste Asbestos
RSW - Restricted Solid Waste
F1 C6 - C10 Fraction minus BTEX
F2 >C10 - C16 Fraction minus Naphthalene
P = Primary Sample
* 0 X LOR in sum of fractions
** 1 x LOR in sum of fractions

CT1 - CT for General Solid Waste (with no TCLP)
CT2 - CT for Restricted Solid Waste (with no TCLP)
SCC1 - SCC for General Solid Waste SCC (with TCLP analysis)
SCC2 - SCC for Restricted Solid Waste SCC (with TCLP analysis)
TCLP1 - TCLP for General Solid Waste
TCLP2 - TCLP for Restricted Solid Waste
< = less than laboratory limit of reporting (LOR)
Am - amosite Ch - chrysotile
FD = Field duplicate

Data Entry: SR
Data Review: KM

Parameter	LOR	NSW EPA (2014) WASTE CLASSIFICATION GUIDELINES							Area B	Area B	Area B	Area B	Area B	Area B	Area B	Area B	Area B	Area B	Area B
								Sample ID	B001_0.0-0.2	B003.5_0.0-0.2	B007.5_0.0-0.2	B009.5_0.0-0.2	B010.5_0.0-0.2	QC150	B012.5_0.0-0.2	B014_0.0-0.2	B014_0.5-0.6	QC154	B015.5_0.5-0.6
								Sample Date	14/03/2016	14/03/2016	14/03/2016	14/03/2016	14/03/2016	14/03/2016	14/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016
		CT1	SCC1	TCLP1	CT2	SCC2	TCLP2	Sample Type	P	P	P	P	P	FD	P	P	P	FD	P
								Lab. Sample Ref.	ES1606083001	ES1606083002	ES1606083003	ES1606083004	ES1606083005	ES1606083036	ES1606083006	ES1606083023	ES1606083024	ES1606083039	ES1606083022
								Sample Classification	SW(A)/RW	SW(A)/RW	SW(A)/GSW	SW(A)/RW	SW(A)/Hazardous	SW(A)/Hazardous	GSW	Hazardous	GSW	GSW	GSW
		mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L	Units											
Moisture Content	1	--			--			%	2.8	4.1	<1.0	46.4	23.9	24.3	27.8	24.4	19.3	19.3	19.6
Asbestos Detected	0.1	--			--			g/kg	Yes	Yes	Yes	Yes	Yes	--	No	No	No	--	No
Asbestos Type		--			--			--	Am	Am	Am	Am + (Trace-Am)	Am	--	-	-	-	--	-
Sample weight (dry)	0	--			--			g	331	238	614	141	185	--	240	410	679	--	886
Arsenic	5	100			400			mg/kg	6	14	5	24	10	8	18	7	<5	<5	<5
Barium	10	--			--			mg/kg	130	110	30	490	70	90	80	10	<10	<10	<10
Beryllium	1	20			80			mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Boron	50	--			--			mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	1	20			80			mg/kg	<1	<1	<1	3	1	<1	<1	<1	<1	<1	<1
Chromium	2	100			400			mg/kg	24	107	61	152	73	70	36	8	<2	<2	<2
Chromium (TCLP)			**1900**	***5***		**7600**	***20***	*mg/L*	--	*<0.1*	--	*<0.1*	--	--	--	--	--	--	--
Cobalt	2	--			--			mg/kg	8	15	18	46	14	11	7	<2	<2	<2	<2
Copper	5	--			--			mg/kg	141	117	473	735	230	157	151	17	<5	<5	<5
Lead	5	100	**1500**		400	**6000**		mg/kg	50	144	621	393	249	124	204	16	<5	<5	<5
Lead (TCLP)				***5***			***20***	*mg/L*	--	*<0.1*	*<0.1*	*<0.1*	*0.1*		*<0.1*	--	--	--	--
Manganese	5	--			--			mg/kg	277	447	129	1220	172	164	123	28	<5	<5	<5
Nickel	2	40	**1050**		160	**4200**		mg/kg	20	41	30	153	53	40	22	5	<2	<2	<2
Nickel (TCLP)				***2***			***8***	*mg/L*	--	*<0.1*	--	*0.1*	*<0.1*	--	--	--	--	--	--
Selenium	5	20			80			mg/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vanadium	5	--			--			mg/kg	37	60	10	112	27	29	13	5	<5	<5	<5
Zinc	5	--			--			mg/kg	1530	1710	6560	9100	4080	2580	2240	510	10	62	<5
Mercury	0.1	4	**50**		16	**200**		mg/kg	5.2	2.1	0.3	61.7	17.6	14.7	3.7	0.2	<0.1	<0.1	<0.1
Mercury (TCLP)				***0.2***			***0.8***	*mg/L*	*<0.001*	--	--	*<0.001*	*<0.001*	--	--	--	--	--	--
Benzo(a)pyrene	0.5	0.8	**10**		3.2	**23**		mg/kg	1.4	<0.5	<0.5	<0.5	<0.5	<4.0	<0.5	1.2	<0.5	<0.5	<0.5
Benzo(a)pyrene (TCLP)				***0.04***			***0.16***	*mg/L*	*<0.5*	--	--	--	--	--	--	*<0.5*	--	--	--
C6 - C9 Fraction	10	**650**			**2600**			mg/kg	<10	<10	<10	<10	<10	<10	<10	13	<10	<10	<10
C10 - C14 Fraction	50	--			--			mg/kg	<50	<50	<50	<50	1660	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	--			--			mg/kg	15200	11600	<100	1090	66700	107000	<100	4720	670	1950	<100
C29 - C36 Fraction	100	--			--			mg/kg	9350	8160	<100	1350	35300	41300	<100	12100	1480	4290	<100
C10 - C36 Fraction (sum)*	50	**10000**			**40000**			mg/kg	**24600**	**19800**	<50	2440	**104000**	**148000**	<50	**16800**	2150	6240	<50
C10 - C36 Fraction (sum)**		**10000**			**40000**			mg/kg	**24600**	**19810**	250	2490	**103660**	**148350**	<250	**16870**	2200	6290	<250
C6 - C10 Fraction	10	--			--			mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F1	10	--			--			mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C10 - C16 Fraction	50	--			--			mg/kg	290	<50	<50	<50	5750	14200	<50	140	50	110	<50
>C16 - C34 Fraction	100	--			--			mg/kg	22500	17900	<100	2040	91700	129000	<100	13000	1660	4860	<100
>C34 - C40 Fraction	100	--			--			mg/kg	6160	4230	<100	940	16000	19800	<100	16400	1970	5660	<100
>C10 - C40 Fraction (sum)	50	--			--			mg/kg	29000	22100	<50	2980	113000	163000	<50	29500	3680	10600	<50
F2	50	--			--			mg/kg	290	<50	<50	<50	5750	14200	<50	140	50	110	<50
Benzene	0.2	10			40			mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	0.5	288			1152			mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5	600			2400			mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	0.5	--			--			mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	<0.5	<0.5
ortho-Xylene	0.5	--			--			mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	0.5	1000			4000			mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	<0.5	<0.5
Sum of BTEX	0.2	--			--			mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.5	0.7	<0.2	<0.2
Naphthalene	1	--			--			mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Notes:

CT - Contaminant Threshold
SCC - Specific Contamaintant Concentration
TCLP - Toxicity Characteristic Leaching Procedure
GSW - General Solid Waste
SW(A) - Special Waste Asbestos
RSW - Restricted Solid Waste
F1 C6 - C10 Fraction minus BTEX
F2 >C10 - C16 Fraction minus Naphthalene
P = Primary Sample
* 0 X LOR in sum of fractions
** 1 x LOR in sum of fractions

CT1 - CT for General Solid Waste (with no TCLP)
CT2 - CT for Restricted Solid Waste (with no TCLP)
SCC1 - SCC for General Solid Waste SCC (with TCLP analysis)
SCC2 - SCC for Restricted Solid Waste SCC (with TCLP analysis)
TCLP1 - TCLP for General Solid Waste
TCLP2 - TCLP for Restricted Solid Waste
< = less than laboratory limit of reporting (LOR)
Am - amosite Ch - chrysotile
FD = Field duplicate

Data Entry: SR
Data Review: KM

Parameter	LOR	NSW EPA (2014) WASTE CLASSIFICATION GUIDELINES							Area B	Area B	Area B	Area B	Area B	Area B	Area B	Area B	Area B	Area B	Area B
								Sample ID	B016_0.0-0.2	B016.5_0.0-0.2	B016.5_0.5-0.6	B031_0.0-0.2	B031_0.5-0.6	B032_0.0-0.2	QC152	B032_0.5-0.6	B033_0.0-0.2	B033_0.5-0.6	B034_0.0-0.2
								Sample Date	15/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016	15/03/2016
		CT1	SCC1	TCLP1	CT2	SCC2	TCLP2	Sample Type	P	P	P	P	P	P	FD	P	P	P	P
								Lab. Sample Ref.	ES1606083021	ES1606083019	ES1606083020	ES1606083017	ES1606083018	ES1606083015	ES1606083038	ES1606083016	ES1606083013	ES1606083014	ES1606083011
								Sample Classification	SW(A)/RW	GSW	GSW	GSW	GSW	SW(A)/GSW	SW(A)/GSW	GSW	GSW	GSW	GSW
		mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L	Units											
Moisture Content	1	--			--			%	40.2	24.7	18.6	22.3	14.9	48.5	45.9	19.4	22.9	18.9	12.2
Asbestos Detected	0.1	--			--			g/kg	Yes	No	No	No	No	Yes	----	No	No	No	No
Asbestos Type		--			--			--	Am	-	-	-	-	Am	----	-	-	-	-
Sample weight (dry)	0	--			--			g	367	422	274	469	438	292	----	440	437	655	368
Arsenic	5	100			400			mg/kg	9	<5	<5	<5	<5	7	5	<5	<5	<5	<5
Barium	10	--			--			mg/kg	80	<10	<10	30	<10	90	50	<10	10	<10	20
Beryllium	1	20			80			mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Boron	50	--			--			mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	1	20			80			mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	2	100			400			mg/kg	24	4	19	23	6	45	37	7	9	<2	12
Chromium (TCLP)			**1900**	***5***		**7600**	***20***	*mg/L*	--	--	--	--	--	--	--	--	--	--	--
Cobalt	2	--			--			mg/kg	7	<2	<2	11	<2	11	10	<2	<2	<2	3
Copper	5	--			--			mg/kg	500	14	<5	110	<5	72	58	<5	34	<5	29
Lead	5	100	**1500**		400	**6000**		mg/kg	109	16	<5	87	50	82	68	<5	37	<5	47
Lead (TCLP)				***5***			***20***	*mg/L*	*<0.1*	--	--	--	--	--	--	--	--	--	--
Manganese	5	--			--			mg/kg	589	15	<5	192	<5	276	219	<5	48	<5	83
Nickel	2	40	**1050**		160	**4200**		mg/kg	25	3	9	34	3	51	47	5	10	<2	12
Nickel (TCLP)				***2***			***8***	*mg/L*	--	--	--	--	--	*<0.1*	--	--	--	--	--
Selenium	5	20			80			mg/kg	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vanadium	5	--			--			mg/kg	32	<5	<5	19	<5	34	26	7	10	<5	9
Zinc	5	--			--			mg/kg	811	134	10	930	10	1930	1530	<5	155	14	772
Mercury	0.1	4	**50**		16	**200**		mg/kg	1.6	0.1	<0.1	0.3	<0.1	0.4	0.4	<0.1	0.2	<0.1	0.2
Mercury (TCLP)				***0.2***			***0.8***	*mg/L*	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.5	0.8	**10**		3.2	**23**		mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene (TCLP)				***0.04***			***0.16***	*mg/L*	--	--	--	--	--	--	--	--	--	--	--
C6 - C9 Fraction	10	**650**			**2600**			mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C14 Fraction	50	--			--			mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	100	--			--			mg/kg	470	<100	<100	2550	<100	4780	4610	<100	<100	<100	<100
C29 - C36 Fraction	100	--			--			mg/kg	860	<100	<100	3020	160	2990	2940	<100	<100	<100	<100
C10 - C36 Fraction (sum)*	50	**10000**			**40000**			mg/kg	1330	<50	<50	5570	160	7770	7550	<50	<50	<50	<50
C10 - C36 Fraction (sum)**		**10000**			**40000**			mg/kg	1380	<250	<250	5620	310	7820	7600	<250	250	250	<250
C6 - C10 Fraction	10	--			--			mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F1	10	--			--			mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C10 - C16 Fraction	50	--			--			mg/kg	<50	<50	<50	<50	<50	190	210	<50	<50	<50	<50
>C16 - C34 Fraction	100	--			--			mg/kg	1090	<100	<100	4820	140	6860	6610	<100	<100	<100	<100
>C34 - C40 Fraction	100	--			--			mg/kg	580	<100	<100	1720	180	1720	1760	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	50	--			--			mg/kg	1670	<50	<50	6540	320	8770	8580	<50	<50	<50	<50
F2	50	--			--			mg/kg	<50	<50	<50	<50	<50	190	210	<50	<50	<50	<50
Benzene	0.2	10			40			mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	0.5	288			1152			mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5	600			2400			mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	0.5	--			--			mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	0.5	--			--			mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	0.5	1000			4000			mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX	0.2	--			--			mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	1	--			--			mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Notes:

CT - Contaminant Threshold
SCC - Specific Contamaintant Concentration
TCLP - Toxicity Characteristic Leaching Procedure
GSW - General Solid Waste
SW(A) - Special Waste Asbestos
RSW - Restricted Solid Waste
F1 C6 - C10 Fraction minus BTEX
F2 >C10 - C16 Fraction minus Naphthalene
P = Primary Sample
* 0 X LOR in sum of fractions
** 1 x LOR in sum of fractions

CT1 - CT for General Solid Waste (with no TCLP)
CT2 - CT for Restricted Solid Waste (with no TCLP)
SCC1 - SCC for General Solid Waste SCC (with TCLP analysis)
SCC2 - SCC for Restricted Solid Waste SCC (with TCLP analysis)
TCLP1 - TCLP for General Solid Waste
TCLP2 - TCLP for Restricted Solid Waste
< = less than laboratory limit of reporting (LOR)
Am - amosite   Ch - chrysotile
FD = Field duplicate

Parameter	LOR	NSW EPA (2014) WASTE CLASSIFICATION GUIDELINES							Area B	Area B	Area B	Area B	Area B	Area B	Area C	Area C
								Sample ID	B034_0.5-0.6	B035_0.0-0.2	B035_0.5-0.6	QC151	B036_0.0-0.2	B036_0.5-0.6	C011_0.0-0.2	C012_0.0-0.2
								Sample Date	15/03/2016	15/03/2016	15/03/2016	16/03/2016	15/03/2016	15/03/2016	16/03/2016	16/03/2016
								Sample Type	P	P	P	FD	P	P	P	P
		CT1	SCC1	TCLP1	CT2	SCC2	TCLP2	Lab. Sample Ref.	ES1606083012	ES1606083009	ES1606083010	S16-Ma18366	ES1606083007	ES1606083008	ES1606083034	ES1606083035
								Sample Classification	GSW	GSW	GSW	GSW	SW(A)/GSW	SW(A)/GSW	Hazardous	GSW
		mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L	Units								
Moisture Content	1	--			--			%	16	13.5	8.6	23	30	20.8	<1.0	17.1
Asbestos Detected	0.1	--			--			g/kg	No	No	No	--	Yes	Yes	No	No
Asbestos Type		--			--			--	-	-	-	--	Am	Am	--	--
Sample weight (dry)	0	--			--			g	445	558	421	--	507	546	555	532
Arsenic	5	100			400			mg/kg	<5	<5	<5	< 2	6	<5	<5	<5
Barium	10	--			--			mg/kg	<10	20	<10		70	<10	60	10
Beryllium	1	20			80			mg/kg	<1	<1	<1	< 2	<1	<1	<1	<1
Boron	50	--			--			mg/kg	<50	<50	<50	< 10	<50	<50	<50	<50
Cadmium	1	20			80			mg/kg	<1	<1	<1	< 0.4	<1	<1	<1	<1
Chromium	2	100			400			mg/kg	6	20	<2	< 1	26	4	54	11
Chromium (TCLP)			**1900**	***5***		**7600**	***20***	*mg/L*	--	--	--	--	--	--	--	--
Cobalt	2	--			--			mg/kg	<2	7	<2	< 5	22	<2	9	2
Copper	5	--			--			mg/kg	<5	118	<5	< 5	92	11	230	23
Lead	5	100	**1500**		400	**6000**		mg/kg	<5	234	<5	< 5	83	13	220	27
Lead (TCLP)				***5***			***20***	*mg/L*	--	*<0.1*	--	--	--	--	--	--
Manganese	5	--			--			mg/kg	<5	138	<5	< 5	365	31	66	40
Nickel	2	40	**1050**		160	**4200**		mg/kg	<2	19	<2	< 5	58	5	14	4
Nickel (TCLP)				***2***			***8***	*mg/L*	--	--	--	--	*<0.1*	--	--	--
Selenium	5	20			80			mg/kg	<5	<5	<5	< 2	<5	<5	<5	<5
Vanadium	5	--			--			mg/kg	<5	17	<5		38	6	9	<5
Zinc	5	--			--			mg/kg	32	1930	<5	< 5	1830	148	1800	303
Mercury	0.1	4	**50**		16	**200**		mg/kg	<0.1	0.3	<0.1	< 0.05	0.6	<0.1	<0.1	<0.1
Mercury (TCLP)				***0.2***			***0.8***	*mg/L*	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.5	0.8	**10**		3.2	**23**		mg/kg	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene (TCLP)				***0.04***			***0.16***	*mg/L*	--	--	--	--	--	--	--	--
C6 - C9 Fraction	10	**650**			**2600**			mg/kg	<10	<10	<10	< 20	<10	<10	<10	<10
C10 - C14 Fraction	50	--			--			mg/kg	<50	<50	<50	< 20	<50	<50	<50	<50
C15 - C28 Fraction	100	--			--			mg/kg	240	<100	<100	< 50	<100	<100	30800	1960
C29 - C36 Fraction	100	--			--			mg/kg	260	<100	<100	58	<100	<100	35000	3260
C10 - C36 Fraction (sum)*	50	**10000**			**40000**			mg/kg	500	<50	<50	58	<50	<50	**65800**	5220
C10 - C36 Fraction (sum)**		**10000**			**40000**			mg/kg	550	<250	<250	58	<250	<250	**65850**	5270
C6 - C10 Fraction	10	--			--			mg/kg	<10	<10	<10	< 20	<10	<10	<10	<10
F1	10	--			--			mg/kg	<10	<10	<10	< 20	<10	<10	<10	<10
>C10 - C16 Fraction	50	--			--			mg/kg	240	<50	<50	< 50	<50	<50	270	<50
>C16 - C34 Fraction	100	--			--			mg/kg	320	<100	<100	< 100	<100	<100	59300	4430
>C34 - C40 Fraction	100	--			--			mg/kg	380	<100	<100	170	<100	<100	19600	1700
>C10 - C40 Fraction (sum)	50	--			--			mg/kg	940	<50	<50	--	<50	<50	79200	6130
F2	50	--			--			mg/kg	240	<50	<50	< 50	<50	<50	270	<50
Benzene	0.2	10			40			mg/kg	<0.2	<0.2	<0.2	< 0.1	<0.2	<0.2	<0.2	<0.2
Toluene	0.5	288			1152			mg/kg	<0.5	<0.5	<0.5	< 0.1	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5	600			2400			mg/kg	<0.5	<0.5	<0.5	< 0.1	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	0.5	--			--			mg/kg	<0.5	<0.5	<0.5	< 0.2	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	0.5	--			--			mg/kg	<0.5	<0.5	<0.5	< 0.1	<0.5	<0.5	<0.5	<0.5
Total Xylenes	0.5	1000			4000			mg/kg	<0.5	<0.5	<0.5	< 0.3	<0.5	<0.5	<0.5	<0.5
Sum of BTEX	0.2	--			--			mg/kg	<0.2	<0.2	<0.2	--	<0.2	<0.2	<0.2	<0.2
Naphthalene	1	--			--			mg/kg	<1	<1	<1	--	<1	<1	<1	<1

Notes:

CT - Contaminant Threshold
SCC - Specific Contamaintant Concentration
TCLP - Toxicity Characteristic Leaching Procedure
GSW - General Solid Waste
SW(A) - Special Waste Asbestos
RSW - Restricted Solid Waste
F1 C6 - C10 Fraction minus BTEX
F2 >C10 - C16 Fraction minus Naphthalene
P = Primary Sample
* 0 X LOR in sum of fractions
** 1 x LOR in sum of fractions

CT1 - CT for General Solid Waste (with no TCLP)
CT2 - CT for Restricted Solid Waste (with no TCLP)
SCC1 - SCC for General Solid Waste SCC (with TCLP analysis)
SCC2 - SCC for Restricted Solid Waste SCC (with TCLP analysis)
TCLP1 - TCLP for General Solid Waste
TCLP2 - TCLP for Restricted Solid Waste
< = less than laboratory limit of reporting (LOR)
Am - amosite Ch - chrysotile
FD = Field duplicate

	Parameter	LOR	NSW EPA (2014) WASTE CLASSIFICATION GUIDELINES						Sample Location	Area A	Area B	Area B	Area B	Area B	Area B
			CT1	SCC1	TCLP1	CT2	SCC2	TCLP2		A020	B043	B044	B045	B046	B047
									Date Sampled	9/11/2016	9/11/2016	9/11/2016	9/11/2016	9/11/2016	9/11/2016
									Sample ID	A020_0.0-0.2_161109	B043_0.0-0.2_161109	B044_0.0-0.2_161109	B045_0.0-0.2_161109	B046_0.0-0.2_161109	B047_0.0-0.2_161109
									Sample Type	P	P	P	P	P	P
									Classification	SW(A) /GSW	GSW	GSW	SW(A) /GSW	GSW	SW(A) / RSW
			mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L	Units						
Asbestos	Asbestos Detected	0.1							g/kg	Yes + Trace	No	No	Yes	No	Yes
	Asbestos Type	-							-	Ch+Am	-	-	Am	-	Am
Total Recoverable Hydrocarbons	C6 - C10 Fraction	10							mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
	C6-C10 Fraction minus BTEX (F1)	10							mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
	>C10-C16 Fraction	50							mg/kg	< 50	< 50	< 50	< 50	< 50	300
	>C10-C16 Fraction minus Naphthalene (F2)	50							mg/kg	< 50	< 50	< 50	< 50	< 50	300
	>C16-C34 Fraction	100							mg/kg	240	740	300	760	3600	11600
	>C34-C40 Fraction	100							mg/kg	< 100	230	< 100	380	700	3330
	>C10-C40 Fraction (sum)	50							mg/kg	240	970	300	1140	4300	15200
PAHs	Benzo(a)pyrene	0.5							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
BTEXN	Benzene	0.2	10			40			mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Toluene	0.5	288			1152			mg/kg	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5
	Ethylbenzene	0.5	600			2400			mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	m & p-Xylene	0.5							mg/kg	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5
	o-Xylene	0.5							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Total Xylene	0.5							mg/kg	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5
	Naphthalene	1							mg/kg	< 1	< 1	< 1	< 1	< 1	< 1
TPH	C6 - C9 Fraction	10	650			2600			mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
	C10 - C14 Fraction	50							mg/kg	< 50	< 50	< 50	< 50	< 50	70
	C15 - C28 Fraction	100							mg/kg	160	460	280	360	2010	6920
	C29 - C36 Fraction	100							mg/kg	110	380	< 100	560	1870	6380
	C10 - C36 Fraction	50	10000			40000			mg/kg	270	840	280	920	3880	13400
Metals	Arsenic	5	100			400			mg/kg	< 5	6	21	17	9	12
	Barium	10							mg/kg	< 10	20	20	170	120	110
	Cadmium	1	20			80			mg/kg	< 1	< 1	< 1	2	2	1
	Chromium	2							mg/kg	14	6	51	96	69	55
	Cobalt	2							mg/kg	< 2	< 2	7	14	14	16
	Copper	5							mg/kg	13	18	141	234	161	184
	Lead	5	100	1500		400	6000		mg/kg	54	17	179	397	167	175
	Leachable Lead	0.1			5			20	mg/L	-	-	0.1	0.1	<0.1	
	Manganese	5							mg/kg	17	13	52	868	468	267
	Nickel	2	40	1050		160	6000		mg/kg	4	4	15	81	50	47
	Leachable Nickel	0.1			2			8	mg/L	-	-	-	<0.1	<0.1	
	Selenium	5				80			mg/kg	< 5	< 5	< 5	< 5	< 5	< 5
	Zinc	5							mg/kg	136	221	1790	6460	2760	3320
	Mercury	0.1	4	50		16	200		mg/kg	0.5	< 0.1	0.7	5.5	6.5	58.6
	Leachable Mercury	0.001			0.2			0.8	mg/l	-	-	-	<0.001	<0.001	<0.001
	Boron	50							mg/kg	< 50	< 50	< 50	< 50	< 50	< 50

Legend:

CT - Contaminant Threshold
SCC - Specific Contaminant Concentration
TCLP = Toxicity Characteristic Leaching Procedure
GSW - General Solid Waste
SW(A) - Special Waste Asbestos
RSW - Restricted Solid Waste
 - Not analysed / not calculated
LOR – Limit of Recording
* LOR Exceeds Guideline Trigger Value
Sample Type: P - Primary, FD - Duplicate, FT - Triplicate
g/kg = grams per kilogram
mg/kg = milligrams per kilogram

CT1 - CT for General Solid Waste (with no TCLP)
CT2 - CT for Restricted Solid Waste (with no TCLP)
SCC1 - SCC for General Solid Waste SCC (with TCLP analysis)
SCC2 - SCC for Restricted Solid Waste SCC (with TCLP analysis)
TCLP1 - TCLP for General Solid Waste
TCLP2 - TCLP for Restricted Solid Waste
Ch: Chrysotile
Am: Amosite

			NSW EPA (2014) WASTE CLASSIFICATION GUIDELINES						Area B	Area B	Area B	Area B	Area B	Area B	Area B	Area C
	Parameter	LOR	CT1	SCC1	TCLP1	CT2	SCC2	TCLP2	B047	B047	B048	B049	B050	B051	B052	C013
									9/11/2016	9/11/2016	9/11/2016	9/11/2016	9/11/2016	11/09/2016	9/11/2016	9/11/2016
									QAQC_100_161109	QAQC_200_161109	B048_0.0-0.2_161109	B049_0.0-0.2_161109	B50_0.0-0.2_161109	B051_0.0-0.2_161109	B052_0.0-0.2_161109	C013_0.0-0.2_161109
									FD	FT	P	P	P	P	P	P
									RSW	RSW	SW(A) /GSW	SW(A) /GSW	GSW	SW(A) /GSW	SW(A) /GSW	GSW
			mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L								
Asbestos	Asbestos Detected	0.1							-	-	Yes + Trace	Yes	No	Yes	Yes	No
	Asbestos Type	-							-	-	Ch+Am	Am	-	Am	Ch+Am	-
Total Recoverable Hydrocarbons	C6 - C10 Fraction	10							1620	260	< 10	< 10	< 10	< 10	< 10	< 10
	C6-C10 Fraction minus BTEX (F1)	10							1620	260	< 10	< 10	< 10	< 10	< 10	< 10
	>C10-C16 Fraction	50							4780	2600	< 50	< 50	< 50	< 50	< 50	< 50
	>C10-C16 Fraction minus Naphthalene (F2)	50							4780	2600	< 50	< 50	< 50	< 50	< 50	< 50
	>C16-C34 Fraction	100							11200	20000	1480	670	< 100	< 100	< 100	< 100
	>C34-C40 Fraction	100							2130	2800	470	280	< 100	< 100	< 100	< 100
	>C10-C40 Fraction (sum)	50							18100	-	1950	950	< 50	< 50	< 50	< 50
PAHs	Benzo(a)pyrene	0.5							< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
BTEXN	Benzene	0.2	10			40			<0.2	<0.1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Toluene	0.5	288			1152			<0.5	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Ethylbenzene	0.5	600			2400			<0.5	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	m & p-Xylene	0.5							<0.5	<0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	o-Xylene	0.5							<0.5	<0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Total Xylene	0.5							<0.5	<0.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Naphthalene	1							5	<0.5	< 1	< 1	< 1	< 1	< 1	< 1
TPH	C6 - C9 Fraction	10	650			2600			1320	140	< 10	< 10	< 10	< 10	< 10	< 10
	C10 - C14 Fraction	50							1850	1200	< 50	< 50	< 50	< 50	< 50	< 50
	C15 - C28 Fraction	100							10800	13000	740	370	< 100	< 100	< 100	< 100
	C29 - C36 Fraction	100							4190	8500	930	400	< 100	< 100	< 100	< 100
	C10 - C36 Fraction	50	10000			40000			16800	22700	1670	770	< 50	< 50	< 50	< 50
Metals	Arsenic	5	100			400			-	-	12	< 5	< 5	< 5	< 5	< 5
	Barium	10							-	-	120	60	30	10	20	< 10
	Cadmium	1	20			80			-	-	2	< 1	< 1	< 1	< 1	< 1
	Chromium	2							-	-	139	32	56	9	5	26
	Cobalt	2							-	-	36	17	14	< 2	4	4
	Copper	5							-	-	595	108	502	8	15	92
	Lead	5	100	1500		400	6000		-	-	264	84	549	10	14	62
	Leachable Lead	0.1			5			20	-	-	<0.1	-	<0.1	-	-	-
	Manganese	5							-	-	597	408	122	40	89	68
	Nickel	2	40	1050		160	6000		-	-	158	59	24	4	14	7
	Leachable Nickel	0.1			2			8	-	-	0.2	<0.1	-	-	-	-
	Selenium	5				80			-	-	< 5	< 5	< 5	< 5	< 5	< 5
	Zinc	5							-	-	3480	1020	5160	114	138	577
	Mercury	0.1	4	50		16	200		-	-	11.2	3.8	0.2	< 0.1	0.2	< 0.1
	Leachable Mercury	0.001			0.2			0.8	-	-	<0.001	-	-	-	-	-
	Boron	50							-	-	< 50	< 50	< 50	< 50	< 50	< 50

Legend:

CT - Contaminant Threshold
SCC - Specific Contaminant Concentration
TCLP = Toxicity Characteristic Leaching Procedure
GSW - General Solid Waste
SW(A) - Special Waste Asbestos
RSW - Restricted Solid Waste
 - Not analysed / not calculated
LOR – Limit of Recording
* LOR Exceeds Guideline Trigger Value
Sample Type: P - Primary, FD - Duplicate, FT - Triplicate
g/kg = grams per kilogram
mg/kg = milligrams per kilogram

CT1 - CT for General Solid Waste (with no TCLP)
CT2 - CT for Restricted Solid Waste (with no TCLP)
SCC1 - SCC for General Solid Waste SCC (with TCLP analysis)
SCC2 - SCC for Restricted Solid Waste SCC (with TCLP analysis)
TCLP1 - TCLP for General Solid Waste
TCLP2 - TCLP for Restricted Solid Waste
Ch: Chrysotile
Am: Amosite

Parameter	LOR	Sample ID / Sample Date / Lab. Sample Ref. / Unit	ASC NEPM (2013) HSL D	ES1607647010 / 7/04/2016 / A006.5_0-0.2	ES1607647001 / 7/04/2016 / B001_0.0-0.2	ES1607647002 / 7/04/2016 / B003.5_0.0-0.2	ES1607647003 / 7/04/2016 / B007.5_0-0.2	ES1607647004 / 7/04/2016 / B009.5_0-0.2	ES1607647005 / 7/04/2016 / B010.5_0-0.2
		Unit		Result	Result	Result	Result	Result	Result
Asbestos Detected	0.1	g/kg		Yes	Yes	Yes	Yes	No	No
Asbestos Type	--	--		Am	Am	Ch	Am	-	-
Sample weight (dry)	0.01	g		2470	2100	2760	2850	2000	3240
Asbestos Containing Material (as 15% Asbestos in ACM >7mm)	0.01	% (w/w)	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Friable Asbestos	0.0004	g		0.21	<0.0004	0.144	<0.0004	<0.0004	<0.0004
Friable Asbestos (as Asbestos in Soil)	0.001	% (w/w)	0.001	0.008	<0.001	0.005	<0.001	<0.001	<0.001
Weight Used for % Calculation	0.0001	kg		2.47	2.1	2.76	2.85	2	3.24
Free Fibres	5	Fibres		No	No	No	No	No	No
Asbestos Containing Material	0.1	g		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Description	--	--		Mid brown sandy soil with several pieces of friable asbestos insulation material approx 5 x 4 x 2 mm with several loose bundles of friable asbestos fibres approx 2 x 1 x 0.5 mm.	Mid brown sandy soil with one loose bundle of friable asbestos fibres approx 2 x 1 x 0.5 mm.	Mid brown sandy soil with one piece of friable asbestos fibre board approx 25 x 15 x 1 mm.	Mid brown sandy soil with two bundles of friable asbestos fibres approx 3 x 1 x 1 mm.	Mid brown clay soil.	Mid brown clay soil.

Notes:

AM - amosite asbestos

Ch - crysotile asbestos

LOR - laboratory limit of reporting

ASC NEPM (2013) - National Environment Protection (Assessment of Contaminated Land) Measure (NEPM) 1999, National Environment Protection Council Amendment 2013. Schedule B1, Guideline on Investigation Levels for Soil and Groundwater.

HSL D - Health Screening Level for Commerical/Industrial land use

Data Entry: SR
Data Review: KM

Parameter	LOR	Sample ID	ES1607647011	ES1607647012	ES1607647013	ES1607647009	ES1607647008	ES1607647006	ES1607647007
		Sample Date	7/04/2016	7/04/2016	7/04/2016	7/04/2016	7/04/2016	7/04/2016	7/04/2016
		Lab. Sample Ref.	A013.5_0-0.2	A013.5_0.4-0.5	A014.5_0.4-0.5	B016_0-0.2	B032_0-0.2	B036_0-0.2	B036-0.5-0.6
		Unit	Result	Result	Result	Result	Result	Result	Result
Asbestos Detected	0.1	g/kg	Yes	No	Yes	No	No	Yes	Yes
Asbestos Type	--	--	Ch + Am	-	Am	-	-	Am	Ch + Am
Sample weight (dry)	0.01	g	2330	2940	3280	2450	1910	2690	2400
Asbestos Containing Material (as 15% Asbestos in ACM >7mm)	0.01	% (w/w)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.11
Friable Asbestos	0.0004	g	0.284	<0.0004	0.0033	<0.0004	<0.0004	<0.0004	0.0035
Friable Asbestos (as Asbestos in Soil)	0.001	% (w/w)	0.012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Weight Used for % Calculation	0.0001	kg	2.33	2.94	3.28	2.45	1.91	2.69	2.4
Free Fibres	5	Fibres	No	No	No	No	No	No	No
Asbestos Containing Material	0.1	g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	17.8
Description	--	--	Mid brown sandy soil with several pieces of friable asbestos insulation approx 25 x 20 x 2 mm plus several bundles of friable asbestos fibres approx 3 x 1 x 1 mm.	Mid brown sandy soil.	Pale brown sandy soil with one loose bundle of friable asbestos fibres approx 3 x 2 x 1 mm.	Mid brown sandy soil.	Mid brown sandy soil with grey rocks.	Mid brown sandy soil with one bundle of friable asbestos fibres approx 3 x 1 x 1 mm.	Mid brown sandy soil with two pieces of bonded asbestos cement sheeting approx 60 x 30 x 5 mm plus several loose bundles of friable asbestos fibres approx 3 x 1 x 0.5 mm.

Notes:
AM - amosite asbestos
Ch - crysotile asbestos
LOR - laboratory limit of reporting
ASC NEPM (2013) - National Environment Protection (Assessment of Contaminated Land) Measure (N
National Environment Protection Council Amendment 2013. Schedule B1, Guideline on Investigation Le
Groundwater.
HSL D - Health Screening Level for Commerical/Industrial land use

Data Entry: SR
Data Review: KM

Table T4
Soil Field Quality Assurance and Qualtiy Control Results

Parameter	LOR	Sample ID	A005.5_0.0-0.2	QC155	RPD	A013.5_0.0-0.2	QC157	RPD	A014.5_0.4-0.5	QC158	RPD	B010.5_0.0-0.2	QC150	RPD	B014_0.5-0.6
		Sample Date	16/03/2016	16/03/2016		16/03/2016	16/03/2016		16/03/2016	16/03/2016		14/03/2016	14/03/2016		15/03/2016
		Sample Type	Inter-laboratory Duplicate			Intra-laboratory Duplicate			Inter-laboratory Duplicate			Intra-laboratory Duplicate			Intra-labo
		Lab. Sample Ref.	ES1606083026	S16-Ma18367		ES1606083031	ES1606083041		ES1606083033	S16-Ma18368		ES1606083005	ES1606083036		ES1606083024
		Unit	Result	Result		Result	Result		Result	Result		Result	Result		Result
Moisture Content (dried @ 103°C)	1	%	<1.0	< 1	0	27.5	43.1	44	19.6	21	7	23.9	24.3	2	19.3
Asbestos Detected	0.1	g/kg	No	--	--	Yes	--	--	Yes	--	--	Yes	--	--	No
Asbestos Type		--	-	--	--	Am	--	--	Am + Cr	--	--	Am	--	--	-
Sample weight (dry)	0.01	g	684	--	--	287	--	--	832	--	--	185	--	--	679
Arsenic	5	mg/kg	6	6	0	9	11	20	<5	8.8	55	10	8	22	<5
Barium	10	mg/kg	<10	--	--	20	40	67	<10	--	--	70	90	25	<10
Beryllium	1	mg/kg	<1	< 2	67	<1	<1	0	<1	< 2	--	<1	<1	0	<1
Boron	50	mg/kg	<50	< 10	133	<50	<50	0	<50	< 10	--	<50	<50	0	<50
Cadmium	1	mg/kg	<1	< 0.4	86	<1	<1	0	<1	< 0.4	--	1	<1	0	<1
Chromium	2	mg/kg	36	< 1	189	45	53	16	4	< 1	--	73	70	4	<2
Chromium (TCLP)		mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	2	mg/kg	4	< 5	22	3	5	50	<2	< 5	86	14	11	24	<2
Copper	5	mg/kg	94	84	11	34	46	30	<5	8.3	50	230	157	38	<5
Lead	5	mg/kg	**160**	**140**	13	47	58	21	6	15	86	**249**	**124**	67	<5
Lead (TCLP)		mg/L	**0.1**	--	--	--	--	--	--	--	--	0.1	--	--	--
Manganese	5	mg/kg	29	28	4	70	132	61	6	12	67	172	164	5	<5
Nickel	2	mg/kg	5	5.6	11	12	24	67	<2	< 5	86	**53**	40	28	<2
Nickel (TCLP)		mg/L	--	--	--	--	--	--	--	--	--	<0.1	--	--	--
Selenium	5	mg/kg	<5	< 2	86	<5	<5	0	<5	< 2	86	<5	<5	0	<5
Vanadium	5	mg/kg	<5	--	--	10	14	33	<5	--	--	27	29	7	<5
Zinc	5	mg/kg	713	700	2	415	581	33	35	130	115	4080	2580	45	10
Mercury	0.1	mg/kg	<0.1	0.13	26	0.5	0.7	33	0.1	0.3	100	**17.6**	**14.7**	18	<0.1
Mercury (TCLP)		mg/L	--	--	--	--	--	--	--	--	--	<0.001	--	--	--
Benzo(a)pyrene	0.5	mg/kg	<0.5	< 0.5	0	<4.0	<4.0	--	<0.5	< 0.5	0	<0.5	<4.0	--	<0.5
Benzo(a)pyrene (TCLP)		mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--
C6 - C9 Fraction	10	mg/kg	<10	< 20	--	<10	<10	0	<10	< 20	67	<10	<10	0	<10
C10 - C14 Fraction	50	mg/kg	<50	< 20	--	630	<50	171	<50	65	26	1660	<50	188	<50
C15 - C28 Fraction	100	mg/kg	2480	2900	16	61000	120000	65	750	1200	46	66700	107000	46	670
C29 - C36 Fraction	100	mg/kg	260	390	40	15800	28400	57	<100	< 50	67	35300	41300	16	1480
C10 - C36 Fraction (sum)	50	mg/kg	2740	3300	19	*77400*	*148000*	63	750	1300	54	*104000*	*148000*	35	2150
C6 - C10 Fraction	10	mg/kg	<10	< 20	--	<10	<10	0	<10	< 20	67	<10	<10	0	<10
C6 - C10 Fraction minus BTEX (F1)	10	mg/kg	<10	< 20	--	<10	<10	0	<10	< 20	67	<10	<10	0	<10
>C10 - C16 Fraction	50	mg/kg	100	< 50	67	2440	3200	27	280	240	15	5750	14200	85	50
>C16 - C34 Fraction	100	mg/kg	2590	3300	24	72100	140000	64	530	1000	61	91700	129000	34	1660
>C34 - C40 Fraction	100	mg/kg	<100	200	67	9120	16400	57	<100	< 100	0	16000	19800	21	1970
>C10 - C40 Fraction (sum)	50	mg/kg	2690	--	--	83700	160000	63	810	--	--	113000	163000	36	3680
>C10 - C16 Fraction minus Naphthalene (F2)	50	mg/kg	100	< 50	67	2440	3200	27	280	240	15	5750	14200	85	50
Benzene	0.2	mg/kg	<0.2	< 0.1	--	<0.2	<0.2	0	<0.2	< 0.1	--	<0.2	<0.2	0	<0.2
Toluene	0.5	mg/kg	<0.5	< 0.1	--	<0.5	<0.5	0	<0.5	< 0.1	--	<0.5	<0.5	0	<0.5
Ethylbenzene	0.5	mg/kg	<0.5	< 0.1	--	<0.5	<0.5	0	<0.5	< 0.1	--	<0.5	<0.5	0	<0.5
meta- & para-Xylene	0.5	mg/kg	<0.5	< 0.2	--	<0.5	<0.5	0	<0.5	< 0.2	--	<0.5	<0.5	0	0.7
ortho-Xylene	0.5	mg/kg	<0.5	< 0.1	--	<0.5	<0.5	0	<0.5	< 0.1	--	<0.5	<0.5	0	<0.5
Total Xylenes	0.5	mg/kg	<0.5	< 0.3	--	<0.5	<0.5	0	<0.5	< 0.3	--	<0.5	<0.5	0	0.7
Sum of BTEX	0.2	mg/kg	<0.2	--	--	<0.2	<0.2	0	<0.2	--	--	<0.2	<0.2	0	0.7
Naphthalene	1	mg/kg	<1	--	--	<1	<1	0	<1	--	--	<1	<1	0	<1

Notes:
RPD - relative percent difference
TCLP - toxicity characteristic leaching procedure
< result less than laboratory limit of reporting (LOR)

Table T4
Soil Field Quality Assurance and Qualtiy Control Results

Parameter	LOR	Sample ID	QC154	RPD	B032_0.0-0.2	QC152	RPD	B035_0.5-0.6	QC151	RPD	QC153	B047_0.0-0.2_161109	QAQC100_161109	RPD	QAQC200_161109	RPD	TB
		Sample Date	15/03/2016		15/03/2016	15/03/2016		15/03/2016	16/03/2016		14/03/2016	9/11/2016	9/11/2016		9/11/2016		9/11/2016
		Sample Type	oratory Duplicate		Intra-laboratory Duplicate			Inter-laboratory Duplicate			Trip Blank	Inter-laboratory Duplicate			Intra-laboratory Duplicate		Trip Blank
		Lab. Sample Ref.	ES1606083039		ES1606083015	ES1606083038		ES1606083010	S16-Ma18366		ES1606083037	ES1625474	ES1625474		523226-S		ES1625474
		Unit	**Result**		**Result**	**Result**		**Result**	**Result**		**Result**	**Result**	**Result**		**Result**		**Result**
Moisture Content (dried @ 103°C)	1	%	19.3	0	48.5	45.9	6	8.6	23	91	--	15.7	21.1		17		--
Asbestos Detected	0.1	g/kg	--	--	Yes	----	--	No	--	--	--	yes	--	--	--	--	--
Asbestos Type		--	--	--	Am	----	--	-	--	--	--	Am	--	--	--	--	--
Sample weight (dry)	0.01	g	--	--	292	----	--	421	--	--	--	19.1	--	--	--	--	--
Arsenic	5	mg/kg	<5	0	7	5	33	<5	< 2	--	--	12	--	--	--	--	--
Barium	10	mg/kg	<10	0	90	50	57	<10	--	--	--	120	--	--	--	--	--
Beryllium	1	mg/kg	<1	0	<1	<1	0	<1	< 2	--	--	<1	--	--	--	--	--
Boron	50	mg/kg	<50	0	<50	<50	0	<50	< 10	--	--	<50	--	--	--	--	--
Cadmium	1	mg/kg	<1	0	<1	<1	0	<1	< 0.4	--	--	1	--	--	--	--	--
Chromium	2	mg/kg	<2	0	45	37	20	<2	< 1	--	--	55	--	--	--	--	--
Chromium (TCLP)		mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	2	mg/kg	<2	0	11	10	10	<2	< 5	--	--	16	--	--	--	--	--
Copper	5	mg/kg	<5	0	72	58	22	<5	< 5	0	--	184	--	--	--	--	--
Lead	5	mg/kg	<5	0	82	68	19	<5	< 5	0	--	175	--	--	--	--	--
Lead (TCLP)		mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	5	mg/kg	<5	0	276	219	23	<5	< 5	0	--	267	--	--	--	--	--
Nickel	2	mg/kg	<2	0	**51**	**47**	8	<2	< 5	--	--	47	--	--	--	--	--
Nickel (TCLP)		mg/L	--	--	<0.1	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	5	mg/kg	<5	0	<5	<5	0	<5	< 2	86	--	<5	--	--	--	--	--
Vanadium	5	mg/kg	<5	0	34	26	27	<5	--	--	--	38	--	--	--	--	--
Zinc	5	mg/kg	62	144	1930	1530	23	<5	< 5	0	--	3320	--	--	--	--	--
Mercury	0.1	mg/kg	<0.1	0	0.4	0.4	0	<0.1	< 0.05	--	--	58.6	--	--	--	--	--
Mercury (TCLP)		mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.5	mg/kg	<0.5	0	<0.5	<0.5	0	<0.5	< 0.5	0	--	<0.5	<0.5	0	<5	--	--
Benzo(a)pyrene (TCLP)		mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
C6 - C9 Fraction	10	mg/kg	<10	0	<10	<10	0	<10	< 20	--	<10	<10	1320	196	140	173	<10
C10 - C14 Fraction	50	mg/kg	<50	0	<50	<50	0	<50	< 20	--	--	70	1850	185	1200	178	--
C15 - C28 Fraction	100	mg/kg	1950	98	4780	4610	4	<100	< 50	--	--	6920	10800	44	13000	61	--
C29 - C36 Fraction	100	mg/kg	4290	97	2990	2940	2	<100	58	--	--	6380	4190	41	8500	28	--
C10 - C36 Fraction (sum)	50	mg/kg	6240	97	7770	7550	3	<50	58	--	--	13400	16800	22	22700	52	--
C6 - C10 Fraction	10	mg/kg	<10	0	<10	<10	0	<10	< 20	--	<10	<10	<10	0	260	185	<10
C6 - C10 Fraction minus BTEX (F1)	10	mg/kg	<10	0	<10	<10	0	<10	< 20	--	<10	<10	1620	197	260	185	<10
>C10 - C16 Fraction	50	mg/kg	110	75	190	210	10	<50	< 50	0	--	300	4780	176	2600	159	--
>C16 - C34 Fraction	100	mg/kg	4860	98	6860	6610	4	<100	< 100	0	--	11600	11200	3	20000	53	--
>C34 - C40 Fraction	100	mg/kg	5660	97	1720	1760	2	<100	170	52	--	3330	2130	44	2800	17	--
>C10 - C40 Fraction (sum)	50	mg/kg	10600	97	8770	8580	2	<50	--	--	--	15200	18100	17	--	--	--
>C10 - C16 Fraction minus Naphthalene (F2)	50	mg/kg	110	75	190	210	10	<50	< 50	0	--	300	4780	176	2600	159	--
Benzene	0.2	mg/kg	<0.2	0	<0.2	<0.2	0	<0.2	< 0.1	--	<0.2	<0.2	<0.2	0	<0.1	0	<1
Toluene	0.5	mg/kg	<0.5	0	<0.5	<0.5	0	<0.5	< 0.1	--	<0.5	<0.5	<0.5	0	<0.1	0	<2
Ethylbenzene	0.5	mg/kg	<0.5	0	<0.5	<0.5	0	<0.5	< 0.1	--	<0.5	<0.5	<0.5	0	<0.1	0	<2
meta- & para-Xylene	0.5	mg/kg	<0.5	--	<0.5	<0.5	0	<0.5	< 0.2	--	<0.5	<0.5	<0.5	0	<0.2	0	<2
ortho-Xylene	0.5	mg/kg	<0.5	0	<0.5	<0.5	0	<0.5	< 0.1	--	<0.5	<0.5	<0.5	0	<0.1	0	<2
Total Xylenes	0.5	mg/kg	<0.5	--	<0.5	<0.5	0	<0.5	< 0.3	--	<0.5	<0.5	<0.5	0	<0.3	0	<2
Sum of BTEX	0.2	mg/kg	<0.2	--	<0.2	<0.2	0	<0.2	--	--	<0.2	<0.2	<0.2	0	--	--	<1
Naphthalene	1	mg/kg	<1	0	<1	<1	0	<1	--	--	<1	<1	<1	0	<0.5	0	<5

Notes:
RPD - relative percent difference
TCLP - toxicity characteristic leaching procedure
< result less than laboratory limit of reporting (LOR)

Parameter	LOR	Sample ID	QC156	QC161	QC162	QAQC_300_161109
		Sample Date	15/03/2016	16/03/2016	16/03/2016	42683
		Lab.Sample Ref.	ES1606083040	ES1606083042	ES1606083043	Rinsate Blank
		Unit	Result	Result	Result	ES1625474
Arsenic	0.001	mg/L	<0.001	<0.001	--	--
Beryllium	0.001	mg/L	<0.001	<0.001	--	--
Barium	0.001	mg/L	<0.001	<0.001	--	--
Cadmium	0.0001	mg/L	<0.0001	<0.0001	--	--
Chromium	0.001	mg/L	<0.001	<0.001	--	--
Cobalt	0.001	mg/L	<0.001	<0.001	--	--
Copper	0.001	mg/L	<0.001	<0.001	--	--
Lead	0.001	mg/L	<0.001	<0.001	--	--
Manganese	0.001	mg/L	<0.001	<0.001	--	--
Nickel	0.001	mg/L	<0.001	<0.001	--	--
Selenium	0.01	mg/L	<0.01	<0.01	--	--
Vanadium	0.01	mg/L	<0.01	<0.01	--	--
Zinc	0.005	mg/L	<0.005	<0.005	--	--
Boron	0.05	mg/L	<0.05	<0.05	--	--
Mercury	0.0001	mg/L	<0.0001	<0.0001	--	--
Benzo(a)pyrene	0.5	µg/L	<0.5	<0.5	--	<0.5
C6 - C9 Fraction	20	µg/L	<20	<20	<20	<20
C10 - C14 Fraction	50	µg/L	<50	<50	--	<50
C15 - C28 Fraction	100	µg/L	<100	<100	--	<100
C29 - C36 Fraction	50	µg/L	<50	<50	--	<50
C10 - C36 Fraction (sum)	50	µg/L	<50	<50	--	<50
C6 - C10 Fraction	20	µg/L	<20	<20	<20	<20
>C10 - C16 Fraction	100	µg/L	<100	<100	--	<100
>C16 - C34 Fraction	100	µg/L	<100	<100	--	<100
>C34 - C40 Fraction	100	µg/L	<100	<100	--	<100
>C10 - C40 Fraction (sum)	100	µg/L	<100	<100	--	<100
Benzene	1	µg/L	<1	<1	<1	<1
Toluene	2	µg/L	<2	<2	<2	<2
Ethylbenzene	2	µg/L	<2	<2	<2	<2
meta- & para-Xylene	2	µg/L	<2	<2	<2	<2
ortho-Xylene	2	µg/L	<2	<2	<2	<2
Total Xylenes	2	µg/L	<2	<2	<2	<2
Sum of BTEX	1	µg/L	<1	<1	<1	<1
Naphthalene	5	µg/L	<5	<5	<5	<5

Notes:

< result less than laboratory limit of reporting (LOR)

Appendix D

Calibration Records

Daily Calibration Sheet

Date: 15/3/16
Job Name: CALTEX KURNELL 60488804
Job Number: 60488804
Field Staff: KATE PIGRAM
Project Manager: STEVE LANDALL
Weather: RAIN, OVERCAST

ITEM	PID	Explosimeter	Acidity		Conductivity	Redox	DO	
Units	ppm	% LEL	pH	pH	uS/cm	mV	ppm	
Model	MINIRAE 3000							
Serial Number	PID3000-14							
Calibration Standard	Isobutylene							
Concentration	100							
Calibration Time	0730							
Calibration Reading	99.3							
Comments								

Checks

Time								
Reading								
Comment								
Reading								
Comment								
Time								
Reading								
Comment								

Notes

Field Staff Signature: KPigram

Daily Calibration Sheet

Date: 16/3/16 Job Name: 60488804 Job Number: 0.00 CALTEX KURNELL

Field Staff: KATE PIGRAM Project Manager: 0 STEVE LANDAU

Weather:

ITEM	PID	Explosimeter	Acidity		Conductivity	Redox	DO	
Units	ppm	% LEL	pH	pH	uS/cm	mV	ppm	
Model	MINIRAE 3000							
Serial Number	PID 3000-14							
Calibration Standard	Isobutylene							
Concentration	100 ppm							
Calibration Time	0720							
Calibration Reading	98.7							
Comments								

Checks

Time								
Reading								
Comment								
Reading								
Comment								
Time								
Reading								
Comment								

Notes

Field Staff Signature: KPigram

Thermo Fisher
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RENTALS

Equipment Report – SOIL AUGER KIT

This soil auger kit has been cleaned and checked:

Date: 01/03/2016 Checked by: MD

Signed:

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

Sent	Received	Returned	Item
☑	☐	☐	1 Regular Auger Head
☑	☐	☐	1 Clay Auger Head
☑	☐	☐	1 Sand Auger Head
☑	☐	☐	1 Tee Handle / Ratchet Handle
☑	☐	☐	Extension rods Qty: 4
☑	☐	☐	1 Finger Ring for disconnecting extensions
☑	☐	☐	Canvas carry bag
☑	☐	☐	Optional – straps for canvas carry bag
☐	☐	☐	
☐	☐	☐	
☐	☐	☐	

Processors Signature/ Initials

Quote Reference	CS004303	Condition on return
Customer Ref		
Equipment ID	AMS50SA	
Equipment serial no.		
Return Date	/ /	
Return Time		

RENTALS

Equipment Report - MiniRAE 3000 PID

This Gas Meter has been performance checked and calibrated as follows:

Lamp	Compound	Concentration	Zero	Span	Traceability Lot #	Pass?
10.6 eV	Isobutylene	100 ppm	0.0 ppm	100.0 ppm	1808481 Cyl 2	☑

Alarm Limits

High	100	ppm
Low	50	ppm

Bump Test

Date	Target Gas	Reading	Pass?
10/03/2016	100 ppm	99.7 ppm	☑

- ☑ Battery Status 100%
- ☑ 10 minutes test complete
- ☑ Spare battery status (Min 5.5 volts)
- ☑ Electrical Safety Tag attached (AS/NZS 3760)

Tag No: 000496

Valid to: 19/05/2016

- ☑ Performance check (pump, lamp, sensor)
- ☑ Data cleared
- ☑ Filters checked

Date: 10/03/2016

Signed: [signature]

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
☑	☐	MiniRAE 2000 PID / Operational Check / Battery Status 100%
☑	☐	Lamp 10.6 eV, Compound Set to: ISOBUTYLENE/factor: 1
☑	☐	Protective yellow rubber boot
☑	☐	Inlet probe (attached to PID)
☑	☐	Spare water trap filter(s) Qty 1
☑	☐	Charger 240V to 12V1250mA
☑	☐	Cradle and Travel Charger
☑	☐	Instruction Manual behind foam on the lid of case "
☑	☐	Quick Guide Sheet behind foam on the lid of case "
☑	☐	Spare Alkaline Battery Compartment with batteries
☑	☐	Inline Moisture trap Filter Guide Laminated
☒	☐	Calibration regulator & tubing (optional)
☒	☐	Data cable and Software CD (optional)
☑	☐	Carry Case
☑	☐	Check to confirm electrical safety (tag must be valid)

Date: 11/03/2016

Signed: [signature]

TFS Reference	CS004303	Return Date: / /	
Customer Reference		Return Time:	
Equipment ID	PID3000-14	Condition on return:	
Equipment Serial No.	592913297		

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RENTALS

Equipment Certification Report - Impact Pro Multi-Gas Detector

This Gas Meter has been performance checked/calibrated as follows:

- ✓ Fresh Air Calibration for all Sensors
- ✓ CH4 (combustibles)
- ✓ O2 00.0% volume check only within +/- 2%
- ✓ Charged | 10 minute test complete
- ✓ Electrical Safety Tag attached (AS/NZS 3760)
- ✓ CO 100ppm Span
- ✓ 50% LEL (2.5%vol = 25,000ppm) Span
- ✓ H2S 40ppm Span n
- ✓ Spare Battery min 4.2v Volts

Tag no: 000478

Valid to: 08/06/2016

* Calibration Gas traceability information available upon request

Date: 11/03/2016 Checked by: MILENKO

Signed:

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Received	Returned	Item
✓			Impact Pro Gas Detector
✓			Monitor / Performance check / Bat % 100%
✓			Monitor setup for METHANE
✓			Power supply 240/12v with base station
✓			Flow adaptor [Grey] for calibration with hose
✓			Pump adaptor [Black] with hose and Inline filter
✓			Battery Cases with 4 Alkaline Batteries
✓			Allen Key located back of Instrument to open battery
✓			Spare inline filters 1
✓			Instruction Manual behind foam on the lid of case
✓			Quick Use Guide behind foam on the lid of case
✓			Carry Case
			Regulator included:
			Cal Gas

Processors Signature/ Initials MS

Quote Reference	CS004303	Condition on return
Customer Ref		
Equipment ID	IMPSO	
Equipment serial no.	ZEC1007672	
Return Date	/ /	
Return Time		

ThermoFisher SCIENTIFIC

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RENTALS

Equipment Report - MiniRAE 3000 PID

This Gas Meter has been performance checked and calibrated as follows:

Lamp	Compound	Concentration	Zero	Span	Traceability Lot #	Pass?
10.6 eV	Isobutylene	100 ppm	0.0 ppm	100.0 ppm	389261 Cyl 2	☑

Alarm Limits

High	100 ppm
Low	50 ppm

Bump Test

Date	Target Gas	Reading	Pass?
25/10/2016	100 ppm	100.1 ppm	☑

- ☑ Battery Status 100%
- ☑ 10 minutes test complete
- ☑ Spare battery status (Min 5.5 volts)
- ☑ Electrical Safety Tag attached (AS/NZS 3760)

Tag No: 000828

Valid to: 12/11/16

- ☑ Performance check (pump, lamp, sensor)
- ☑ Data cleared
- ☑ Filters checked

Date: 25/10/2016

Signed: [signature]

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
☑	☐	MiniRAE 2000 PID / Operational Check / Battery Status 100%
☑	☐	Lamp **10.6 eV**, Compound Set to: **Isobutylene** C/factor: **1**
☑	☐	Protective yellow rubber boot
☑	☐	Inlet probe (attached to PID)
☑	☐	Spare water trap filter(s) Qty 1
☑	☐	Charger 240V to 12V1250mA
☑	☐	Cradle and Travel Charger
☑	☐	Instruction Manual behind foam on the lid of case "
☑	☐	Quick Guide Sheet behind foam on the lid of case "
☑	☐	Spare Alkaline Battery Compartment with batteries
☑	☐	Inline Moisture trap Filter Guide Laminated
☒	☐	Calibration regulator & tubing (optional)
☐	☐	Data cable and Software CD (optional)
☑	☐	Carry Case
☑	☐	Check to confirm electrical safety (tag must be valid)

Date: 27/10/2016

Signed: [signature]

TFS Reference	CS005730	Return Date: / /	
Customer Reference		Return Time:	
Equipment ID	PID3000-2	Condition on return:	
Equipment Serial No.	592911920		

Appendix E

Laboratory Reports

AECOM

Chain of Custody

AECOM - Sydney
Level 21, 420 George Street,
Sydney, NSW 2000
Tel: (02) 8934 0000
Fax: (02) 8934 0001
E-mail: Stephen.Randall@aecom.com

Laboratory Details
Lab. Name: ALS
Lab. Address:
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No:

Sampled By: Kate Pigram
AECOM Project No: 60488804/1.2
Project Name: Caltex Kurnell
PO No.

Environmental Division
Sydney
Work Order Reference
ES1606083
Telephone : + 61-2-8784 8555

Specifications:

Specification	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr _______ days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: ____________)	
6. Shell Quality Partnership:	
7. Report Format: Fax Hardcopy Email :	

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)
1	B001_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
2	B003.5_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
3	B007.5_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
4	B009.5_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
5	B010.5_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
6	B012.5_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
7	B036_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
8	B036_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
9	B035_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
10	B035_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
11	B034_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
12	B034_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X

Analysis Request — Other

Subcontract / Forward Lab / Split WO Newcastle: Asbestos
Lab / Analysis: Envirolab QC157, QC155, QC158
Organised By / Date: Frank
Relinquished By / Date:
Connote / Courier:
WO No: ES1606083
Attach By PO / Internal Sheet:

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Lab Report No. | Esky ID

Relinquished by: Kate Pigram	Signed: Kate Pigram	Date: 17/03/2016	Relinquished by: Signed: Date:
Recieved by: Frank	Signed:	Date: 17-3-16 1500	Recieved by: Signed: Date:

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Chain of Custody

AECOM

AECOM - Sydney
Level 21, 420 George Street,
Sydney, NSW 2000

Tel: (02) 8934 0000
Fax: (02) 8934 0001
E-mail: Stephen.Randall@aecom.com

Laboratory Details

Lab. Name: ALS
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No:

Sampled By: Kate Pigram
AECOM Project No: 60488804/1.2
Project Name: Caltex Kurnell
PO No.

Specifications:

	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr _______days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: ____________)	
6. Shell Quality Partnership:	
7. Report Format: Fax Hardcopy Email :	

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)
13	B033_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
14	B033_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
15	B032_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
16	B032_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
17	B031_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
18	B031_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
19	B016.5_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
20	B016.5_0.4-0.5	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
21	B016_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
22	B015.5_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
23	B014_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
24	B014_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X

Other

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Lab Report No. Esky ID

Relinquished by: Kate Pigram	Signed: Kate Pigram	Date: 17/03/2016	Relinquished by:	Signed:	Date:
Recieved by: Frank	Signed:	Date: 17-3-16	Recieved by:	Signed:	Date:

1500

AECOM

Chain of Custody

AECOM - Sydney
Level 21, 420 George Street,
Sydney, NSW 2000

Tel: (02) 8934 0000
Fax: (02) 8934 0001
E-mail: Stephen.Randall@aecom.com

Laboratory Details

Lab. Name: ALS
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No:

Sampled By: Kate Pigram | AECOM Project No: 60488804/1.2 | Project Name: Caltex Kurnell | PO No.

Specifications:

Specifications	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr _______days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: ______________________)	
6. Shell Quality Partnership:	
7. Report Format: Fax Hardcopy Email : ______________	

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)
25	A003.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
26	A005.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
27	A006.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
28	A007.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
29	A008.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
N.R ~~30~~	A009.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
31	A013.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
32	A013.5_0.4-0.5	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
33	A014.5_0.4-0.5	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
34	C011_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
35	C012_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
36	QC150	14/03/2016	X					X		1 x 125 mL jar		X	X

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Lab Report No.

Esky ID

Relinquished by:	Kate Pigram	Signed:	Kate Pigram	Date: 17/03/2016	Relinquished by:		Signed:		Date:
Recieved by:	Frank	Signed:	[signature]	Date: 17-3-16 1500	Recieved by:		Signed:		Date:

AECOM

Chain of Custody

AECOM - Sydney
Level 21, 420 George Street,
Sydney, NSW 2000

Tel: (02) 8934 0000
Fax: (02) 8934 0001
E-mail: Stephen.Randall@aecom.com

Laboratory Details
Lab. Name: ALS
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No:

Sampled By: Kate Pigram
AECOM Project No: 60488804/1.2
Project Name: Caltex Kurnell
PO No.

Specifications: Yes (tick)

1. Urgent TAT required? (please circle: 24hr 48hr _______days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: ____________________)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email : ____________

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)	TRH C6-C10 & BTEXN	Other
37	QC153	14/03/2016	X					X		1 x 125 mL jar				X	
*	QC151	15/03/2016	X					X		1 x 125 mL jar		X	X		PLEASE FORWARD SAMPLE AND COC TO EUROFINS
38	QC152	15/03/2016	X					X		1 x 125 mL jar		X	X		
39	QC154	15/03/2016	X					X		1 x 125 mL jar		X	X		
40	QC156	15/03/2016		X				X		2 x vials; 1 x 100 mL plastic; 1 x amber		X	X		
*	QC155	16/03/2016	X					X		1 x 125 mL jar		X	X		PLEASE FORWARD SAMPLE AND COC TO EUROFINS
41	QC157	16/03/2016	X					X		1 x 125 mL jar		X	X		
*	QC158	16/03/2016	X					X		1 x 125 mL jar		X	X		PLEASE FORWARD SAMPLE AND COC TO EUROFINS
42	QC161	16/03/2016		X				X		2 x vials; 1 x 100 mL plastic; 1 x amber		X	X		
43	QC162	16/03/2016		X				X		2 x vials				X	

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Lab Report No. Esky ID

Relinquished by:	Kate Pigram	Signed:	Kate Pigram	Date:	17/03/2016	Relinquished by:		Signed:		Date:
Recieved by:	Frank	Signed:	[signature]	Date:	17-3-16 1500	Recieved by:		Signed:		Date:

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ALS Environmental

SAMPLE RECEIPT NOTI□ICATION (SRN)

Work Order : **ES16060□□**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: Stephen.Randall□ aecom.com	E-mail	: loren.schiavon□ alsglobal.com
Telephone	: 02 8934 0000	Telephone	: +61 2 8784 8503
Facsimile	: 02 8934 0001	Facsimile	: +61-2-8784 8500
Project	: 60488804/1.2 Caltex Kurnell	Page	: 1 of 4
Order number	: 60488804/1.2	Quote number	: EB2015AECOMAU0580 (EN/004/15)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 □ ALS QC Standard
Site	: ----		
Sampler	: KATE PIGRAM		

Dates

Date Samples Received	: 17-Mar-2016 3:00 PM	Issue Date	: 17-Mar-2016
Client Requested Due Date	: 24-Mar-2016	Scheduled Reporting Date	: **□4□Mar□□016**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 5	Temperature	: 4.6□c
Receipt Detail	:	No. of samples received / analysed	: 42 / 42

□eneral Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Sa□ples QC1□1□QC1□□and QC1□□ □ill be sent to Euro□ins as per coc request.**
- **Sa□ple A00□.□□0.0□0.□ □as not recei□ed.**
- **Please re□er to the Proacti□e □oldin□ Ti□ e Report table belo□ □hich su□ □arises breaches o□ reco□ □ended holdin□ ti□ es that ha□e occurred prior to sa□ ples instructions bein□ recei□ed at the laboratory. The absence o□this su□ □ary table indicates that all sa□ ples ha□e been recei□ed □ithin the reco□ □ended holdin□ ti□ es □or the analysis requested.**
- **Sa□ ple(s) requirin□ □olatile or□anic co□ pound analysis recei□ed in airti□ht containers (□□E).**
- **Asbestos analysis □ill be conducted by ALS Ne□castle.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation □on□Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

□ **No sa□ple container □preser□ation non□co□pliance exists.**

Summary of Sample(s) and □e□uested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **SOIL**

□a□oratory sample ID	Client samplin□ date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EP075 SIM PAH only SIM - PAH only	SOIL - S-03 15 Metals (NEPM 2013 Suite - incl. Digestion)	SOIL - S-04 TRH/BTE□N	SOIL - S-18 (NO MOIST) TRH(C6-C9)/BTE□N with No Moisture for TBs
ES1606083-001	□14-Mar-2016 □	B001□0.0-0.2	□	□	□	□	□	
ES1606083-002	□14-Mar-2016 □	B003.5□0.0-0.2	□	□	□	□	□	
ES1606083-003	□14-Mar-2016 □	B007.5□0.0-0.2	□	□	□	□	□	
ES1606083-004	□14-Mar-2016 □	B009.5□0.0-0.2	□	□	□	□	□	
ES1606083-005	□14-Mar-2016 □	B010.5□0.0-0.2	□	□	□	□	□	
ES1606083-006	□14-Mar-2016 □	B012.5□0.0-0.2	□	□	□	□	□	
ES1606083-007	□15-Mar-2016 □	B036□0.0-0.2	□	□	□	□	□	
ES1606083-008	□15-Mar-2016 □	B036□0.5-0.6	□	□	□	□	□	
ES1606083-009	□15-Mar-2016 □	B035□0.0-0.2	□	□	□	□	□	
ES1606083-010	□15-Mar-2016 □	B035□0.5-0.6	□	□	□	□	□	
ES1606083-011	□15-Mar-2016 □	B034□0.0-0.2	□	□	□	□	□	
ES1606083-012	□15-Mar-2016 □	B034□0.5-0.6	□	□	□	□	□	
ES1606083-013	□15-Mar-2016 □	B033□0.0-0.2	□	□	□	□	□	
ES1606083-014	□15-Mar-2016 □	B033□0.5-0.6	□	□	□	□	□	
ES1606083-015	□15-Mar-2016 □	B032□0.0-0.2	□	□	□	□	□	
ES1606083-016	□15-Mar-2016 □	B032□0.5-0.6	□	□	□	□	□	
ES1606083-017	□15-Mar-2016 □	B031□0.0-0.2	□	□	□	□	□	
ES1606083-018	□15-Mar-2016 □	B031□0.5-0.6	□	□	□	□	□	
ES1606083-019	□15-Mar-2016 □	B016.5□0.0-0.2	□	□	□	□	□	
ES1606083-020	□15-Mar-2016 □	B016.5□0.5-0.6	□	□	□	□	□	
ES1606083-021	□15-Mar-2016 □	B016□0.0-0.2	□	□	□	□	□	
ES1606083-022	□15-Mar-2016 □	B015.5□0.5-0.6	□	□	□	□	□	
ES1606083-023	□15-Mar-2016 □	B014□0.0-0.2	□	□	□	□	□	
ES1606083-024	□15-Mar-2016 □	B014□0.5-0.6	□	□	□	□	□	
ES1606083-025	□16-Mar-2016 □	A003.5□0.0-0.2	□	□	□	□	□	
ES1606083-026	□16-Mar-2016 □	A005.5□0.0-0.2	□	□	□	□	□	
ES1606083-027	□16-Mar-2016 □	A006.5□0.0-0.2	□	□	□	□	□	
ES1606083-028	□16-Mar-2016 □	A007.5□0.0-0.2	□	□	□	□	□	
ES1606083-029	□16-Mar-2016 □	A008.5□0.0-0.2	□	□	□	□	□	
ES1606083-031	□16-Mar-2016 □	A013.5□0.0-0.2	□	□	□	□	□	
ES1606083-032	□16-Mar-2016 □	A013.5□0.4-0.5	□	□	□	□	□	
ES1606083-033	□16-Mar-2016 □	A014.5□0.4-0.5	□	□	□	□	□	
ES1606083-034	□16-Mar-2016 □	C011□0.0-0.2	□	□	□	□	□	
ES1606083-035	□16-Mar-2016 □	C012□0.0-0.2	□	□	□	□	□	
ES1606083-036	□14-Mar-2016 □	QC150	□		□	□	□	

			SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EP075 SIM PAH only SIM - PAH only	SOIL - S-03 15 Metals (NEPM 2013 Suite - incl. Digestion)	SOIL - S-04 TRH/BTE□N	SOIL - S-18 (NO MOIST) TRH(C6-C9)/BTE□N with No Moisture for TBs
ES1606083-037	□14-Mar-2016 □	QC153						▯
ES1606083-038	□15-Mar-2016 □	QC152	▯		▯	▯	▯	
ES1606083-039	□15-Mar-2016 □	QC154	▯		▯	▯	▯	
ES1606083-041	□16-Mar-2016 □	QC157	▯		▯	▯	▯	

Matrix: **WATER**

□a□oratory sample ID	Client samplin□ date / time	Client sample ID	WATER - W-03 15 Metals (NEPM Suite)
ES1606083-040	□15-Mar-2016 □	QC156	▯
ES1606083-042	□16-Mar-2016 □	QC161	▯

Matrix: **WATER**

□a□oratory sample ID	Client samplin□ date / time	Client sample ID	WATER - EP075 SIM PAH only SIM - PAH only	WATER - W-04 TRH/BTE□N	WATER - W-18 TRH(C6 - C9)/BTE□N
ES1606083-040	□15-Mar-2016 □	QC156	▯	▯	
ES1606083-042	□16-Mar-2016 □	QC161	▯	▯	
ES1606083-043	□16-Mar-2016 □	QC162			▯

Proactive □oldin□ □ime □eport

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

AP_CUSTOMER SERVICE ANZ

- A4 - AU Tax Invoice (INV)	Email	ap_customerservice.anz@aecom.com

STEPHEN RANDALL

- *AU Certificate of Analysis - NATA (COA)	Email	Stephen.Randall@aecom.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Stephen.Randall@aecom.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Stephen.Randall@aecom.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Stephen.Randall@aecom.com
- A4 - AU Tax Invoice (INV)	Email	Stephen.Randall@aecom.com
- Chain of Custody (CoC) (COC)	Email	Stephen.Randall@aecom.com
- EDI Format - ENMRG (ENMRG)	Email	Stephen.Randall@aecom.com
- EDI Format - EQUIS V5 URS (EQUIS_V5_URS)	Email	Stephen.Randall@aecom.com
- EDI Format - ESDAT (ESDAT)	Email	Stephen.Randall@aecom.com
- EDI Format - XTab (XTAB)	Email	Stephen.Randall@aecom.com
- Electronic SRN for EQuIS (ESRN_EQUIS)	Email	Stephen.Randall@aecom.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES16060□□**	Page	: 1 of 22
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 8934 0000	Telephone	: +61 2 8784 8503
Project	: 60488804/1.2 Caltex Kurnell	Date Samples Received	: 17-Mar-2016 15:00
Order number	: 60488804/1.2	Date Analysis Commenced	: 18-Mar-2016
C-O-C number	: ----	Issue Date	: 30-Mar-2016 16:07
Sampler	: KATE PIGRAM		
Site	: ----		
Quote number	: ----		
No. of samples received	: 42		
No. of samples analysed	: 42		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
 = This result is computed from individual analyte detections at or above the level of reporting
 = ALS is not NATA accredited for these tests.

- EG035: Poor matrix spike recovery was obtained for Mercury on sample EP1602288-1 due to high matrix interference. Confirmed by re-analysis.
- EG035: Positive Hg results have been confirmed by reanalysis.
- EP075(SIM) :Particular samples required dilution due to sample matrix . LOR values have been adjusted accordingly.
- EA200 Am Amosite (brown asbestos)
- EA200 Cr Crocidolite (blue asbestos)
- EA200 Trace - Asbestos fibres (Free Fibres) detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable respirable asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 Ch Chrysotile (white asbestos)
- EA200: UMF Unknown Mineral Fibres. - indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for TEQ ero are treated as zero, for TEQ 1/2LOR are treated as half the reported LOR, and for TEQ LOR are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for TEQ ero are treated as zero.

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B001□0.0□0.□	B00□.□□0.0□0.□	B007.□□0.0□0.□	B00□.□□0.0□0.□	B010.□□0.0□0.□
			Client samplin□ date / time	□14-Mar-2016□	□14-Mar-2016□	□14-Mar-2016□	□14-Mar-2016□	□14-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□001	ES16060□□00□	ES16060□□00□	ES16060□□004	ES16060□□00□
				Result	Result	Result	Result	Result
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	□.□	**4.1**	<1.0	**46.4**	□□.□
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Asbestos Type	1332-21-4	-	--	**A□**	**A□**	**A□**	**A□ □(Trace□A□)**	**A□**
Sa□ple □ei□ht (dry)	----	0.01	g	**□□1**	**□□□**	**614**	**141**	**1□□**
APPROVED IDENTI□IER:	----	-	--	**C.OWLER**	**C.OWLER**	**□.MOR□AN**	**□.MOR□AN**	**C.OWLER**
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	**6**	**14**	**□**	**□4**	**10**
Bariu□	7440-39-3	10	mg/kg	**1□0**	**110**	**□0**	**4□0**	**70**
Berylliu□	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cad□iu□	7440-43-9	1	mg/kg	<1	<1	<1	**□**	**1**
Chro□iu□	7440-47-3	2	mg/kg	**□4**	**107**	**61**	**1□□**	**7□**
Cobalt	7440-48-4	2	mg/kg	**□**	**1□**	**1□**	**46**	**14**
Copper	7440-50-8	5	mg/kg	**141**	**117**	**47□**	**7□□**	**□□0**
Lead	7439-92-1	5	mg/kg	**□0**	**144**	**6□1**	**□□□**	**□4□**
Man□anese	7439-96-5	5	mg/kg	**□77**	**447**	**1□□**	**1□□0**	**17□**
Nickel	7440-02-0	2	mg/kg	**□0**	**41**	**□0**	**1□□**	**□□**
Seleniu□	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadiu□	7440-62-2	5	mg/kg	**□7**	**60**	**10**	**11□**	**□7**
□inc	7440-66-6	5	mg/kg	**1□□0**	**1710**	**6□60**	**□100**	**40□0**
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	**□.□**	**□.1**	**0.□**	**61.7**	**17.6**
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	**1.4**	<0.5	<0.5	<0.5	<0.5
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 □C14 □raction	----	50	mg/kg	<50	<50	<50	<50	**1660**
C1□ □C□□ □raction	----	100	mg/kg	**1□□00**	**11600**	<100	**10□0**	**66700**
C□□ □C□6 □raction	----	100	mg/kg	**□□□0**	**□160**	<100	**1□□0**	**□□□00**
□C10 □C□6 □raction (su□)	----	50	mg/kg	**□4600**	**1□□00**	<50	**□440**	**104000**
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	<10	<10	<10

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B001□0.0□0.□	B00□.□□0.0□0.□	B007.□□0.0□0.□	B00□.□□0.0□0.□	B010.□□0.0□0.□
			Client samplin□ date / time	□14-Mar-2016□	□14-Mar-2016□	□14-Mar-2016□	□14-Mar-2016□	□14-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□001	ES16060□□00□	ES16060□□00□	ES16060□□004	ES16060□□00□
				Result	Result	Result	Result	Result
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□C6 □C10 □raction □inus BTE□ (□1)	C6□C10-BTE□	10	mg/kg	<10	<10	<10	<10	<10
□C10 □C16 □raction	----	50	mg/kg	□□0	<50	<50	<50	□7□0
□C16 □C□4 □raction	----	100	mg/kg	□□□00	17□00	<100	□040	□1700
□C□4 □C40 □raction	----	100	mg/kg	6160	4□□0	<100	□40	16000
□ □C10 □C40 □raction (su□)	----	50	mg/kg	□□000	□□100	<50	□□□0	11□000
□ □C10 □C16 □raction □inus Naphthalene (□□)	----	50	mg/kg	□□0	<50	<50	<50	□7□0
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□eta□□ para□□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ Su□ o□BTE□	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
□Total □ylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	□□.6	□□.0	□4.□	100	□□.0
□Chlorophenol□D4	93951-73-6	0.5	%	□□.□	□0.6	□□.□	□□.6	□1.□
□.4.6□Tribro□ophenol	118-79-6	0.5	%	10□	107	114	11□	1□□
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	0.5	%	□□.0	7□.1	□□.□	106	□□.□
Anthracene□d10	1719-06-8	0.5	%	10□	□□.□	107	111	10□
4□Terphenyl□d14	1718-51-0	0.5	%	10□	□□.6	□□.4	10□	11□
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□□Dichloroethane□D4	17060-07-0	0.2	%	□6.1	10□	□□.□	□□.6	□7.0
Toluene□D□	2037-26-5	0.2	%	10□	116	106	□4.6	10□
4□Bro□o□luoroben□ene	460-00-4	0.2	%	10□	110	10□	□4.□	□□.6

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B01□.□□0.0□0.□	B0□6□0.0□0.□	B0□6□0.□□0.6	B0□□□0.0□0.□	B0□□□0.□□0.6
			Client samplin□ date / time	□14-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□006	ES16060□□007	ES16060□□00□	ES16060□□00□	ES16060□□010
				Result	Result	Result	Result	Result
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	□7.□	□0.0	□0.□	1□.□	□6
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	Yes	Yes	No	No
Asbestos Type	1332-21-4	-	--	□	A□	A□	□	□
Sa□ple □ei□ht (dry)	----	0.01	g	□40	□07	□46	□□□	4□1
APPROVED IDENTI□IER:	----	-	--	S.SPOONER	S.SPOONER	□.MOR□AN	□.MOR□AN	S.SPOONER
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	1□	6	<5	<5	<5
Bariu□	7440-39-3	10	mg/kg	□0	70	<10	□0	<10
Berylliu□	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cad□iu□	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chro□iu□	7440-47-3	2	mg/kg	□6	□6	4	□0	<2
Cobalt	7440-48-4	2	mg/kg	7	□□	<2	7	<2
Copper	7440-50-8	5	mg/kg	1□1	□□	11	11□	<5
Lead	7439-92-1	5	mg/kg	□04	□□	1□	□□4	<5
Man□anese	7439-96-5	5	mg/kg	1□□	□6□	□1	1□□	<5
Nickel	7440-02-0	2	mg/kg	□□	□□	□	1□	<2
Seleniu□	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadiu□	7440-62-2	5	mg/kg	1□	□□	6	17	<5
□inc	7440-66-6	5	mg/kg	□□40	1□□0	14□	1□□0	<5
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	□.7	0.6	<0.1	0.□	<0.1
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 □C14 □raction	----	50	mg/kg	<50	<50	<50	<50	<50
C1□ □C□□ □raction	----	100	mg/kg	<100	<100	<100	<100	<100
C□□ □C□6 □raction	----	100	mg/kg	<100	<100	<100	<100	<100
□C10 □C□6 □raction (su□)	----	50	mg/kg	<50	<50	<50	<50	<50
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	<10	<10	<10

□nalytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS □um□er	□□□	□nit	B01□.□□0.0□0.□	B0□6□0.0□0.□	B0□6□0.□□0.6	B0□□□0.0□0.□	B0□□□0.□□0.6
			Client samplin□ date / time	□14-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□
				ES16060□□006	ES16060□□007	ES16060□□00□	ES16060□□00□	ES16060□□010
				Result	Result	Result	Result	Result
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□C6 □C10 □raction □inus BTE□ (□1)	C6□C10-BTE□	10	mg/kg	<10	<10	<10	<10	<10
□C10 □C16 □raction	----	50	mg/kg	<50	<50	<50	<50	<50
□C16 □C□4 □raction	----	100	mg/kg	<100	<100	<100	<100	<100
□C□4 □C40 □raction	----	100	mg/kg	<100	<100	<100	<100	<100
□ □C10 □C40 □raction (su□)	----	50	mg/kg	<50	<50	<50	<50	<50
□ □C10 □C16 □raction □inus Naphthalene (□□)	----	50	mg/kg	<50	<50	<50	<50	<50
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□eta□□ para□□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ Su□ o□BTE□	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
□ Total □ylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	□□.7	□□.□	□7.□	□6.6	□1.□
□Chlorophenol□D4	93951-73-6	0.5	%	□7.6	□4.6	□□.□	□7.4	□□.1
□.4.6□Tribro□ophenol	118-79-6	0.5	%	114	117	11□	117	10□
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	0.5	%	10□	□□.□	10□	10□	□6.□
Anthracene□d10	1719-06-8	0.5	%	11□	10□	11□	114	10□
4□Terphenyl□d14	1718-51-0	0.5	%	101	100	104	10□	□□.□
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□□Dichloroethane□D4	17060-07-0	0.2	%	□□.7	□□.□	□□.6	□7.□	□1.□
Toluene□D□	2037-26-5	0.2	%	□6.□	□□.□	□4.0	□□.6	□□.□
4□Bro□o□luoroben□ene	460-00-4	0.2	%	□6.7	□6.□	□□.1	□1.6	□4.□

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B0□4□0.0□0.□	B0□4□0.□0.6	B0□□□0.0□0.□	B0□□□0.□0.6	B0□□□0.0□0.□
			Client samplin□ date / time	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□011	ES16060□□01□	ES16060□□01□	ES16060□□014	ES16060□□01□
				Result	Result	Result	Result	Result
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	1□.□	16.0	□□.□	1□.□	4□.□
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	Yes
Asbestos Type	1332-21-4	-	--	□	□	□	□	A□
Sa□ple □ei□ht (dry)	----	0.01	g	□6□	44□	4□7	6□□	□□□
APPROVED IDENTI□IER:	----	-	--	S.SPOONER	C.OWLER	C.OWLER	□.MOR□AN	□.MOR□AN
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	7
Bariu□	7440-39-3	10	mg/kg	□0	<10	10	<10	□0
Berylliu□	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cad□iu□	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chro□iu□	7440-47-3	2	mg/kg	1□	6	□	<2	4□
Cobalt	7440-48-4	2	mg/kg	□	<2	<2	<2	11
Copper	7440-50-8	5	mg/kg	□□	<5	□4	<5	7□
Lead	7439-92-1	5	mg/kg	47	<5	□7	<5	□□
Man□anese	7439-96-5	5	mg/kg	□□	<5	4□	<5	□76
Nickel	7440-02-0	2	mg/kg	1□	<2	10	<2	□1
Seleniu□	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadiu□	7440-62-2	5	mg/kg	□	<5	10	<5	□4
□inc	7440-66-6	5	mg/kg	77□	□□	1□□	14	1□□0
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	0.□	<0.1	0.□	<0.1	0.4
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 □C14 □raction	----	50	mg/kg	<50	<50	<50	<50	<50
C1□ □C□□ □raction	----	100	mg/kg	<100	□40	<100	<100	47□0
C□□ □C□6 □raction	----	100	mg/kg	<100	□60	<100	<100	□□□0
□C10 □C□6 □raction (su□)	----	50	mg/kg	<50	□00	<50	<50	7770
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	<10	<10	<10

□nalytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS □um□er	□□□	□nit	B0□4□0.0□0.□	B0□4□0.□0.6	B0□□□0.0□0.□	B0□□□0.□0.6	B0□□□0.0□0.□
			Client samplin□ date / time	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□
				ES16060□□011	ES16060□□01□	ES16060□□01□	ES16060□□014	ES16060□□01□
				Result	Result	Result	Result	Result
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□C6 □C10 □raction □ inus BTE□ (□1)	C6□C10-BTE□	10	mg/kg	<10	<10	<10	<10	<10
□C10 □C16 □raction	----	50	mg/kg	<50	□40	<50	<50	1□0
□C16 □C□4 □raction	----	100	mg/kg	<100	□□0	<100	<100	6□60
□C□4 □C40 □raction	----	100	mg/kg	<100	□□0	<100	<100	17□0
□ □C10 □C40 □raction (su□)	----	50	mg/kg	<50	□40	<50	<50	□770
□ □C10 □C16 □raction □ inus Naphthalene (□□)	----	50	mg/kg	<50	□40	<50	<50	1□0
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ eta□□ para□□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ Su□ o□BTE□	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
□ Total □ylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP07□(SIM)S: Phenolic Co□ pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	□6.□	101	□6.1	□□.□	10□
□Chlorophenol□D4	93951-73-6	0.5	%	□6.1	10□	□□.1	□□.7	100
□.4.6□Tribro□ ophenol	118-79-6	0.5	%	107	106	100	□7.6	10□
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	0.5	%	10□	101	10□	10□	10□
Anthracene□d10	1719-06-8	0.5	%	11□	10□	111	11□	11□
4□Terphenyl□d14	1718-51-0	0.5	%	107	10□	107	10□	11□
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□Dichloroethane□D4	17060-07-0	0.2	%	□7.□	□7.6	□6.6	□4.□	□□.7
Toluene□D□	2037-26-5	0.2	%	10□	□0.□	□□.7	□6.□	□□.□
4□Bro□ o□luoroben□ene	460-00-4	0.2	%	10□	□□.0	□6.□	□6.4	□7.0

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B0□□□0.□0.6	B0□1□0.0□0.□	B0□1□0.□0.6	B016.□□0.0□0.□	B016.□□0.□0.6
			Client samplin□ date / time	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□016	ES16060□□017	ES16060□□01□	ES16060□□01□	ES16060□□0□0
				Result	Result	Result	Result	Result
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	1□4	□□.□	14.□	□4.7	1□6
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	□	□	□	□	□
Sa□ple □ei□ht (dry)	----	0.01	g	440	46□	4□□	4□□	□74
APPROVED IDENTI□IER:	----	-	--	S.SPOONER	S.SPOONER	□.MOR□AN	□.MOR□AN	C.OWLER
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Bariu□	7440-39-3	10	mg/kg	<10	□0	<10	<10	<10
Berylliu□	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cad□iu□	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chro□iu□	7440-47-3	2	mg/kg	7	□□	6	4	1□
Cobalt	7440-48-4	2	mg/kg	<2	11	<2	<2	<2
Copper	7440-50-8	5	mg/kg	<5	110	<5	14	<5
Lead	7439-92-1	5	mg/kg	<5	□7	□0	16	<5
Man□anese	7439-96-5	5	mg/kg	<5	1□□	<5	1□	<5
Nickel	7440-02-0	2	mg/kg	□	□4	□	□	□
Seleniu□	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadiu□	7440-62-2	5	mg/kg	7	1□	<5	<5	<5
□inc	7440-66-6	5	mg/kg	<5	□□0	10	1□4	10
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	0.□	<0.1	0.1	<0.1
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 □C14 □raction	----	50	mg/kg	<50	<50	<50	<50	<50
C1□ □C□□ □raction	----	100	mg/kg	<100	□□□0	<100	<100	<100
C□□ □C□6 □raction	----	100	mg/kg	<100	□0□0	160	<100	<100
□C10 □C□6 □raction (su□)	----	50	mg/kg	<50	□□70	160	<50	<50
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	<10	<10	<10

□nalytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

			Client sample ID	B0□□□0.□0.6	B0□1□0.0□0.□	B0□1□0.□0.6	B016.□□0.0□0.□	B016.□□0.□0.6
			Client samplin□ date / time	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□016	ES16060□□017	ES16060□□01□	ES16060□□01□	ES16060□□0□0
				Result	Result	Result	Result	Result
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□C6 □C10 □raction □inus BTE□ (□1)	C6□C10-BTE□	10	mg/kg	<10	<10	<10	<10	<10
□C10 □C16 □raction	----	50	mg/kg	<50	<50	<50	<50	<50
□C16 □C□4 □raction	----	100	mg/kg	<100	**4□□0**	**140**	<100	<100
□C□4 □C40 □raction	----	100	mg/kg	<100	**17□0**	**1□0**	<100	<100
□ □C10 □C40 □raction (su□)	----	50	mg/kg	<50	**6□40**	**□□0**	<50	<50
□ □C10 □C16 □raction □inus Naphthalene (□□)	----	50	mg/kg	<50	<50	<50	<50	<50
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□eta□□ para□□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ Su□ o□BTE□	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
□ Total □ylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	**101**	**□1.□**	**□□.1**	**□□.0**	**□□.0**
□Chlorophenol□D4	93951-73-6	0.5	%	**10□**	**□0.6**	**□0.□**	**10□**	**□□.□**
□.4.6□Tribro□ophenol	118-79-6	0.5	%	**107**	**1□7**	**1□1**	**14□**	**1□□**
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	0.5	%	**104**	**□0.0**	**□0.0**	**100**	**□□.6**
Anthracene□d10	1719-06-8	0.5	%	**11□**	**10□**	**10□**	**117**	**10□**
4□Terphenyl□d14	1718-51-0	0.5	%	**10□**	**□7.0**	**□□.6**	**11□**	**10□**
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□Dichloroethane□D4	17060-07-0	0.2	%	**□□.□**	**□□.0**	**□7.1**	**100**	**□□.6**
Toluene□D□	2037-26-5	0.2	%	**□6.□**	**□□.□**	**□7.6**	**10□**	**□□.□**
4□Bro□o□luoroben□ene	460-00-4	0.2	%	**□□.□**	**□6.□**	**□7.4**	**101**	**□6.0**

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B016□0.0□0.□	B01□.□□0.□0.6	B014□0.0□0.□	B014□0.□0.6	A00□.□□0.0□0.□
			Client samplin□ date / time	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□16-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□□0□1	ES16060□□□0□□	ES16060□□□0□□	ES16060□□□0□4	ES16060□□□0□□
				Result	Result	Result	Result	Result
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	40.□	1□.6	□4.4	1□.□	□0.□
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	No	No	No	No
Asbestos Type	1332-21-4	-	--	A□	□	□	□	□
Sa□ple □ei□ht (dry)	----	0.01	g	□67	□□6	410	67□	□01
APPROVED IDENTI□IER:	----	-	--	C.OWLER	S.SPOONER	□.MOR□AN	C.OWLER	□.MOR□AN
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	□	<5	7	<5	7
Bariu□	7440-39-3	10	mg/kg	□0	<10	10	<10	□0
Berylliu□	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cad□iu□	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chro□iu□	7440-47-3	2	mg/kg	□4	<2	□	<2	□1
Cobalt	7440-48-4	2	mg/kg	7	<2	<2	<2	4
Copper	7440-50-8	5	mg/kg	□00	<5	17	<5	6□
Lead	7439-92-1	5	mg/kg	10□	<5	16	<5	□□
Man□anese	7439-96-5	5	mg/kg	□□□	<5	□□	<5	□□
Nickel	7440-02-0	2	mg/kg	□□	<2	□	<2	11
Seleniu□	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadiu□	7440-62-2	5	mg/kg	□□	<5	□	<5	□
□inc	7440-66-6	5	mg/kg	□11	<5	□10	10	407
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	1.6	<0.1	0.□	<0.1	0.□
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	1.□	<0.5	<0.5
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	1□	<10	<10
C10 □C14 □raction	----	50	mg/kg	<50	<50	<50	<50	<50
C1□ □C□□ □raction	----	100	mg/kg	470	<100	47□0	670	6□000
C□□ □C□6 □raction	----	100	mg/kg	□60	<100	1□100	14□0	6740
□C10 □C□6 □raction (su□)	----	50	mg/kg	1□□0	<50	16□00	□1□0	71700
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	<10	<10	<10

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B016□0.0□0.□	B01□.□□0.□0.6	B014□0.0□0.□	B014□0.□0.6	A00□.□□0.0□0.□
			Client samplin□ date / time	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□16-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□□0□1	ES16060□□□0□□	ES16060□□□0□□	ES16060□□□0□4	ES16060□□□0□□
				Result	Result	Result	Result	Result
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□ **C6 □C10 □raction □inus BTE□ (□1)**	C6□C10-BTE□	10	mg/kg	<10	<10	<10	<10	<10
□C10 □C16 □raction	----	50	mg/kg	<50	<50	**140**	**□0**	**□□□0**
□C16 □C□4 □raction	----	100	mg/kg	**10□0**	<100	**1□000**	**1660**	**6□□00**
□C□4 □C40 □raction	----	100	mg/kg	**□□0**	<100	**16400**	**1□70**	**□□40**
□ **□C10 □C40 □raction (su□)**	----	50	mg/kg	**1670**	<50	**□□□00**	**□6□0**	**7□000**
□ **□C10 □C16 □raction □inus Naphthalene (□□)**	----	50	mg/kg	<50	<50	**140**	**□0**	**□□□0**
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ **eta□□ para□□ylene**	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	**0.□**	**0.7**	<0.5
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ **Su□ o□BTE□**	----	0.2	mg/kg	<0.2	<0.2	**0.□**	**0.7**	<0.2
□ **Total □ylenes**	1330-20-7	0.5	mg/kg	<0.5	<0.5	**0.□**	**0.7**	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP07□(SIM)S: Phenolic Co□ pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	**□□.□**	**□1.6**	**□6.□**	**□□.6**	**□4.0**
□Chlorophenol□D4	93951-73-6	0.5	%	**□□.1**	**□□.□**	**□□.1**	**□□.□**	**100**
□.4.6□Tribro□ophenol	118-79-6	0.5	%	**□6.6**	**11□**	**11□**	**1□□**	**1□0**
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	0.5	%	**□6.□**	**□□.6**	**□□.1**	**□□.0**	**□7.6**
Anthracene□d10	1719-06-8	0.5	%	**10□**	**114**	**100**	**11□**	**□□.1**
4□Terphenyl□d14	1718-51-0	0.5	%	**□1.7**	**□□.□**	**□7.□**	**□□.4**	**7□.6**
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□Dichloroethane□D4	17060-07-0	0.2	%	**□□.4**	**10□**	**□□.7**	**□□.□**	**74.1**
Toluene□D□	2037-26-5	0.2	%	**10□**	**110**	**□1.7**	**106**	**□□.□**
4□Bro□o□luoroben□ene	460-00-4	0.2	%	**106**	**111**	**7□.0**	**104**	**7□.0**

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	A00□.□□0.0□0.□	A006.□□0.0□0.□	A007.□□0.0□0.□	A00□.□□0.0□0.□	A01□.□□0.0□0.□
			Client samplin□ date / time	□16-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□□0□6	ES16060□□□0□7	ES16060□□□0□□	ES16060□□□0□□	ES16060□□□0□1
				Result	Result	Result	Result	Result
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	<1.0	□.□	**10.4**	**7.□**	**□7.□**
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	**No**	**Yes**	**No**	**No**	**Yes**
Asbestos Type	1332-21-4	-	--	□	**A□**	□	□	**A□**
Sa□ple □ei□ht (dry)	----	0.01	g	**6□4**	**□□□**	**□10**	**□□7**	**□□7**
APPROVED IDENTI□IER:	----	-	--	**S.SPOONER**	**□.MOR□AN**	**C.OWLER**	**□.MOR□AN**	**C.OWLER**
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	**6**	**6**	□	<5	□
Bariu□	7440-39-3	10	mg/kg	<10	**□0**	**□0**	**□0**	**□0**
Berylliu□	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cad□iu□	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chro□iu□	7440-47-3	2	mg/kg	**□6**	**□□**	**40**	**□□**	**4□**
Cobalt	7440-48-4	2	mg/kg	**4**	**4**	<2	□	□
Copper	7440-50-8	5	mg/kg	**□4**	**□□**	**40**	**47**	**□4**
Lead	7439-92-1	5	mg/kg	**160**	**□4□**	**□□**	**□□**	**47**
Man□anese	7439-96-5	5	mg/kg	**□□**	**44**	**□4**	**□6**	**70**
Nickel	7440-02-0	2	mg/kg	□	□	**7**	**1□**	**1□**
Seleniu□	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadiu□	7440-62-2	5	mg/kg	<5	**6**	□	**1□**	**10**
□inc	7440-66-6	5	mg/kg	**71□**	**□□□**	**□06**	**□11**	**41□**
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	**0.1**	**0.□**	**0.□**	**0.□**
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	<0.5	**17.□**	<4.0	<0.5	<4.0
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	**1□**	<10	<10
C10 □C14 □raction	----	50	mg/kg	<50	**□70**	**□740**	**10□0**	**6□0**
C1□ □C□□ □raction	----	100	mg/kg	**□4□0**	**41000**	**□□□00**	**67□00**	**61000**
C□□ □C□6 □raction	----	100	mg/kg	**□60**	**1□□00**	**4760**	**4□40**	**1□□00**
□C10 □C□6 □raction (su□)	----	50	mg/kg	**□740**	**□□□00**	**106000**	**7□□00**	**77400**
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	**□0**	<10	<10

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	A00□.□□0.0□0.□	A006.□□0.0□0.□	A007.□□0.0□0.□	A00□.□□0.0□0.□	A01□.□□0.0□0.□
			Client samplin□ date / time	□16-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□□0□6	ES16060□□□0□7	ES16060□□□0□□	ES16060□□□0□□	ES16060□□□0□1
				Result	Result	Result	Result	Result
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□ C6 □C10 □raction □inus BTE□ (□1)	C6□C10-BTE□	10	mg/kg	<10	<10	**1□**	<10	<10
□C10 □C16 □raction	----	50	mg/kg	**100**	**□□10**	**1□100**	**7□00**	**□440**
□C16 □C□4 □raction	----	100	mg/kg	**□□□0**	**4□400**	**□6600**	**64600**	**7□100**
□C□4 □C40 □raction	----	100	mg/kg	<100	**6□□0**	**□□60**	**□□□0**	**□1□0**
□ □C10 □C40 □raction (su□)	----	50	mg/kg	**□6□0**	**□□100**	**10□000**	**7□□00**	**□□700**
□ □C10 □C16 □raction □inus Naphthalene (□□)	----	50	mg/kg	**100**	**□□10**	**1□100**	**7□00**	**□440**
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□eta□□ para□□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	**1.6**	<0.5	<0.5
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ Su□ o□BTE□	----	0.2	mg/kg	<0.2	<0.2	**1.6**	<0.2	<0.2
□ Total □ylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	**1.6**	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	**□0.0**	**□□.6**	**77.□**	**□□.□**	**7□.□**
□Chlorophenol□D4	93951-73-6	0.5	%	**□□.□**	**□4.0**	**76.□**	**□□.□**	**7□.6**
□.4.6□Tribro□ophenol	118-79-6	0.5	%	**1□7**	**1□0**	**74.1**	**107**	**□□.□**
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	0.5	%	**□□.□**	**□□.7**	**7□.□**	**□□.6**	**6□.□**
Anthracene□d10	1719-06-8	0.5	%	**106**	**104**	**7□.□**	**□6.7**	**□□.□**
4□Terphenyl□d14	1718-51-0	0.5	%	**□0.1**	**11□**	**□7.7**	**□0.□**	**11□**
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□Dichloroethane□D4	17060-07-0	0.2	%	**100**	**□4.1**	**□□.□**	**□7.7**	**76.1**
Toluene□D□	2037-26-5	0.2	%	**116**	**1□0**	**11□**	**1□0**	**□6.4**
4□Bro□o□luoroben□ene	460-00-4	0.2	%	**10□**	**106**	**10□**	**106**	**□0.1**

□nalytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS □um□er	□□□	□nit	A01□.□□0.4□0.□	A014.□□0.4□0.□	C011□0.0□0.□	C01□□0.0□0.□	QC1□0
			Client samplin□ date / time	□16-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□	□14-Mar-2016□
				ES16060□□0□□	ES16060□□0□□	ES16060□□0□4	ES16060□□0□□	ES16060□□0□6
				Result	Result	Result	Result	Result
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	1□1	1□.6	<1.0	17.1	□4.□
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	Yes	No	No	□□□
Asbestos Type	1332-21-4	-	--	A□	A□ □Cr	□	□	□□□
Sa□ple □ei□ht (dry)	----	0.01	g	761	□□□	□□□	□□□	□□□
APPROVED IDENTI□IER:	----	-	--	□.MOR□AN	□.MOR□AN	C.OWLER	□.MOR□AN	□□□
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	□
Bariu□	7440-39-3	10	mg/kg	<10	<10	60	10	□0
Berylliu□	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cad□iu□	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chro□iu□	7440-47-3	2	mg/kg	□	4	□4	11	70
Cobalt	7440-48-4	2	mg/kg	<2	<2	□	□	11
Copper	7440-50-8	5	mg/kg	<5	<5	□□0	□□	1□7
Lead	7439-92-1	5	mg/kg	<5	6	□□0	□7	1□4
Man□anese	7439-96-5	5	mg/kg	11	6	66	40	164
Nickel	7440-02-0	2	mg/kg	<2	<2	14	4	40
Seleniu□	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadiu□	7440-62-2	5	mg/kg	<5	<5	□	<5	□□
□inc	7440-66-6	5	mg/kg	<5	□□	1□00	□0□	□□□0
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	0.1	<0.1	<0.1	14.7
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<4.0
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 □C14 □raction	----	50	mg/kg	<50	<50	<50	<50	<50
C1□ □C□□ □raction	----	100	mg/kg	□□0	7□0	□0□00	1□60	107000
C□□ □C□6 □raction	----	100	mg/kg	<100	<100	□□000	□□60	41□00
□C10 □C□6 □raction (su□)	----	50	mg/kg	□□0	7□0	6□□00	□□□0	14□000
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	<10	<10	<10

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	A01□.□□0.4□0.□	A014.□□0.4□0.□	C011□0.0□0.□	C01□□0.0□0.□	QC1□0
			Client samplin□ date / time	□16-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□	□14-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES16060□□□0□□	ES16060□□□0□□	ES16060□□□0□4	ES16060□□□0□□	ES16060□□□0□6
				Result	Result	Result	Result	Result
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□ **C6 □C10 □raction □inus BTE□ (□1)**	C6□C10-BTE□	10	mg/kg	<10	<10	<10	<10	<10
□C10 □C16 □raction	----	50	mg/kg	**70**	**□□0**	**□70**	<50	**14□00**
□C16 □C□4 □raction	----	100	mg/kg	**□00**	**□□0**	**□□□00**	**44□0**	**1□□000**
□C□4 □C40 □raction	----	100	mg/kg	<100	<100	**1□600**	**1700**	**1□□00**
□ **□C10 □C40 □raction (su□)**	----	50	mg/kg	**□70**	**□10**	**7□□00**	**61□0**	**16□000**
□ **□C10 □C16 □raction □inus Naphthalene (□□)**	----	50	mg/kg	**70**	**□□0**	**□70**	<50	**14□00**
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□eta□□ para□□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ **Su□ o□BTE□**	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
□ **Total □ylenes**	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	□□.□	□□.□	□□.□	**107**	**7□.7**
□Chlorophenol□D4	93951-73-6	0.5	%	**□□.0**	**□□.7**	**□□.1**	**□□.4**	**70.□**
□.4.6□Tribro□ophenol	118-79-6	0.5	%	**1□6**	**1□4**	**1□□**	**1□6**	**□□.0**
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	0.5	%	□□.□	□□.□	□□.□	**□□.0**	**66.4**
Anthracene□d10	1719-06-8	0.5	%	**10□**	**11□**	**106**	**111**	□□.□
4□Terphenyl□d14	1718-51-0	0.5	%	**11□**	**116**	**1□□**	**114**	**70.□**
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□Dichloroethane□D4	17060-07-0	0.2	%	**77.□**	**□6.□**	**10□**	**□□.0**	**□6.6**
Toluene□D□	2037-26-5	0.2	%	**100**	**117**	**1□□**	**11□**	**101**
4□Bro□o□luoroben□ene	460-00-4	0.2	%	**□7.□**	**116**	**1□0**	**110**	□□.□

□nalytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS □um□er	□□□	□nit	QC1□□	QC1□□	QC1□4	QC1□7	□□□□
Client sampling date / time				□14-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□16-Mar-2016□	----
				ES16060□□□0□7	ES16060□□□0□□	ES16060□□□0□□	ES16060□□□041	□□□□□□□□
				Result	Result	Result	Result	Result
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	□□□□	4□.□	1□.□	4□.1	□□□□
EA□00: AS 4□64 □□004 Identi□ication o□ Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	□□□□	□□□□	□□□□	□□□□	□□□□
Asbestos Type	1332-21-4	-	--	□□□□	□□□□	□□□□	□□□□	□□□□
Sa□ple □ei□ht (dry)	----	0.01	g	□□□□	□□□□	□□□□	□□□□	□□□□
APPROVED IDENTI□IER:	----	-	--	□□□□	□□□□	□□□□	□□□□	□□□□
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	□□□□	□	<5	11	□□□□
Bariu□	7440-39-3	10	mg/kg	□□□□	□0	<10	40	□□□□
Berylliu□	7440-41-7	1	mg/kg	□□□□	<1	<1	<1	□□□□
Boron	7440-42-8	50	mg/kg	□□□□	<50	<50	<50	□□□□
Cad□iu□	7440-43-9	1	mg/kg	□□□□	<1	<1	<1	□□□□
Chro□iu□	7440-47-3	2	mg/kg	□□□□	□7	<2	□□	□□□□
Cobalt	7440-48-4	2	mg/kg	□□□□	10	<2	□	□□□□
Copper	7440-50-8	5	mg/kg	□□□□	□□	<5	46	□□□□
Lead	7439-92-1	5	mg/kg	□□□□	6□	<5	□□	□□□□
Man□anese	7439-96-5	5	mg/kg	□□□□	□1□	<5	1□□	□□□□
Nickel	7440-02-0	2	mg/kg	□□□□	47	<2	□4	□□□□
Seleniu□	7782-49-2	5	mg/kg	□□□□	<5	<5	<5	□□□□
Vanadiu□	7440-62-2	5	mg/kg	□□□□	□6	<5	14	□□□□
□inc	7440-66-6	5	mg/kg	□□□□	1□□0	6□	□□1	□□□□
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	□□□□	0.4	<0.1	0.7	□□□□
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	□□□□	<0.5	<0.5	<4.0	□□□□
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	<10	<10	□□□□
C10 □C14 □raction	----	50	mg/kg	□□□□	<50	<50	<50	□□□□
C1□ □C□□ □raction	----	100	mg/kg	□□□□	4610	1□□0	1□0000	□□□□
C□□ □C□6 □raction	----	100	mg/kg	□□□□	□□40	4□□0	□□400	□□□□
□ C10 □C□6 □raction (su□)	----	50	mg/kg	□□□□	7□□0	6□40	14□000	□□□□
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	<10	<10	□□□□

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QC1□□	QC1□□	QC1□4	QC1□7	□□□□
			Client samplin□ date / time	□14-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□16-Mar-2016□	----
Compound	CAS □um□er	□□□	□nit	ES16060□□□0□7	ES16060□□□0□□	ES16060□□□0□□	ES16060□□□041	□□□□□□□□
				Result	Result	Result	Result	Result
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□ **C6 □C10 □raction □inus BTE□ (□1)**	C6□C10-BTE□	10	mg/kg	<10	<10	<10	<10	□□□□
□C10 □C16 □raction	----	50	mg/kg	□□□□	**□10**	**110**	**□□00**	□□□□
□C16 □C□4 □raction	----	100	mg/kg	□□□□	**6610**	**4□60**	**140000**	□□□□
□C□4 □C40 □raction	----	100	mg/kg	□□□□	**1760**	**□660**	**16400**	□□□□
□ **□C10 □C40 □raction (su□)**	----	50	mg/kg	□□□□	**□□□0**	**10600**	**160000**	□□□□
□ **□C10 □C16 □raction □inus Naphthalene (□□)**	----	50	mg/kg	□□□□	**□10**	**110**	**□□00**	□□□□
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	□□□□
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	□□□□
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	□□□□
□eta□□ para□□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	□□□□
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	□□□□
□ **Su□ o□BTE□**	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	□□□□
□ **Total □ylenes**	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	□□□□
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	□□□□
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	□□□□	**□□.4**	**□□.□**	**□0.□**	□□□□
□Chlorophenol□D4	93951-73-6	0.5	%	□□□□	**□□.7**	**□1.□**	**□□.6**	□□□□
□.4.6□Tribro□ophenol	118-79-6	0.5	%	□□□□	**1□□**	**1□6**	**□7.□**	□□□□
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	0.5	%	□□□□	**□4.□**	**□□.□**	**6□.6**	□□□□
Anthracene□d10	1719-06-8	0.5	%	□□□□	**111**	**111**	**□0.1**	□□□□
4□Terphenyl□d14	1718-51-0	0.5	%	□□□□	**1□□**	**1□□**	**□1.4**	□□□□
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□□Dichloroethane□D4	17060-07-0	0.2	%	**□□.4**	**7□.6**	**□□.□**	**□4.6**	□□□□
Toluene□D□	2037-26-5	0.2	%	**10□**	**□□.□**	**11□**	**106**	□□□□
4□Bro□o□luoroben□ene	460-00-4	0.2	%	**110**	**□□.0**	**11□**	**□1.6**	□□□□

□nalytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS □um□er	□□□	□nit	QC1□6	QC161	QC16□		
			Client sample ID	QC1□6	QC161	QC16□		
			Client samplin□ date / time	□15-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□	----	----
				ES16060□□040	ES16060□□04□	ES16060□□04□		
				Result	Result	Result	Result	Result
E□0□0□: Dissol□ed Metals by ICP□MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001			
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05			
Bariu□	7440-39-3	0.001	mg/L	<0.001	<0.001			
Berylliu□	7440-41-7	0.001	mg/L	<0.001	<0.001			
Cad□iu□	7440-43-9	0.0001	mg/L	<0.0001	<0.0001			
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001			
Chro□iu□	7440-47-3	0.001	mg/L	<0.001	<0.001			
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001			
Man□anese	7439-96-5	0.001	mg/L	<0.001	<0.001			
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001			
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001			
Seleniu□	7782-49-2	0.01	mg/L	<0.01	<0.01			
Vanadiu□	7440-62-2	0.01	mg/L	<0.01	<0.01			
□inc	7440-66-6	0.005	mg/L	<0.005	<0.005			
E□0□□□: Dissol□ed Mercury by □IMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001			
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	□g/L	<0.5	<0.5			
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	20	□g/L	<20	<20	<20		
C10 □C14 □raction	----	50	□g/L	<50	<50			
C1□ □C□□ □raction	----	100	□g/L	<100	<100			
C□□ □C□6 □raction	----	50	□g/L	<50	<50			
□ C10 □C□6 □raction (su□)	----	50	□g/L	<50	<50			
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	20	□g/L	<20	<20	<20		
□ C6 □C10 □raction □inus BTE□ (□1)	C6□C10-BTE□	20	□g/L	<20	<20	<20		
□C10 □C16 □raction	----	100	□g/L	<100	<100			
□C16 □C□4 □raction	----	100	□g/L	<100	<100			
□C□4 □C40 □raction	----	100	□g/L	<100	<100			
□ □C10 □C40 □raction (su□)	----	100	□g/L	<100	<100			
□ □C10 □C16 □raction □inus Naphthalene (□□)	----	100	□g/L	<100	<100			

□nalytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	QC1□6	QC161	QC16□	□□□□	□□□□
			Client samplin□ date / time	□15-Mar-2016□	□16-Mar-2016□	□16-Mar-2016□	----	----
Compound	CAS □um□er	□□□	□nit	ES16060□□□040	ES16060□□□04□	ES16060□□□04□	□□□□□□□□	□□□□□□□□
				Result	Result	Result	Result	Result
EP0□0: BTE□N								
Ben□ene	71-43-2	1	□g/L	<1	<1	<1	□□□□	□□□□
Toluene	108-88-3	2	□g/L	<2	<2	<2	□□□□	□□□□
Ethylben□ene	100-41-4	2	□g/L	<2	<2	<2	□□□□	□□□□
□eta□□ para□□ylene	108-38-3 106-42-3	2	□g/L	<2	<2	<2	□□□□	□□□□
ortho□□ylene	95-47-6	2	□g/L	<2	<2	<2	□□□□	□□□□
□**Total □ylenes**	1330-20-7	2	□g/L	<2	<2	<2	□□□□	□□□□
□**Su□ o□BTE□**	----	1	□g/L	<1	<1	<1	□□□□	□□□□
Naphthalene	91-20-3	5	□g/L	<5	<5	<5	□□□□	□□□□
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	1	%	**□4.□**	**□1.□**	□□□□	□□□□	□□□□
□□Chlorophenol□D4	93951-73-6	1	%	**4□.0**	**40.□**	□□□□	□□□□	□□□□
□.4.6□Tribro□ophenol	118-79-6	1	%	**□□.□**	**□1.□**	□□□□	□□□□	□□□□
EP07□(SIM)T: PA□ Surro□ates								
□□□luorobiphenyl	321-60-8	1	%	**77.4**	**71.1**	□□□□	□□□□	□□□□
Anthracene□d10	1719-06-8	1	%	**□□.□**	**7□.□**	□□□□	□□□□	□□□□
4□Terphenyl□d14	1718-51-0	1	%	**□□.□**	**7□.0**	□□□□	□□□□	□□□□
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□□Dichloroethane□D4	17060-07-0	2	%	**101**	**10□**	**106**	□□□□	□□□□
Toluene□D□	2037-26-5	2	%	**100**	**101**	**106**	□□□□	□□□□
4□Bro□o□luoroben□ene	460-00-4	2	%	**□□.7**	**□□.□**	**100**	□□□□	□□□□

□nalytical Results

Descripti□e Results

Sub-Matrix: **SOIL**

Method□Compound	*Client sample ID □Client samplin□ date / time*	*Analytical □esults*
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils		
EA200: Description	B001□0.0-0.2 - □14-Mar-2016□	Mid grey clay soil with several friable asbestos fibre bundles approx 3 x 1 x 1mm
EA200: Description	B003.5□0.0-0.2 - □14-Mar-2016□	Mid grey clay soil with several friable asbestos fibre bundles approx 3 x 1 x 0.5mm
EA200: Description	B007.5□0.0-0.2 - □14-Mar-2016□	Dark brown sandy soil with several pieces of friable asbestos insulation material approx 35 x 25 x 3mm
EA200: Description	B009.5□0.0-0.2 - □14-Mar-2016□	Mid brown clay soil containing trace asbestos fibres plus several pieces of friable asbestos insulation material approx 4 x 3 x 2mm
EA200: Description	B010.5□0.0-0.2 - □14-Mar-2016□	Mid grey soil with several friable asbestos fibre bundles approx 1 x 0.5 x 0.5mm
EA200: Description	B012.5□0.0-0.2 - □14-Mar-2016□	Mid brown sandy soil with grey rocks
EA200: Description	B036□0.0-0.2 - □15-Mar-2016□	Mid brown clay soil with one loose bundle of friable asbestos fibres approx 2 x 1 x 0.5mm
EA200: Description	B036□0.5-0.6 - □15-Mar-2016□	Pale brown sandy soil with several bundles of friable asbestos fibres approx 2 x 1 x 1mm
EA200: Description	B035□0.0-0.2 - □15-Mar-2016□	Mid brown sandy soil
EA200: Description	B035□0.5-0.6 - □15-Mar-2016□	Mid grey sandy soil with grey rocks
EA200: Description	B034□0.0-0.2 - □15-Mar-2016□	Mid brown sandy soil with grey rocks
EA200: Description	B034□0.5-0.6 - □15-Mar-2016□	Pale brown sandy soil with tar like grains
EA200: Description	B033□0.0-0.2 - □15-Mar-2016□	Pale brown sandy soil
EA200: Description	B033□0.5-0.6 - □15-Mar-2016□	Mid brown sandy soil
EA200: Description	B032□0.0-0.2 - □15-Mar-2016□	Mid brown clay soil with several pieces of friable asbestos insulation material approx 4 x 4 x 2mm
EA200: Description	B032□0.5-0.6 - □15-Mar-2016□	Mid brown sandy soil with grey rocks
EA200: Description	B031□0.0-0.2 - □15-Mar-2016□	Mid brown sandy soil with grey rocks
EA200: Description	B031□0.5-0.6 - □15-Mar-2016□	Cream sandy soil
EA200: Description	B016.5□0.0-0.2 - □15-Mar-2016□	Pale grey sandy soil
EA200: Description	B016.5□0.5-0.6 - □15-Mar-2016□	Mid grey sandy soil with grey rocks
EA200: Description	B016□0.0-0.2 - □15-Mar-2016□	Pale brown sandy soil with grey rocks plus two friable asbestos fibre bundles approx 3 x 1 x 0.5mm
EA200: Description	B015.5□0.5-0.6 - □15-Mar-2016□	Mid grey sandy soil with grey rocks
EA200: Description	B014□0.0-0.2 - □15-Mar-2016□	Mid brown sandy soil coated in tar like material
EA200: Description	B014□0.5-0.6 - □15-Mar-2016□	Mid grey sandy soil
EA200: Description	A003.5□0.0-0.2 - □16-Mar-2016□	Mid brown sandy soil
EA200: Description	A005.5□0.0-0.2 - □16-Mar-2016□	Mid brown sandy soil with grey rocks
EA200: Description	A006.5□0.0-0.2 - □16-Mar-2016□	Mid brown sandy soil with several bundles of friable asbestos fibres approx 3 x 1 x 1mm
EA200: Description	A007.5□0.0-0.2 - □16-Mar-2016□	Mid grey sandy soil coated with tar like residue
EA200: Description	A008.5□0.0-0.2 - □16-Mar-2016□	Mid brown sandy soil coated in tar like material
EA200: Description	A013.5□0.0-0.2 - □16-Mar-2016□	Mid grey sandy soil with several friable asbestos fibre bundles approx 4 x 1 x 1mm
EA200: Description	A013.5□0.4-0.5 - □16-Mar-2016□	Mid grey-brown sandy soil with several bundles of friable asbestos fibres approx 3 x 1 x 1mm
EA200: Description	A014.5□0.4-0.5 - □16-Mar-2016□	Mid brown sandy soil with several pieces of friable asbestos insulation material approx 30 x 30 x 3mm plus several bundles of friable asbestos fibres approx 3 x 1 x 1mm
EA200: Description	C011□0.0-0.2 - □16-Mar-2016□	Mid brown sandy soil
EA200: Description	C012□0.0-0.2 - □16-Mar-2016□	Mid brown sandy soil

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES16060□□**	Page	: 1 of 15
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 8934 0000	Telephone	: +61 2 8784 8503
Project	: 60488804/1.2 Caltex Kurnell	Date Samples Received	: 17-Mar-2016
Order number	: 60488804/1.2	Date Analysis Commenced	: 18-Mar-2016
C-O-C number	: ----	Issue Date	: 30-Mar-2016
Sampler	: KATE PIGRAM		
Site	: ----		
Quote number	: ----		
No. of samples received	: 42		
No. of samples analysed	: 42		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Si□natories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Si□natories	*Position*	*Accreditation Cate□ory*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni □yoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 400□11)									
ES1606073-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	21.4	22.2	3.58	0% - 20%
ES1606083-004	B009.5□0.0-0.2	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	46.4	48.2	3.76	0% - 20%
EA055: Moisture Content (QC Lot: 400□1□)									
ES1606083-013	B033□0.0-0.2	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	22.9	26.0	12.7	0% - 20%
ES1606083-024	B014□0.5-0.6	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	19.3	19.6	1.23	0% - 50%
EA055: Moisture Content (QC Lot: 400□1□)									
ES1606083-034	C011□0.0-0.2	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	<1.0	<1.0	0.00	No Limit
ES1606101-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	16.1	19.5	19.2	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 40□100)									
ES1606016-003	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	20	20	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	11	13	22.4	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	173	178	2.80	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	8	10	24.6	No Limit
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
ES1606083-009	B035□0.0-0.2	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 40□100) - continued									
ES1606083-009	B035□0.0-0.2	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	20	20	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	20	19	7.75	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	7	6	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	19	17	7.36	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	118	138	15.4	0% - 20%
		EG005T: Lead	7439-92-1	5	mg/kg	234	209	11.4	0% - 20%
		EG005T: Manganese	7439-96-5	5	mg/kg	138	125	10.4	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	17	15	9.39	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	1930	1670	14.5	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 40□10□)									
ES1606083-019	B016.5□0.0-0.2	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	<10	<10	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	4	4	0.00	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	14	12	13.4	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	16	14	11.3	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	15	16	0.00	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	134	116	14.3	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
ES1606083-029	A008.5□0.0-0.2	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	30	20	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	32	23	31.7	0% - 50%
		EG005T: Cobalt	7440-48-4	2	mg/kg	5	4	24.8	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	13	11	16.6	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	47	44	6.49	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	95	68	33.7	0% - 50%
		EG005T: Manganese	7439-96-5	5	mg/kg	96	71	30.4	0% - 50%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	13	10	22.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample □D	*Client sample □D*	*Method□Compound*	*C□S □umber*	*L□R*	*Unit*	*□ri□inal Result*	*Duplicate Result*	*RPD (□)*	*Reco□ery Limits (□)*
E□00□T: Total Metals by ICP□AES (QC Lot: 40□10□) □continued									
ES1606083-029	A008.5□0.0-0.2	EG005T: □inc	7440-66-6	5	mg/kg	911	1040	13.6	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
E□0□□T: Total Reco□erable Mercury by □IMS (QC Lot: 40□101)									
ES1606016-003	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1606083-009	B035□0.0-0.2	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.3	0.4	0.00	No Limit
E□0□□T: Total Reco□erable Mercury by □IMS (QC Lot: 40□10□)									
ES1606083-019	B016.5□0.0-0.2	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	0.4	108	No Limit
ES1606083-029	A008.5□0.0-0.2	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.3	0.4	0.00	No Limit
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons (QC Lot: □□□047)									
ES1606083-001	B001□0.0-0.2	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	1.4	1.2	22.2	No Limit
ES1606083-011	B034□0.0-0.2	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons (QC Lot: □□□0□1)									
ES1606083-021	B016□0.0-0.2	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1606083-032	A013.5□0.4-0.5	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP0□0□071: Total Petroleu□ □ydrocarbons (QC Lot: □□□□□□)									
ES1606083-001	B001□0.0-0.2	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1606083-011	B034□0.0-0.2	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP0□0□071: Total Petroleu□ □ydrocarbons (QC Lot: □□□□0□)									
ES1606083-021	B016□0.0-0.2	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1606083-032	A013.5□0.4-0.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP0□0□071: Total Petroleu□ □ydrocarbons (QC Lot: □□□046)									
ES1606083-001	B001□0.0-0.2	EP071: C15 - C28 Fraction	----	100	mg/kg	15200	16700	9.76	0% - 20%
		EP071: C29 - C36 Fraction	----	100	mg/kg	9350	10100	7.50	0% - 20%
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1606083-011	B034□0.0-0.2	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP0□0□071: Total Petroleu□ □ydrocarbons (QC Lot: □□□0□0)									
ES1606083-021	B016□0.0-0.2	EP071: C15 - C28 Fraction	----	100	mg/kg	470	400	18.2	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	860	860	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1606083-032	A013.5□0.4-0.5	EP071: C15 - C28 Fraction	----	100	mg/kg	230	250	7.38	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QC Lot: □□□□□□)									
ES1606083-001	B001□0.0-0.2	EP080: C6 - C10 Fraction	C6□C10	10	mg/kg	<10	<10	0.00	No Limit
ES1606083-011	B034□0.0-0.2	EP080: C6 - C10 Fraction	C6□C10	10	mg/kg	<10	<10	0.00	No Limit
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QC Lot: □□□□0□)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	L□R	Unit	□ri□inal Result	Duplicate Result	RPD (□)	Reco□ery Limits (□)
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QC Lot: □□□□0□) □continued									
ES1606083-021	B016□0.0-0.2	EP080: C6 - C10 Fraction	C6□C10	10	mg/kg	<10	<10	0.00	No Limit
ES1606083-032	A013.5□0.4-0.5	EP080: C6 - C10 Fraction	C6□C10	10	mg/kg	<10	<10	0.00	No Limit
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QC Lot: □□□046)									
ES1606083-001	B001□0.0-0.2	EP071: >C16 - C34 Fraction	----	100	mg/kg	22500	24200	7.05	0% - 20%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	6160	5940	3.67	0% - 20%
		EP071: >C10 - C16 Fraction	----	50	mg/kg	290	240	17.3	No Limit
ES1606083-011	B034□0.0-0.2	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QC Lot: □□□0□0)									
ES1606083-021	B016□0.0-0.2	EP071: >C16 - C34 Fraction	----	100	mg/kg	1090	1110	1.88	0% - 50%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	580	560	4.67	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1606083-032	A013.5□0.4-0.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	200	240	18.3	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	70	50	25.3	No Limit
EP0□0: BTE□N (QC Lot: □□□□□□)									
ES1606083-001	B001□0.0-0.2	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1606083-011	B034□0.0-0.2	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP0□0: BTE□N (QC Lot: □□□□0□)									
ES1606083-021	B016□0.0-0.2	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1606083-032	A013.5□0.4-0.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	L□R	Unit	□ri□inal Result	Duplicate Result	RPD (□)	Reco□ery Limits (□)
				Laboratory Duplicate (DUP) Report					
EP0□0: BTE□N (QC Lot: □□□□0□) □continued									
ES1606083-032	A013.5□0.4-0.5	EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	L□R	Unit	□ri□inal Result	Duplicate Result	RPD (□)	Reco□ery Limits (□)
				Laboratory Duplicate (DUP) Report					
E□0□0□: Dissol□ed Metals by ICP□MS (QC Lot: 401□47)									
ES1605762-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.011	0.012	0.00	0% - 50%
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.023	0.023	0.00	0% - 20%
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.027	0.026	0.00	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.002	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.013	0.012	8.83	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: □inc	7440-66-6	0.005	mg/L	0.040	0.043	5.03	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.06	0.06	0.00	No Limit
ES1606003-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.019	0.019	0.00	0% - 50%
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.433	0.425	1.93	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.005	0.006	0.00	No Limit
		EG020A-F: □inc	7440-66-6	0.005	mg/L	7.86	7.95	1.11	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.20	0.19	0.00	No Limit
E□0□0□: Dissol□ed Metals by ICP□MS (QC Lot: 401□□1)									
ES1606083-042	QC161	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample □D	*Client sample □D*	*Method□Compound*	*C□S □umber*	*L□R*	*Unit*	*□ri□inal Result*	*Duplicate Result*	*RPD (□)*	*Reco□ery Limits (□)*
E□0□0□: Dissol□ed Metals by ICP□MS (QC Lot: 401□□1) □continued									
ES1606083-042	QC161	EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: □inc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EW1601094-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.012	0.013	8.63	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.00	No Limit
		EG020A-F: □inc	7440-66-6	0.005	mg/L	0.060	0.064	5.61	0% - 50%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
E□0□□□: Dissol□ed Mercury by □IMS (QC Lot: 401□4□)									
ES1605714-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1606003-004	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP0□0/071: Total Petroleu□ □ydrocarbons (QC Lot: □□□□4□)									
ES1605867-001	Anonymous	EP080: C6 - C9 Fraction	----	20	□g/L	<20	<20	0.00	No Limit
ES1606007-003	Anonymous	EP080: C6 - C9 Fraction	----	20	□g/L	<20	<20	0.00	No Limit
EP0□0/071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QC Lot: □□□□4□)									
ES1605867-001	Anonymous	EP080: C6 - C10 Fraction	C6□C10	20	□g/L	<20	<20	0.00	No Limit
ES1606007-003	Anonymous	EP080: C6 - C10 Fraction	C6□C10	20	□g/L	<20	<20	0.00	No Limit
EP0□0: BTE□N (QC Lot: □□□□4□)									
ES1605867-001	Anonymous	EP080: Benzene	71-43-2	1	□g/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	□g/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	Laboratory Duplicate (DUP) Report					
				L□R	Unit	□ri□inal Result	Duplicate Result	RPD (□)	Reco□ery Limits (□)
EP0□0: BTE□N (QC Lot: □□□□4□) □continued									
ES1605867-001	Anonymous	EP080: meta- □ para-□ylene	108-38-3 106-42-3	2	□g/L	<2	<2	0.00	No Limit
		EP080: ortho-□ylene	95-47-6	2	□g/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	□g/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	□g/L	<5	<5	0.00	No Limit
ES1606007-003	Anonymous	EP080: Benzene	71-43-2	1	□g/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	□g/L	<2	<2	0.00	No Limit
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	2	□g/L	<2	<2	0.00	No Limit
		EP080: ortho-□ylene	95-47-6	2	□g/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	□g/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	□g/L	<5	<5	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Reco□ery (□)	Reco□ery Limits (□)	
Method□Compound	C□S □umber	L□R	Unit	Result	Concentration	LCS	Lo□	□i□h
E□00□T: Total Metals by ICP□AES (QCLot: 40□100)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	94.2	86	126
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	103	85	115
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	108	90	112628
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	95.1	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	100	76	128
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	102	88	120
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	97.7	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	96.5	80	114
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	99.1	85	117
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	99.7	87	123
EG005T: Selenium	7782-49-2	5	mg/kg	<5	5.37 mg/kg	101	75	131
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	29.6 mg/kg	104	92	122
EG005T: □inc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	97.1	80	122
E□00□T: Total Metals by ICP□AES (QCLot: 40□10□)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	103	86	126
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	103	85	115
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	110	90	112628
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	96.1	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	108	76	128
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	105	88	120
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	100.0	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	98.2	80	114
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	104	85	117
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	100	87	123
EG005T: Selenium	7782-49-2	5	mg/kg	<5	5.37 mg/kg	95.8	75	131
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	29.6 mg/kg	105	92	122
EG005T: □inc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	112	80	122
E□0□□T: Total Reco□erable Mercury by □IMS (QCLot: 40□101)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	78.5	70	105
E□0□□T: Total Reco□erable Mercury by □IMS (QCLot: 40□10□)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	78.4	70	105
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons (QCLot: □□□047)								

Sub-Matrix: **SOIL**

Method□Compound	C□S □umber	L□R	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Reco□ery (□) LCS	Reco□ery Limits (□) Lo□	 □i□h
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons (QCLot: □□□047) □continued								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	106	70	126
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons (QCLot: □□□0□1)								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	96.4	70	126
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: □□□□□□)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	111	68	128
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: □□□□0□)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	106	68	128
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: □□□046)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	103	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	111	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	104	71	129
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: □□□0□0)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	103	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	114	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	104	71	129
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: □□□□□□)								
EP080: C6 - C10 Fraction	C6□C10	10	mg/kg	<10	31 mg/kg	112	68	128
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: □□□□0□)								
EP080: C6 - C10 Fraction	C6□C10	10	mg/kg	<10	31 mg/kg	107	68	128
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: □□□046)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	101	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	110	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	98.7	63	131
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: □□□0□0)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	106	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	111	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	96.8	63	131
EP0□0: BTE□N (QCLot: □□□□□□)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	106	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	105	65	117
EP080: meta- □ para-□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	106	66	118
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	105	63	119
EP080: ortho-□ylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	107	68	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	104	67	121
EP0□0: BTE□N (QCLot: □□□□0□)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	101	62	116

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method/Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080: BTEXN (QCLot: □□□□0□) - continued								
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	109	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	110	66	118
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	103	63	119
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	109	68	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	99.8	67	121

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method/Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 401□47)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	100	85	114
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	96.1	82	110
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	97.8	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	91.1	85	115
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.9	84	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.2	85	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	98.6	82	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.4	81	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	92.9	83	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	96.7	82	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.0	82	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	97.8	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	95.8	83	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.1	81	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 401□□1)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.7	85	114
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	96.3	82	110
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	97.5	85	115
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	95.9	85	115
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.3	84	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	91.5	85	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	95.4	82	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	92.9	81	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	92.1	83	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	91.5	82	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.7	82	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	95.2	85	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	91.8	83	109

Sub-Matrix: **WATER**

Method□Compound	C□S □umber	L□R	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Reco□ery (□) LCS	Reco□ery Limits (□) Lo□	Reco□ery Limits (□) □i□h
E□0□0□: Dissol□ed Metals by ICP□MS (QCLot: 401□□1) □continued								
EG020A-F: □inc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.0	81	117
E□0□□□: Dissol□ed Mercury by □IMS (QCLot: 401□4□)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	92.0	83	105
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons (QCLot: □□□□□□)								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	□g/L	<0.5	5 □g/L	81.5	63	117
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: □□□□□0)								
EP071: C10 - C14 Fraction	----	50	□g/L	<50	2000 □g/L	101	76	116
EP071: C15 - C28 Fraction	----	100	□g/L	<100	3000 □g/L	98.2	83	109
EP071: C29 - C36 Fraction	----	50	□g/L	<50	2000 □g/L	101	75	113
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: □□□□4□)								
EP080: C6 - C9 Fraction	----	20	□g/L	<20	260 □g/L	86.6	75	127
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: □□□□□0)								
EP071: >C10 - C16 Fraction	----	100	□g/L	<100	2500 □g/L	100	76	114
EP071: >C16 - C34 Fraction	----	100	□g/L	<100	3500 □g/L	103	81	111
EP071: >C34 - C40 Fraction	----	100	□g/L	<100	1500 □g/L	106	77	119
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: □□□□4□)								
EP080: C6 - C10 Fraction	C6□C10	20	□g/L	<20	310 □g/L	90.6	75	127
EP0□0: BTE□N (QCLot: □□□□4□)								
EP080: Benzene	71-43-2	1	□g/L	<1	10 □g/L	94.7	70	122
EP080: Ethylbenzene	100-41-4	2	□g/L	<2	10 □g/L	95.9	70	120
EP080: meta- □ para-□ylene	108-38-3 106-42-3	2	□g/L	<2	10 □g/L	95.0	69	121
EP080: Naphthalene	91-20-3	5	□g/L	<5	10 □g/L	88.5	70	120
EP080: ortho-□ylene	95-47-6	2	□g/L	<2	10 □g/L	98.4	72	122
EP080: Toluene	108-88-3	2	□g/L	<2	10 □g/L	91.3	69	123

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	Matrix Spike (MS) Report: Spike Concentration	SpikeReco□ery(□) MS	Reco□ery Limits (□) Lo□	Reco□ery Limits (□) □i□h
E□00□T: Total Metals by ICP□AES (QCLot: 40□100)							
ES1606016-003	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	96.3	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	95.8	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	96.0	70	130

Sub-Matrix: **SOIL**

Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	Matrix Spike (MS) Report Spike Concentration	SpikeReco□ery(□) MS	Reco□ery Limits (□) Lo□	□i□h
E□00□T: Total Metals by ICP□AES (QCLot: 40□100) □continued							
ES1606016-003	Anonymous	EG005T: Copper	7440-50-8	250 mg/kg	96.2	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	96.0	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	96.7	70	130
		EG005T: □inc	7440-66-6	250 mg/kg	95.0	70	130
E□00□T: Total Metals by ICP□AES (QCLot: 40□10□)							
ES1606083-019	B016.5□0.0-0.2	EG005T: Arsenic	7440-38-2	50 mg/kg	97.3	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	98.3	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	98.0	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	97.0	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	97.9	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	98.8	70	130
		EG005T: □inc	7440-66-6	250 mg/kg	88.2	70	130
E□0□□T: Total Reco□erable Mercury by □IMS (QCLot: 40□101)							
ES1606016-003	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	91.1	70	130
E□0□□T: Total Reco□erable Mercury by □IMS (QCLot: 40□10□)							
ES1606083-019	B016.5□0.0-0.2	EG035T: Mercury	7439-97-6	5 mg/kg	88.7	70	130
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: □□□□□□)							
ES1606083-001	B001□0.0-0.2	EP080: C6 - C9 Fraction	----	32.5 mg/kg	120	70	130
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: □□□□0□)							
ES1606083-021	B016□0.0-0.2	EP080: C6 - C9 Fraction	----	32.5 mg/kg	117	70	130
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: □□□046)							
ES1606083-001	B001□0.0-0.2	EP071: C10 - C14 Fraction	----	523 mg/kg	109	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	# Not Determined	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	# Not Determined	52	132
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: □□□0□0)							
ES1606083-021	B016□0.0-0.2	EP071: C10 - C14 Fraction	----	523 mg/kg	93.3	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	103	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	122	52	132
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: □□□□□□)							
ES1606083-001	B001□0.0-0.2	EP080: C6 - C10 Fraction	C6□C10	37.5 mg/kg	110	70	130
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: □□□□0□)							
ES1606083-021	B016□0.0-0.2	EP080: C6 - C10 Fraction	C6□C10	37.5 mg/kg	112	70	130
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: □□□046)							
ES1606083-001	B001□0.0-0.2	EP071: >C10 - C16 Fraction	----	860 mg/kg	101	73	137

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	Recovery Limits (%) High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: □□□046) - continued							
ES1606083-001	B001□0.0-0.2	EP071: >C16 - C34 Fraction	----	3223 mg/kg	# Not Determined	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	# Not Determined	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: □□□0□0)							
ES1606083-021	B016□0.0-0.2	EP071: >C10 - C16 Fraction	----	860 mg/kg	99.2	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	114	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	119	52	132
EP080: BTEXN (QCLot: □□□□□□)							
ES1606083-001	B001□0.0-0.2	EP080: Benzene	71-43-2	2.5 mg/kg	116	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	122	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	118	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	110	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	118	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	115	70	130
EP080: BTEXN (QCLot: □□□□0□)							
ES1606083-021	B016□0.0-0.2	EP080: Benzene	71-43-2	2.5 mg/kg	106	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	112	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	112	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	102	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	112	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	107	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	Recovery Limits (%) High
EG020F: Dissolved Metals by ICP-MS (QCLot: 401□47)							
ES1605714-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	104	70	130
		EG020A-F: Barium	7440-39-3	1 mg/L	101	70	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	98.7	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	98.9	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	94.6	70	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	102	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	101	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	95.0	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	95.3	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	98.9	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%) Low	Recovery Limits (%) High
EG020F: Dissolved Metals by ICP-MS (QCLot: 401□47) - continued							
ES1605714-001	Anonymous	EG020A-F: Vanadium	7440-62-2	1 mg/L	96.3	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	102	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 401□□1)							
ES1606098-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	99.3	70	130
		EG020A-F: Barium	7440-39-3	1 mg/L	95.9	70	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	98.9	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	95.2	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	94.0	70	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	97.6	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	97.1	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	91.5	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	95.4	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	94.9	70	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	95.9	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	96.8	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 401□4□)							
EP1602288-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	# 56.1	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: □□□□4□)							
ES1605867-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	88.1	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: □□□□4□)							
ES1605867-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	85.8	70	130
EP080: BTEXN (QCLot: □□□□4□)							
ES1605867-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	70.0	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	81.4	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	81.1	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	95.2	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	81.9	70	130
		EP080: Toluene	108-88-3	25 µg/L	73.5	70	130

ALS Environmental

QA□QC Co□pliance Assess□ent to assist □ith Quality Re□ie□

Work Order	: **ES16060□□**	Page	: 1 of 14
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Telephone	: +61 2 8784 8503
Project	: 60488804/1.2 Caltex Kurnell	Date Samples Received	: 17-Mar-2016
Site	: ----	Issue Date	: 30-Mar-2016
Sampler	: KATE PIGRAM	No. of samples received	: 42
Order number	: 60488804/1.2	No. of samples analysed	: 42

This report is auto□atically □enerated by the ALS LIMS throu□h interpretation o□the ALS Quality Control Report and se□eral Quality Assurance para□eters □easured by ALS. This auto□ated reportin□ hi□hli□hts any non□con□or□ances□□acilitates □aster and □ore accurate data □alidation and is desi□ned to assist internal expert and external Auditor re□ie□. Many co□ponents o□this report contribute to the o□erall DQO assess□ent and reportin□ □or □uideline co□pliance.

Brief method summaries and references are also provided to assist in traceability.

Summary o□□utliers

□utliers □□uality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank □alue outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist □please see □ollo□in□ pa□es □or □ull details.**
- **Surro□ate reco□ery outliers exist □or all re□ular sa□ple □atrices □please see □ollo□in□ pa□es □or □ull details.**

□utliers □□nalysis □oldin□ □ime Compliance

- **NO Analysis □oldin□ Ti□e Outliers exist.**

□utliers □□re□uency o□□uality Control Samples

- **Quality Control Sa□ple □requency Outliers exist □please see □ollo□in□ pa□es □or □ull details.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP080/071: Total Petroleum Hydrocarbons	ES1606083--001	B001_0.0-0.2	**C15 - C28 Fraction**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080/071: Total Petroleum Hydrocarbons	ES1606083--001	B001_0.0-0.2	**C29 - C36 Fraction**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	ES1606083--001	B001_0.0-0.2	**>C16 - C34 Fraction**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	ES1606083--001	B001_0.0-0.2	**>C34 - C40 Fraction**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG035F: Dissolved Mercury by FIMS	EP1602288--001	Anonymous	**Mercury**	7439-97-6	56.1 %	70-130%	**Recovery less than lower data quality objective**

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075(SIM)S: Phenolic Compound Surrogates	ES1606083-019	B016.5_0.0-0.2	**2.4.6-Tribromophenol**	118-79-6	142 %	40-138 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	ES1606083-031	A013.5_0.0-0.2	**2-Fluorobiphenyl**	321-60-8	69.5 %	70-122 %	**Recovery less than lower data quality objective**
EP075(SIM)T: PAH Surrogates	ES1606083-036	QC150	**2-Fluorobiphenyl**	321-60-8	66.4 %	70-122 %	**Recovery less than lower data quality objective**
EP075(SIM)T: PAH Surrogates	ES1606083-041	QC157	**2-Fluorobiphenyl**	321-60-8	62.6 %	70-122 %	**Recovery less than lower data quality objective**
EP075(SIM)T: PAH Surrogates	ES1606083-039	QC154	**4-Terphenyl-d14**	1718-51-0	133 %	65-129 %	**Recovery greater than upper data quality objective**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	7	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	11	0.00	10.00	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	7	0.00	5.00	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	0	11	0.00	5.00	NEPM 2013 B3 □ ALS QC Standard

□nalysis □oldin□ □ime Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days □ other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***□□C in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: □ = Holding time breach ; □ = Within holding time.

Method / *Container □Client Sample ID(s)*		*Sample Date*	*Extraction / Preparation*			*Analysis*		
			Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA0□□: Moisture Content								
Soil □lass □ar □Unpreser□ed (EA0□□10□)								
B001□0.0-0.2,	B003.5□0.0-0.2,	**14□Mar□□016**	□□□□	----	----	**□0□Mar□□016**	28-Mar-2016	✓
B007.5□0.0-0.2,	B009.5□0.0-0.2,							
B010.5□0.0-0.2,	B012.5□0.0-0.2,							
QC150								
Soil □lass □ar □Unpreser□ed (EA0□□10□)								
B036□0.0-0.2,	B036□0.5-0.6,	**1□Mar□□016**	□□□□	----	----	**□0□Mar□□016**	29-Mar-2016	✓
B035□0.0-0.2,	B035□0.5-0.6,							
B034□0.0-0.2,	B034□0.5-0.6,							
B033□0.0-0.2,	B033□0.5-0.6,							
B032□0.0-0.2,	B032□0.5-0.6,							
B031□0.0-0.2,	B031□0.5-0.6,							
B016.5□0.0-0.2,	B016.5□0.5-0.6,							
B016□0.0-0.2,	B015.5□0.5-0.6,							
B014□0.0-0.2,	QC152, B014□0.5-0.6,							
QC154								
Soil □lass □ar □Unpreser□ed (EA0□□10□)								
A003.5□0.0-0.2,	A005.5□0.0-0.2,	**16□Mar□□016**	□□□□	----	----	**□0□Mar□□016**	30-Mar-2016	✓
A006.5□0.0-0.2,	A007.5□0.0-0.2,							
A008.5□0.0-0.2,	A013.5□0.0-0.2,							
A013.5□0.4-0.5,	A014.5□0.4-0.5,							
C011□0.0-0.2,	C012□0.0-0.2,							
QC157								

Matrix: **SOIL**

Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.

Method Container □Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Snap Lock Ba□: Separate ba□ recei□ed (EA□00)								
B001□0.0-0.2,	B003.5□0.0-0.2,	**14□Mar□□016**	□□□□	----	----	**□□Mar□□016**	10-Sep-2016	✓
B007.5□0.0-0.2,	B009.5□0.0-0.2,							
B010.5□0.0-0.2,	B012.5□0.0-0.2							
Snap Lock Ba□: Separate ba□ recei□ed (EA□00)								
B036□0.0-0.2,	B036□0.5-0.6,	**1□Mar□□016**	□□□□	----	----	**□□Mar□□016**	11-Sep-2016	✓
B035□0.0-0.2,	B035□0.5-0.6,							
B034□0.0-0.2,	B034□0.5-0.6,							
B033□0.0-0.2,	B033□0.5-0.6,							
B032□0.0-0.2,	B032□0.5-0.6,							
B031□0.0-0.2,	B031□0.5-0.6,							
B016.5□0.0-0.2,	B016.5□0.5-0.6,							
B016□0.0-0.2,	B015.5□0.5-0.6,							
B014□0.0-0.2,	B014□0.5-0.6							
Snap Lock Ba□: Separate ba□ recei□ed (EA□00)								
A003.5□0.0-0.2,	A005.5□0.0-0.2,	**16□Mar□□016**	□□□□	----	----	**□□Mar□□016**	12-Sep-2016	✓
A006.5□0.0-0.2,	A007.5□0.0-0.2,							
A008.5□0.0-0.2,	A013.5□0.0-0.2,							
A013.5□0.4-0.5,	A014.5□0.4-0.5,							
C011□0.0-0.2,	C012□0.0-0.2							

Matrix: **SOIL**

Evaluation: ▯ = Holding time breach ; ▯ = Within holding time.

Method / *Container* □*Client Sample ID(s)*	*Sample Date*	Extraction / Preparation: *Date extracted*	*Due for extraction*	*Evaluation*	Analysis: *Date analysed*	*Due for analysis*	*Evaluation*
E□00□T: Total Metals by ICP□AES							
Soil □lass □ar □Unpreser□ed (E□00□T) B001□0.0-0.2, B003.5□0.0-0.2, B007.5□0.0-0.2, B009.5□0.0-0.2, B010.5□0.0-0.2, B012.5□0.0-0.2, QC150	**14□Mar□016**	**□□Mar□016**	10-Sep-2016	П	**□□Mar□016**	10-Sep-2016	П
Soil □lass □ar □Unpreser□ed (E□00□T) B036□0.0-0.2, B036□0.5-0.6, B035□0.0-0.2, B035□0.5-0.6, B034□0.0-0.2, B034□0.5-0.6, B033□0.0-0.2, B033□0.5-0.6, B032□0.0-0.2, B032□0.5-0.6, B031□0.0-0.2, B031□0.5-0.6, B016.5□0.0-0.2, B016.5□0.5-0.6, B016□0.0-0.2, B015.5□0.5-0.6, B014□0.0-0.2, QC152, B014□0.5-0.6, QC154	**1□Mar□016**	**□□Mar□016**	11-Sep-2016	П	**□□Mar□016**	11-Sep-2016	П
Soil □lass □ar □Unpreser□ed (E□00□T) A003.5□0.0-0.2, A005.5□0.0-0.2, A006.5□0.0-0.2, A007.5□0.0-0.2, A008.5□0.0-0.2, A013.5□0.0-0.2, A013.5□0.4-0.5, A014.5□0.4-0.5, C011□0.0-0.2, C012□0.0-0.2, QC157	**16□Mar□016**	**□□Mar□016**	12-Sep-2016	П	**□□Mar□016**	12-Sep-2016	П

Matrix: **SOIL**

Evaluation: □ = Holding time breach ; □ = Within holding time.

Method Container □Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
E□0□□T: Total Reco□erable Mercury by □IMS								
Soil □lass □ar □Unpreser□ed (E□0□□T) B001□0.0-0.2, B007.5□0.0-0.2, B010.5□0.0-0.2, QC150	B003.5□0.0-0.2, B009.5□0.0-0.2, B012.5□0.0-0.2,	**14□Mar□□016**	**□□Mar□□016**	11-Apr-2016	✓	**□□Mar□□016**	11-Apr-2016	✓
Soil □lass □ar □Unpreser□ed (E□0□□T) B036□0.0-0.2, B035□0.0-0.2, B034□0.0-0.2, B033□0.0-0.2, B032□0.0-0.2, B031□0.0-0.2, B016.5□0.0-0.2, B016□0.0-0.2, B014□0.0-0.2, QC154	B036□0.5-0.6, B035□0.5-0.6, B034□0.5-0.6, B033□0.5-0.6, B032□0.5-0.6, B031□0.5-0.6, B016.5□0.5-0.6, B015.5□0.5-0.6, QC152, B014□0.5-0.6,	**1□□Mar□□016**	**□□Mar□□016**	12-Apr-2016	✓	**□□Mar□□016**	12-Apr-2016	✓
Soil □lass □ar □Unpreser□ed (E□0□□T) A003.5□0.0-0.2, A006.5□0.0-0.2, A008.5□0.0-0.2, A013.5□0.4-0.5, C011□0.0-0.2, QC157	A005.5□0.0-0.2, A007.5□0.0-0.2, A013.5□0.0-0.2, A014.5□0.4-0.5, C012□0.0-0.2,	**16□Mar□□016**	**□□Mar□□016**	13-Apr-2016	✓	**□□Mar□□016**	13-Apr-2016	✓

Matrix: **SOIL**

Evaluation: □ = Holding time breach ; □ = Within holding time.

Method Container □Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP0□0□071: Total Petroleu□ □ydrocarbons								
Soil □lass □ar □Unpreser□ed (EP071)								
B001□0.0-0.2,	B003.5□0.0-0.2,	**14□Mar□□016**	**□1□Mar□□016**	28-Mar-2016	П	**□□Mar□□016**	30-Apr-2016	П
B007.5□0.0-0.2,	B009.5□0.0-0.2,							
B010.5□0.0-0.2,	B012.5□0.0-0.2,							
QC150								
Soil □lass □ar □Unpreser□ed (EP071)								
B036□0.0-0.2,	B036□0.5-0.6,	**1□Mar□□016**	**□1□Mar□□016**	29-Mar-2016	П	**□□Mar□□016**	30-Apr-2016	П
B035□0.0-0.2,	B035□0.5-0.6,							
B034□0.0-0.2,	B034□0.5-0.6,							
B033□0.0-0.2,	B033□0.5-0.6,							
B032□0.0-0.2,	B032□0.5-0.6,							
B031□0.0-0.2,	B031□0.5-0.6,							
B016.5□0.0-0.2,	B016.5□0.5-0.6,							
B016□0.0-0.2,	B015.5□0.5-0.6,							
B014□0.0-0.2,	QC152, B014□0.5-0.6,							
QC154								
Soil □lass □ar □Unpreser□ed (EP071)								
A003.5□0.0-0.2,	A005.5□0.0-0.2,	**16□Mar□□016**	**□1□Mar□□016**	30-Mar-2016	П	**□□Mar□□016**	30-Apr-2016	П
A006.5□0.0-0.2,	A007.5□0.0-0.2,							
A008.5□0.0-0.2,	A013.5□0.0-0.2,							
A013.5□0.4-0.5,	A014.5□0.4-0.5,							
C011□0.0-0.2,	C012□0.0-0.2,							
QC157								

Matrix: **SOIL**

Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.

Method Container □Client Sample ID(s)		Sample Date	Extraction / Preparation Date extracted	Due for extraction	Evaluation	Analysis Date analysed	Due for analysis	Evaluation
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Soil □lass □ar □Unpreser□ed (EP07□(SIM))								
B001□0.0-0.2, B007.5□0.0-0.2, B010.5□0.0-0.2, QC150	B003.5□0.0-0.2, B009.5□0.0-0.2, B012.5□0.0-0.2,	**14□Mar□□016**	**□1□Mar□□016**	28-Mar-2016	✓	**□□Mar□□016**	30-Apr-2016	✓
Soil □lass □ar □Unpreser□ed (EP07□(SIM))								
B036□0.0-0.2, B035□0.0-0.2, B034□0.0-0.2, B033□0.0-0.2, B032□0.0-0.2, B031□0.0-0.2, B016.5□0.0-0.2, B016□0.0-0.2, B014□0.0-0.2, QC154	B036□0.5-0.6, B035□0.5-0.6, B034□0.5-0.6, B033□0.5-0.6, B032□0.5-0.6, B031□0.5-0.6, B016.5□0.5-0.6, B015.5□0.5-0.6, QC152, B014□0.5-0.6,	**1□Mar□□016**	**□1□Mar□□016**	29-Mar-2016	✓	**□□Mar□□016**	30-Apr-2016	✓
Soil □lass □ar □Unpreser□ed (EP07□(SIM))								
A003.5□0.0-0.2, A006.5□0.0-0.2, A008.5□0.0-0.2, A013.5□0.4-0.5, C011□0.0-0.2, QC157	A005.5□0.0-0.2, A007.5□0.0-0.2, A013.5□0.0-0.2, A014.5□0.4-0.5, C012□0.0-0.2,	**16□Mar□□016**	**□1□Mar□□016**	30-Mar-2016	✓	**□□Mar□□016**	30-Apr-2016	✓

Matrix: **SOIL** Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.

Method Container □Client Sample ID(s)	Sample Date	Extraction / Preparation Date extracted	Due for extraction	Evaluation	Analysis Date analysed	Due for analysis	Evaluation
EP0□0□071: Total Petroleu□ □ydrocarbons							
Soil □lass □ar □Unpreser□ed (EP0□0) B001□0.0-0.2, B003.5□0.0-0.2, B007.5□0.0-0.2, B009.5□0.0-0.2, B010.5□0.0-0.2, B012.5□0.0-0.2	**14□Mar□□016**	**1□□Mar□□016**	28-Mar-2016	✓	**1□□Mar□□016**	28-Mar-2016	✓
Soil □lass □ar □Unpreser□ed (EP0□0) QC150, QC153	**14□Mar□□016**	**1□□Mar□□016**	28-Mar-2016	✓	**□1□Mar□□016**	28-Mar-2016	✓
Soil □lass □ar □Unpreser□ed (EP0□0) B036□0.0-0.2, B036□0.5-0.6, B035□0.0-0.2, B035□0.5-0.6, B034□0.0-0.2, B034□0.5-0.6, B033□0.0-0.2, B033□0.5-0.6, B032□0.0-0.2, B032□0.5-0.6, B031□0.0-0.2, B031□0.5-0.6, B016.5□0.0-0.2, B016.5□0.5-0.6	**1□□Mar□□016**	**1□□Mar□□016**	29-Mar-2016	✓	**1□□Mar□□016**	29-Mar-2016	✓
Soil □lass □ar □Unpreser□ed (EP0□0) B016□0.0-0.2, B015.5□0.5-0.6, B014□0.0-0.2, B014□0.5-0.6, QC152, QC154	**1□□Mar□□016**	**1□□Mar□□016**	29-Mar-2016	✓	**□1□Mar□□016**	29-Mar-2016	✓
Soil □lass □ar □Unpreser□ed (EP0□0) A003.5□0.0-0.2, A005.5□0.0-0.2, A006.5□0.0-0.2, A007.5□0.0-0.2, A008.5□0.0-0.2, A013.5□0.0-0.2, A013.5□0.4-0.5, A014.5□0.4-0.5, C011□0.0-0.2, C012□0.0-0.2, QC157	**16□Mar□□016**	**1□□Mar□□016**	30-Mar-2016	✓	**□1□Mar□□016**	30-Mar-2016	✓

Matrix: **WATER** Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.

Method Container □Client Sample ID(s)	Sample Date	Extraction / Preparation Date extracted	Due for extraction	Evaluation	Analysis Date analysed	Due for analysis	Evaluation
E□0□0□: Dissol□ed Metals by ICP□MS							
Clear Plastic Bottle □Nitric Acid□□iltered (E□0□0A□□) QC156	**1□□Mar□□016**	□□□□	----	----	**□□Mar□□016**	11-Sep-2016	✓
Clear Plastic Bottle □Nitric Acid□□iltered (E□0□0A□□) QC161	**16□Mar□□016**	□□□□	----	----	**□□Mar□□016**	12-Sep-2016	✓
E□0□□□: Dissol□ed Mercury by □IMS							
Clear Plastic Bottle □Nitric Acid□□iltered (E□0□□□) QC156	**1□□Mar□□016**	□□□□	----	----	**□□Mar□□016**	12-Apr-2016	✓
Clear Plastic Bottle □Nitric Acid□□iltered (E□0□□□) QC161	**16□Mar□□016**	□□□□	----	----	**□□Mar□□016**	13-Apr-2016	✓

Matrix: **WATER**

Evaluation: □ = Holding time breach ; □ = Within holding time.

Method Container □Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP0□0□071: Total Petroleu□ □ydrocarbons							
A□ber □lass Bottle □Unpreser□ed (EP071) QC156	**1□Mar□016**	**1□Mar□016**	22-Mar-2016	□	**1□Mar□016**	27-Apr-2016	□
A□ber □lass Bottle □Unpreser□ed (EP071) QC161	**16□Mar□016**	**1□Mar□016**	23-Mar-2016	□	**1□Mar□016**	27-Apr-2016	□
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons							
A□ber □lass Bottle □Unpreser□ed (EP07□(SIM)) QC156	**1□Mar□016**	**1□Mar□016**	22-Mar-2016	□	**1□Mar□016**	27-Apr-2016	□
A□ber □lass Bottle □Unpreser□ed (EP07□(SIM)) QC161	**16□Mar□016**	**1□Mar□016**	23-Mar-2016	□	**1□Mar□016**	27-Apr-2016	□
EP0□0□071: Total Petroleu□ □ydrocarbons							
A□ber VOC Vial □Sul□uric Acid (EP0□0) QC156	**1□Mar□016**	**1□Mar□016**	29-Mar-2016	□	**1□Mar□016**	29-Mar-2016	□
A□ber VOC Vial □Sul□uric Acid (EP0□0) QC161, QC162	**16□Mar□016**	**1□Mar□016**	30-Mar-2016	□	**1□Mar□016**	30-Mar-2016	□

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type / *Analytical Methods*	*Method*	Count: *QC*	Count: *Regular*	Rate (%): *Actual*	Rate (%): *Expected*	*Evaluation*	*Quality Control Specification*
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	6	60	**10.00**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	38	**10.□□**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Total Mercury by FIMS	EG035T	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Total Metals by ICP-AES	EG005T	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	4	38	**10.□□**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTEX	EP080	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	38	**□.□6**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	**□.00**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**□.00**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	38	**□.□6**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**□.00**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	38	**□.□6**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	**□.00**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**□.00**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	38	**□.□6**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**□.00**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	2	38	**□.□6**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	**□.00**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**□.00**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	38	**□.□6**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**□.00**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard

Matrix: **WATER**

Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type / *Analytical Methods*	*Method*	Count: *QC*	Count: *Regular*	Rate (%): *Actual*	Rate (%): *Expected*	*Evaluation*	*Quality Control Specification*
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	2	16	**1□.□0**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	29	**1□.7□**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	7	**0.00**	**10.00**	✗	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	11	**0.00**	**10.00**	✗	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	16	**6.□□**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard

Matrix: **WATER**

Evaluation: □ = Quality Control frequency not within specification ; □ = Quality Control frequency within specification.

Quality Control Sample Type		Count		□ate (□)			□uality Control Specification
Analytical Methods	*Method*	*□C*	*□e□ular*	***□ctual***	***□xpected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	29	**6.□0**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.□□**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	**□.0□**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTE□	EP080	1	20	**□.00**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	16	**6.□□**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	29	**6.□0**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.□□**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	**□.0□**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTE□	EP080	1	20	**□.00**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	16	**6.□□**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	29	**6.□0**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	7	**0.00**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	11	**0.00**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTE□	EP080	1	20	**□.00**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard

Brie Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTE	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45m filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45m filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTE	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

S6-51

Frank ~~FE~~ 31-3-16 1715

Frank Ferraro

From:	Loren Schiavon
Sent:	Thursday, 31 March 2016 5:09 PM
To:	Fadi Soro; Frank Ferraro; Dianne Blane
Subject:	FW: Additional Analysis on Work order ES1606083

Hi Guys,

Can you please arrange the TCLP re-batch requested below?

Dianne – can you confirm what size bags were received for the asbestos and if a quant post reporting for abs/pres is possible at all?

Thanks.

Kind regards

Environmental Division
Sydney
Work Order Reference
ES1607003

Telephone : + 61-2-8784 8555

Loren Schiavon

CLIENT SERVICES CO-ORDINATOR
ALS | Environmental Division

277-289 Woodpark Road
Smithfield NSW 2164 Australia

T +61 2 8784 8503
F +61 2 8784 8500

From: Randall, Stephen [mailto:stephen.randall@aecom.com]
Sent: Thursday, 31 March 2016 2:46 PM
To: Loren Schiavon
Cc: Robinson, Scott (Sydney)
Subject: Additional Analysis on Work order ES1606083

Hi Loren,

Can I please request the following additional analyses for the above work order?

Asbestos Quantification:

- B001_0.0-0.2 ← CANCELLED
- B003.5_0.0-0.2
- B007.5_0.0-0.2
- B009.5_0.0-0.2
- B010.5_0.0-0.2
- B036_0.0-0.2
- B036_0.5-0.6
- B032_0.0-0.2
- B016_0.0-0.2
- A006.5_0.0-0.2

- A013.5_0.0-0.2
- A013.5_0.4-0.5
- A014.5_0.4-0.5

TCLP analysis:

1 • A005.5_0.0-0.2 on lead
2 • B007.5_0.0-0.2 on lead
3 • B035_0.0-0.2 on lead
4 • B009.5_0.0-0.2 on mercury and lead
5 • B012.5_0.0-0.2 on lead
6 • B016_0.0-0.2 on lead

Please place these on normal TAT. If there are any issues with this please give me a call.

Thanks

Steve

Stephen Randall
Senior Environmental Scientist
D +61 2 8934 0594 M +61 413 074 243
stephen.randall@aecom.com

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES160700□**	Page	: 1 of 6
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 8934 0000	Telephone	: +61 2 8784 8503
Project	: 60488804/1.2 Caltex Kurnell	Date Samples Received	: 31-Mar-2016 17:15
Order number	: 60488804/1.2	Date Analysis Commenced	: 01-Apr-2016
C-O-C number	: ----	Issue Date	: 22-Apr-2016 11:09
Sampler	: KATE PIGRAM		
Site	: ----		
Quote number	: ----		
No. of samples received	: 6		
No. of samples analysed	: 6		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
 = This result is computed from individual analyte detections at or above the level of reporting
 = ALS is not NATA accredited for these tests.

 This report has been amended and re-released to allow the reporting of additional analytical data.

□nalytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL)**

			Client sample ID	A00□.□□0.0□0.□	B007.□□0.0□0.□	B0□□□0.0□0.□	B00□.□□0.0□0.□	B01□.□□0.0□0.□
			Client samplin□ date / time	□16-Mar-2016□	□14-Mar-2016□	□15-Mar-2016□	□14-Mar-2016□	□14-Mar-2016□
Compound	*CAS □um□er*	*□□□*	*□nit*	**ES160700□001**	**ES160700□00□**	**ES160700□00□**	**ES160700□004**	**ES160700□00□**
				Result	Result	Result	Result	Result
EN□□: TCLP Leach								
Initial p□	----	0.1	pH Unit	**6.1**	**□.1**	**7.4**	**7.6**	**□.7**
A□ter □Cl p□	----	0.1	pH Unit	**1.□**	**1.7**	**1.6**	**1.7**	**□.7**
Extraction □luid Nu□ber	----	1	-	**1**	**1**	**1**	**1**	**1**
□inal p□	----	0.1	pH Unit	**4.□**	**□.0**	**4.□**	**□.0**	**6.□**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B016□0.0□0.□				
			Client sampling date / time	□15-Mar-2016□	----	----	----	----
Compound	CAS Number	LOR	Unit	ES160700□006				
				Result	----	----	----	----
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	□.□				
After HCl pH	----	0.1	pH Unit	**1.7**				
Extraction Fluid Number	----	1	-	**1**				
Final pH	----	0.1	pH Unit	□.□				

□nalytical Results

Sub-Matrix: **TCLP LEAC□ATE** (Matrix: **WATER**)			Client sample ID	**A00□.□□0.0□0.□**	**B007.□□0.0□0.□**	**B0□□□0.0□0.□**	**B00□.□□0.0□0.□**	**B01□.□□0.0□0.□**
			Client samplin□ date / time	□16-Mar-2016□	□14-Mar-2016□	□15-Mar-2016□	□14-Mar-2016□	□14-Mar-2016□
Compound	CAS □um□er	□□□	□nit	**ES160700□001**	**ES160700□00□**	**ES160700□00□**	**ES160700□004**	**ES160700□00□**
				Result	Result	Result	Result	Result
E□00□C: Leachable Metals by ICPAES								
Chro□iu□	7440-47-3	0.1	mg/L	□□□□	□□□□	□□□□	<0.1	□□□□
Lead	7439-92-1	0.1	mg/L	**0.1**	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/L	□□□□	□□□□	□□□□	**0.1**	□□□□
E□0□□C: Leachable Mercury by □IMS								
Mercury	7439-97-6	0.001	mg/L	□□□□	□□□□	□□□□	<0.0010	□□□□

□nalytical Results

Sub-Matrix: **TCLP LEAC□ATE**
(Matrix: **WATER**)

			Client sample ID	B016□0.0□0.□				
			Client samplin□ date / time	□15-Mar-2016□	----	----	----	----
Compound	CAS □um□er	□□ □	□nit	ES160700□006				
				Result	----	----	----	----
E□00□C: Leachable Metals by ICPAES								
Chro□ iu□	7440-47-3	0.1	mg/L					
Lead	7439-92-1	0.1	mg/L	<0.1				
Nickel	7440-02-0	0.1	mg/L					
E□0□□C: Leachable Mercury by □IMS								
Mercury	7439-97-6	0.001	mg/L					

QUALITY CONTROL REPORT

Work Order	: **ES160700**	Page	: 1 of 3
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 8934 0000	Telephone	: +61 2 8784 8503
Project	: 60488804/1.2 Caltex Kurnell	Date Samples Received	: 31-Mar-2016
Order number	: 60488804/1.2	Date Analysis Commenced	: 01-Apr-2016
C-O-C number	: ----	Issue Date	: 22-Apr-2016
Sampler	: KATE PIGRAM		
Site	: ----		
Quote number	: ----		
No. of samples received	: 6		
No. of samples analysed	: 6		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005C: Leachable Metals by ICPAES (QC Lot: 41□□77)									
ES1606988-001	Anonymous	EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.00	No Limit
ES1606993-004	Anonymous	EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Lead	7439-92-1	0.1	mg/L	0.4	0.4	0.00	No Limit
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EG035C: Leachable Mercury by FIMS (QC Lot: 41□□47)									
ES1606988-001	Anonymous	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit
ES1607018-014	Anonymous	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method/Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EN33: TCLP Leach (QCLot: 4114□6)								
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method/Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005C: Leachable Metals by ICPAES (QCLot: 41□□77)								
EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	0.1 mg/L	104	88	114
EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	0.1 mg/L	100	80	118
EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	0.1 mg/L	102	83	115
EG035C: Leachable Mercury by FIMS (QCLot: 41□□47)								
EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	91.9	79	109

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method/Compound	CAS Number	Concentration	MS	Low	High
EG005C: Leachable Metals by ICPAES (QCLot: 41□□77)							
ES1606988-002	Anonymous	EG005C: Chromium	7440-47-3	1 mg/L	103	70	130
		EG005C: Lead	7439-92-1	1 mg/L	104	70	130
		EG005C: Nickel	7440-02-0	1 mg/L	102	70	130
EG035C: Leachable Mercury by FIMS (QCLot: 41□□47)							
ES1606988-002	Anonymous	EG035C: Mercury	7439-97-6	0.01 mg/L	89.8	70	130

Environmental

QA□QC Co□pliance Assess□ent to assist □ith Quality Re□ie□

Work Order	: **ES160700□**	Page	: 1 of 4
A□end□ent	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Telephone	: +61 2 8784 8503
Project	: 60488804/1.2 Caltex Kurnell	Date Samples Received	: 31-Mar-2016
Site	: ----	Issue Date	: 22-Apr-2016
Sampler	: KATE PIGRAM	No. of samples received	: 6
Order number	: 60488804/1.2	No. of samples analysed	: 6

This report is auto□atically □enerated by the ALS LIMS throu□h interpretation o□the ALS Quality Control Report and se□eral Quality Assurance para□eters □easured by ALS. This auto□ated reportin□ hi□hli□hts any non□con□or□ances□□acilitates □aster and □ore accurate data □alidation and is desi□ned to assist internal expert and external Auditor re□ie□. Many co□ponents o□this report contribute to the o□erall DQO assess□ent and reportin□ □or □uideline co□pliance.

Brief method summaries and references are also provided to assist in traceability.

Summary o□□utliers

□utliers □□uality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **<u>NO</u> Method Blank □alue outliers occur.**
- **<u>NO</u> Duplicate outliers occur.**
- **<u>NO</u> Laboratory Control outliers occur.**
- **<u>NO</u> Matrix Spike outliers occur.**
- **□or all re□ular sa□ple □atrices□<u>NO</u> surro□ate reco□ery outliers occur.**

□utliers □□nalysis □oldin□ □ime Compliance

- **<u>NO</u> Analysis □oldin□ Ti□e Outliers exist.**

□utliers □□re□uency o□□uality Control Samples

- **<u>NO</u> Quality Control Sa□ple □requency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EG005C: Leachable Metals by ICPAES							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C)							
A005.5□0.0-0.2, B007.5□0.0-0.2, B035□0.0-0.2, B009.5□0.0-0.2, B012.5□0.0-0.2, B016□0.0-0.2	**01-Apr-2016**	**04-Apr-2016**	28-Sep-2016	✓	**04-Apr-2016**	28-Sep-2016	✓
EG035C: Leachable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C)							
B009.5□0.0-0.2	**01-Apr-2016**	----	----	----	**04-Apr-2016**	29-Apr-2016	✓

□uality Control Parameter □re□uency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: □ = Quality Control frequency not within specification ; □ = Quality Control frequency within specification.

Quality Control Sample Type		Count		□ate (□)			□uality Control Specification
Analytical Methods	*Method*	*□C*	*□e□ular*	***□ctual***	***□xpected***	*Evaluation*	
Method Blanks (MB)							
TCLP for Non □ Semivolatile Analytes	EN33a	1	11	□.0□	□.0□	✓	NEPM 2013 B3 □ ALS QC Standard

Matrix: **WATER**

Evaluation: □ = Quality Control frequency not within specification ; □ = Quality Control frequency within specification.

Quality Control Sample Type		Count		□ate (□)			□uality Control Specification
Analytical Methods	*Method*	*□C*	*□e□ular*	***□ctual***	***□xpected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Leachable Mercury by FIMS	EG035C	2	11	**1□.1□**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Leachable Metals by ICPAES	EG005C	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Laboratory Control Samples (LCS)							
Leachable Mercury by FIMS	EG035C	1	11	□.0□	□.00	✓	NEPM 2013 B3 □ ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	20	□.00	□.00	✓	NEPM 2013 B3 □ ALS QC Standard
Method Blanks (MB)							
Leachable Mercury by FIMS	EG035C	1	11	□.0□	□.00	✓	NEPM 2013 B3 □ ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	20	□.00	□.00	✓	NEPM 2013 B3 □ ALS QC Standard
Matrix Spikes (MS)							
Leachable Mercury by FIMS	EG035C	1	11	□.0□	□.00	✓	NEPM 2013 B3 □ ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	20	□.00	□.00	✓	NEPM 2013 B3 □ ALS QC Standard

Brie Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Leachable Metals by ICPAES	EG005C	SOIL	In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (2013) Schedule B(3)
Leachable Mercury by FIMS	EG035C	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
TCLP for Non Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: AECOM Services
OFFICE: 420 george st, sydney
PROJECT: 60488804 Kurnell   PROJECT NO.: Task 13
ORDER NUMBER: 60488804   PURCHASE ORDER NO.: 1.3
PROJECT MANAGER: S. Randall   CONTACT PH: 0413074243
SAMPLER: Nik Walker   SAMPLER MOBILE: 0404775677
COC Emailed to ALS? (YES / NO)   EDD FORMAT (or default): EQuIS
Email Reports to (will default to PM if no other addresses are listed): NSW.Geoscience.Analytical@urs.com + Project Manager
Email Invoice to (will default to PM if no other addresses are listed):

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☑ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.: SY/026/16
COUNTRY OF ORIGIN: Australia

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: 21.7 °C
Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME: 8/4/16	Frank ALS DATE/TIME: 8-4-16 1435	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY LAB ID	SAMPLE DETAILS MATRIX: Solid(S) Water(W) SAMPLE ID	DATE / TIME	MATRIX	CONTAINER INFORMATION TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). Asbestos Quantification							Additional Information Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	B001_0.0-0.2	7/4/16	S	1x 500g bag	1	✓							
2	B003.5_0.0-0.2					✓							
3	B007.5_0-0.2					✓							
4	B009.5_0-0.2					✓							
5	B010.5_0-0.2					✓							
6	B036_0.5-0.6 →	0-0.2 on bag				✓							
7	B036_0.5-0.6					✓							
8	B032_0-0.2					✓							
9	B016_0-0.2					✓							
10	A006.5_0-0.2					✓							
11	A013.5_0-0.2					✓							
12	A013.5_0.4-0.5					✓							
13	A014.5_0.4-0.5				TOTAL	✓							

Environmental Division
Sydney
Work Order Reference
ES1607647

Telephone : + 61-2-8784 8555

Subcon / Forward Lab / Split WO
Lab / Analysis: Newcastle: Asbestos
Organised By / Date: Frank
Relinquished By / Date:
Connote / Courier:
WO No: ES1607647
Attach By PO / Internal Sheet:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

ALS Environmental

CERTI□ICATE O□ ANALYSIS

Work Order	: **ES1607647**	Page	: 1 of 5
Client	: **AECOM SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: Supplier ID number - 1179447 Level 8, 420 GEORGE STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8925 5500	Telephone	: +61 2 8784 8503
Project	: 60488804 Kurnell Task 1.3	Date Samples Received	: 08-Apr-2016 14:35
Order number	: 60488804 1.3	Date Analysis Commenced	: 12-Apr-2016
C-O-C number	: ----	Issue Date	: 15-Apr-2016 10:32
Sampler	: NICHOLAS WALKER		
Site	: ----		
Quote number	: ----		
No. of samples received	: 13		
No. of samples analysed	: 13		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results

Additional in□or□ation pertinent to this report □ill be □ound in the □ollo□in□ separate attach□ents: Quality Control Report□ QA□QC Co□pliance Assess□ent to assist □ith Quality Re□ie□ and Sa□ple Receipt Noti□ication.

Si□natories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Si□natories	*Position*	*Accreditation Cate□ory*
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
□ = This result is computed from individual analyte detections at or above the level of reporting
□ = ALS is not NATA accredited for these tests.

- EA200N: Asbestos weights and percentages are not covered under the Scope of NATA Accreditation.
  Weights of Asbestos are based on extracted bulk asbestos, fibre bundles, and/or ACM and do not include respirable fibres (if present)
  The Friable Asbestos weight is calculated from the extracted Fibrous Asbestos and Asbestos Fines as an equivalent weight of 100% Asbestos
  Percentages for Asbestos content in ACM are based on the 2013 NEPM default values.
  All calculations of percentage Asbestos under this method are approximate and should be used as a guide only.
- EA200 □Am□ Amosite (brown asbestos)
- EA200 □Cr□ Crocidolite (blue asbestos)
- EA200 □Trace□- Asbestos fibres (□Free Fibres□) detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable □respirable□asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 □Ch□ Chrysotile (white asbestos)
- EA200: □UMF□Unknown Mineral Fibres. □-□indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- EA200N: ALS laboratory procedures and methods used for the identification and quantitation of asbestos are consistent with AS4964-2004 and the requirements of the 2013 NEPM for Assessment of Site Contamination
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2

□nalytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**B001□0.0□0.□**	**B00□.□□0.0□0.□**	**B007.□□0□0.□**	**B00□.□□0□0.□**	**B010.□□0□0.□**
			Client samplin□ date / time	□07-Apr-2016□	□07-Apr-2016□	□07-Apr-2016□	□07-Apr-2016□	□07-Apr-2016□
Compound	*CAS □um□er*	*□□□*	*□nit*	**ES1607647□001**	**ES1607647□00□**	**ES1607647□00□**	**ES1607647□004**	**ES1607647□00□**
				Result	Result	Result	Result	Result
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	**Yes**	**Yes**	**Yes**	**No**	**No**
Asbestos Type	1332-21-4	-	--	**A□**	**Ch**	**A□**	□	□
Sa□ple □ei□ht (dry)	----	0.01	g	**□100**	**□760**	**□□□0**	**□000**	**□□40**
APPROVED IDENTI□IER:	----	-	--	**S.SPOONER**	**□.MOR□AN**	**□.MOR□AN**	**C.OWLER**	**C.OWLER**
EA□00N: Asbestos Quanti□ication (non□NATA)								
□ **□ree □ibres**	----	5	Fibres	**No**	**No**	**No**	**No**	**No**
□ **□riable Asbestos**	1332-21-4	0.0004	g	<0.0004	**0.144**	<0.0004	<0.0004	<0.0004
□ **□riable Asbestos (as Asbestos in Soil)**	1332-21-4	0.001	% (w/w)	<0.001	**0.00□**	<0.001	<0.001	<0.001
□ **Asbestos Containin□ Material**	1332-21-4	0.1	g	<0.1	<0.1	<0.1	<0.1	<0.1
□ **Asbestos Containin□ Material (as 1□□ Asbestos in ACM □7□ □)**	1332-21-4	0.01	% (w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
□ **Wei□ht Used □or □ Calculation**	----	0.0001	kg	**□.10**	**□.76**	**□.□□**	**□.00**	**□.□4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B0□6□0□0.□	B0□6□0.□□0.6	B0□□□0□0.□	B016□0□0.□	A006.□□0□0.□
			Client sampling date / time	□07-Apr-2016□	□07-Apr-2016□	□07-Apr-2016□	□07-Apr-2016□	□07-Apr-2016□
Compound	CAS Number	LOR	Unit	ES1607647□006	ES1607647□007	ES1607647□00□	ES1607647□00□	ES1607647□010
				Result	Result	Result	Result	Result
EA□00: AS 4□64 □□004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	**Yes**	**Yes**	**No**	**No**	**Yes**
Asbestos Type	1332-21-4	-	--	**A□**	**Ch □ A□**	□	□	**A□**
Sample Weight (dry)	----	0.01	g	**□6□0**	**□400**	**1□10**	**□4□0**	**□470**
APPROVED IDENTIFIER:	----	-	--	**□.MORGAN**	**S.SPOONER**	**S.SPOONER**	**□.MORGAN**	**S.SPOONER**
EA□00N: Asbestos Quantification (non□NATA)								
□ Free Fibres	----	5	Fibres	**No**	**No**	**No**	**No**	**No**
□ Friable Asbestos	1332-21-4	0.0004	g	<0.0004	**0.00□□**	<0.0004	<0.0004	**0.□10**
□ Friable Asbestos (as Asbestos in Soil)	1332-21-4	0.001	% (w/w)	<0.001	<0.001	<0.001	<0.001	**0.00□**
□ Asbestos Containing Material	1332-21-4	0.1	g	<0.1	**17.□**	<0.1	<0.1	<0.1
□ Asbestos Containing Material (as 1□□ Asbestos in ACM □7□ □)	1332-21-4	0.01	% (w/w)	<0.01	**0.11**	<0.01	<0.01	<0.01
□ Weight Used for □ Calculation	----	0.0001	kg	**□.6□**	**□.40**	**1.□1**	**□.4□**	**□.47**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

			Client sample ID	**A01□.□□0□0.□**	**A01□.□□0.4□0.□**	**A014.□□0.4□0.□**	□□□□	□□□□
			Client sampling date / time	□07-Apr-2016□	□07-Apr-2016□	□07-Apr-2016□	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1607647□011**	**ES1607647□01□**	**ES1607647□01□**	□□□□□□□□	□□□□□□□□
				Result	Result	Result	Result	Result
EA□00: AS 4□64 □□004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	**Yes**	**No**	**Yes**	□□□□	□□□□
Asbestos Type	1332-21-4	-	--	**Ch □A□**	□	**A□**	□□□□	□□□□
Sample Weight (dry)	----	0.01	g	**□□□0**	**□□40**	**□□□0**	□□□□	□□□□
APPROVED IDENTIFIER:	----	-	--	**□.MOR□AN**	**□.MOR□AN**	**S.SPOONER**	□□□□	□□□□
EA□00N: Asbestos Quantification (non□NATA)								
□ Free Fibres	----	5	Fibres	**No**	**No**	**No**	□□□□	□□□□
□ Friable Asbestos	1332-21-4	0.0004	g	**0.□□4**	<0.0004	**0.00□□**	□□□□	□□□□
□ Friable Asbestos (as Asbestos in Soil)	1332-21-4	0.001	% (w/w)	**0.01□**	<0.001	<0.001	□□□□	□□□□
□Asbestos Containing Material	1332-21-4	0.1	g	<0.1	<0.1	<0.1	□□□□	□□□□
□Asbestos Containing Material (as 1□□ Asbestos in ACM □7□ □)	1332-21-4	0.01	% (w/w)	<0.01	<0.01	<0.01	□□□□	□□□□
□Weight Used for □ Calculation	----	0.0001	kg	□.□□	□.□4	□.□□	□□□□	□□□□

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	*Client sample ID - Client sampling date / time*	*Analytical Results*
EA□00: AS 4□64 □□004 Identification of Asbestos in Soils		
EA200: Description	B001□0.0-0.2 - □07-Apr-2016□	Mid brown sandy soil with one loose bundle of friable asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	B003.5□0.0-0.2 - □07-Apr-2016□	Mid brown sandy soil with one piece of friable asbestos fibre board approx 25 x 15 x 1 mm.
EA200: Description	B007.5□0-0.2 - □07-Apr-2016□	Mid brown sandy soil with two bundles of friable asbestos fibres approx 3 x 1 x 1 mm.
EA200: Description	B009.5□0-0.2 - □07-Apr-2016□	Mid brown clay soil.
EA200: Description	B010.5□0-0.2 - □07-Apr-2016□	Mid brown clay soil.
EA200: Description	B036□0-0.2 - □07-Apr-2016□	Mid brown sandy soil with one bundle of friable asbestos fibres approx 3 x 1 x 1 mm.
EA200: Description	B036-0.5-0.6 - □07-Apr-2016□	Mid brown sandy soil with two pieces of bonded asbestos cement sheeting approx 60 x 30 x 5 mm plus several loose bundles of friable asbestos fibres approx 3 x 1 x 0.5 mm.
EA200: Description	B032□0-0.2 - □07-Apr-2016□	Mid brown sandy soil with grey rocks.
EA200: Description	B016□0-0.2 - □07-Apr-2016□	Mid brown sandy soil.
EA200: Description	A006.5□0-0.2 - □07-Apr-2016□	Mid brown sandy soil with several pieces of friable asbestos insulation material approx 5 x 4 x 2 mm with several loose bundles of friable asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	A013.5□0-0.2 - □07-Apr-2016□	Mid brown sandy soil with several pieces of friable asbestos insulation approx 25 x 20 x 2 mm plus several bundles of friable asbestos fibres approx 3 x 1 x 1 mm.
EA200: Description	A013.5□0.4-0.5 - □07-Apr-2016□	Mid brown sandy soil.
EA200: Description	A014.5□0.4-0.5 - □07-Apr-2016□	Pale brown sandy soil with one loose bundle of friable asbestos fibres approx 3 x 2 x 1 mm.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1607647**	Page	: 1 of 3
Client	: **AECOM SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: Supplier ID number - 1179447 Level 8, 420 GEORGE STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 8925 5500	Telephone	: +61 2 8784 8503
Project	: 60488804 Kurnell Task 1.3	Date Samples Received	: 08-Apr-2016
Order number	: 60488804 1.3	Date Analysis Commenced	: 12-Apr-2016
C-O-C number	: ----	Issue Date	: 15-Apr-2016
Sampler	: NICHOLAS WALKER		
Site	: ----		
Quote number	: ----		
No. of samples received	: 13		
No. of samples analysed	: 13		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

QA□QC Co□pliance Assess□ent to assist □ith Quality Re□ie□

Work Order	: **ES1607647**	Page	: 1 of 4
Client	: **AECOM SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Telephone	: +61 2 8784 8503
Project	: 60488804 Kurnell Task 1.3	Date Samples Received	: 08-Apr-2016
Site	: ----	Issue Date	: 15-Apr-2016
Sampler	: NICHOLAS WALKER	No. of samples received	: 13
Order number	: 60488804 1.3	No. of samples analysed	: 13

This report is auto□atically □enerated by the ALS LIMS throu□h interpretation o□the ALS Quality Control Report and se□eral Quality Assurance para□eters □easured by ALS. This auto□ated reportin□ hi□hli□hts any non□con□or□ances□□acilitates □aster and □ore accurate data □alidation and is desi□ned to assist internal expert and external Auditor re□ie□. Many co□ponents o□this report contribute to the o□erall DQO assess□ent and reportin□ □or □uideline co□pliance.

Brief method summaries and references are also provided to assist in traceability.

Summary o□□utliers

□utliers □□uality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **<u>NO</u> Method Blank □alue outliers occur.**
- **<u>NO</u> Duplicate outliers occur.**
- **<u>NO</u> Laboratory Control outliers occur.**
- **<u>NO</u> Matrix Spike outliers occur.**
- **□or all re□ular sa□ple □atrices□<u>NO</u> surro□ate reco□ery outliers occur.**

□utliers □□nalysis □oldin□ □ime Compliance

- **<u>NO</u> Analysis □oldin□ Ti□e Outliers exist.**

□utliers □□re□uency o□□uality Control Samples

- **<u>NO</u> Quality Control Sa□ple □requency Outliers exist.**

□nalysis □oldin□ □ime Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days □ other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***□□C in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: □ = Holding time breach ; □ = Within holding time.

Method / *Container □Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils							
Snap Lock Ba□: Separate ba□ recei□ed (EA□00) B001□0.0-0.2, B003.5□0.0-0.2, B007.5□0-0.2, B009.5□0-0.2, B010.5□0-0.2, B036□0-0.2, B036-0.5-0.6, B032□0-0.2, B016□0-0.2, A006.5□0-0.2, A013.5□0-0.2, A013.5□0.4-0.5, A014.5□0.4-0.5	**07□Apr□□016**	□□□□	----	----	**1□□Apr□□016**	04-Oct-2016	✓
EA□00N: Asbestos Quanti□ication (non□NATA)							
Snap Lock Ba□: Separate ba□ recei□ed (EA□00N) B001□0.0-0.2, B003.5□0.0-0.2, B007.5□0-0.2, B009.5□0-0.2, B010.5□0-0.2, B036□0-0.2, B036-0.5-0.6, B032□0-0.2, B016□0-0.2, A006.5□0-0.2, A013.5□0-0.2, A013.5□0.4-0.5, A014.5□0.4-0.5	**07□Apr□□016**	□□□□	----	----	**1□□Apr□□016**	04-Oct-2016	✓

uality Control Parameter re uency Compliance

- **No Quality Control data a ailable or this section.**

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Asbestos Classification and Quantitation per NEPM 2013	EA200N	SOIL	Asbestos Classification and Quantitation per NEPM 2013 with Confirmation of Identification by AS 4964 - 2004 Gravimetric determination of Asbestos Containing Material, Friable Asbestos and sample weight and calculation of percentage concentrations per NEPM protocols. Friable Asbestos is reported as the equivalent weight in the sample received after accounting for sub-sampling (where applicable for the <7mm and/or <2mm fractions).

550-51
#1,7,15,4,5,2,23,27.

Frank ARS 20-4-16 1730

Loren Schiavon

From: Robinson, Scott (Sydney) <scott.e.robinson@aecom.com>
Sent: Wednesday, 20 April 2016 5:27 PM
To: Loren Schiavon; Randall, Stephen
Cc: Dodd, Katherine; Lokuge, Chani
Subject: RE: Additional Analysis on Work order ES1606083 - Caltex Kurnell

Loren:

Can you add the following in green to Steve's request below:

TCLP analysis:

1 B001_0.0-0.2 – Mercury and Benzo(a)pyrene
2 B036_0.0-0.2 on Nickel
3 B032_0.0-0.2 on Nickel
B009.5_0.0-0.2 on Nickel, Chromium - INSUFFICIENT VOLUME REMAINING.
4 B010.5_0.0-0.2 on Nickel, Mercury, Lead
5 B003.5_0.0-0.2 on Nickel, Chromium, Lead
6 B014_0.0-0.2 - Benzo(a)pyrene
7 A006.5_0.0-0.2 – Lead and Benzo(a)pyrene

Environmental Division
Sydney
Work Order Reference
ES1608579

Telephone : + 61-2-8784 8555

Scott Robinson
Technical Director - Environment
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From: Loren Schiavon [mailto:loren.schiavon@alsglobal.com]
Sent: Wednesday, 20 April 2016 4:53 PM
To: Randall, Stephen
Cc: Robinson, Scott (Sydney)
Subject: RE: Additional Analysis on Work order ES1606083

Hi Steve,

I'll arrange this re-batch for you now.

Cheers.

Kind regards

Loren Schiavon

CLIENT SERVICES CO-ORDINATOR
ALS | Environmental Division

277-289 Woodpark Road
Smithfield NSW 2164 Australia

CERTIFICATE OF ANALYSIS

Work Order	: **ES160□□7□**	Page	: 1 of 7
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 8934 0000	Telephone	: +61 2 8784 8503
Project	: 60488804/1.2 Caltex Kurnell	Date Samples Received	: 20-Apr-2016 17:30
Order number	: 60488804/1.2	Date Analysis Commenced	: 21-Apr-2016
C-O-C number	: ----	Issue Date	: 28-Apr-2016 14:50
Sampler	: KATE PIGRAM		
Site	: ----		
Quote number	: ----		
No. of samples received	: 7		
No. of samples analysed	: 7		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED
ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
□ = This result is computed from individual analyte detections at or above the level of reporting
□ = ALS is not NATA accredited for these tests.

□ Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) □ Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for □TEQ □ero□ are treated as zero.

□nalytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

			Client sample ID	B001□0.0□0.□	B0□6□0.0□0.□	B0□□□0.0□0.□	B010.□□0.0□0.□	B00□.□□0.0□0.□
			Client samplin□ date / time	□14-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□14-Mar-2016□	□14-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES160□□7□001	ES160□□7□00□	ES160□□7□00□	ES160□□7□004	ES160□□7□00□
				Result	Result	Result	Result	Result
EN□□: TCLP Leach								
Initial p□	----	0.1	pH Unit	**6.7**	**□.1**	**□.□**	**7.□**	**7.□**
A□ter □Cl p□	----	0.1	pH Unit	**□.0**	**1.7**	**□.0**	**1.□**	**1.□**
Extraction □luid Nu□ber	----	1	-	**1**	**1**	**1**	**1**	**1**
□inal p□	----	0.1	pH Unit	**6.6**	**□.0**	**□.□**	**□.0**	**□.1**

□nalytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

			Client sample ID	**B014□0.0□0.□**	**A006.□□0.0□0.□**	□□□□	□□□□	□□□□
			Client samplin□ date / time	□15-Mar-2016□	□16-Mar-2016□	----	----	----
Compound	*CAS □um□er*	*□□□*	*□nit*	**ES160□□7□006**	**ES160□□7□007**	□□□□□□□□	□□□□□□□□	□□□□□□□□
				Result	Result	----	----	----
EN□□: TCLP Leach								
Initial p□	----	0.1	pH Unit	**7.1**	□.□	□□□□	□□□□	□□□□
A□ter □Cl p□	----	0.1	pH Unit	**1.6**	**1.6**	□□□□	□□□□	□□□□
Extraction □luid Nu□ber	----	1	-	**1**	**1**	□□□□	□□□□	□□□□
□inal p□	----	0.1	pH Unit	**4.□**	**4.□**	□□□□	□□□□	□□□□

□nalytical Results

Sub-Matrix: TCLP LEAC□ATE (Matrix: WATER)			Client sample ID	B001□0.0□0.□	B0□6□0.0□0.□	B0□□□0.0□0.□	B010.□□0.0□0.□	B00□.□□0.0□0.□
			Client samplin□ date / time	□14-Mar-2016□	□15-Mar-2016□	□15-Mar-2016□	□14-Mar-2016□	□14-Mar-2016□
Compound	CAS □um□er	□□□	□nit	ES160□□7□001	ES160□□7□00□	ES160□□7□00□	ES160□□7□004	ES160□□7□00□
				Result	Result	Result	Result	Result
E□00□C: Leachable Metals by ICPAES								
Chro□iu□	7440-47-3	0.1	mg/L	□□□□	□□□□	□□□□	□□□□	<0.1
Lead	7439-92-1	0.1	mg/L	□□□□	□□□□	□□□□	**0.1**	<0.1
Nickel	7440-02-0	0.1	mg/L	□□□□	<0.1	<0.1	<0.1	<0.1
E□0□□C: Leachable Mercury by □IMS								
Mercury	7439-97-6	0.001	mg/L	<0.0010	□□□□	□□□□	<0.0010	□□□□
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	□g/L	<0.5	□□□□	□□□□	□□□□	□□□□
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	1	%	□□.□	□□□□	□□□□	□□□□	□□□□
□□Chlorophenol□D4	93951-73-6	1	%	**60.□**	□□□□	□□□□	□□□□	□□□□
□.4.6□Tribro□ophenol	118-79-6	1	%	**64.□**	□□□□	□□□□	□□□□	□□□□
EP07□(SIM)T: PA□ Surro□ates								
□□□luorobiphenyl	321-60-8	1	%	**67.□**	□□□□	□□□□	□□□□	□□□□
Anthracene□d10	1719-06-8	1	%	**7□.□**	□□□□	□□□□	□□□□	□□□□
4□Terphenyl□d14	1718-51-0	1	%	**71.6**	□□□□	□□□□	□□□□	□□□□

□nalytical Results

Sub-Matrix: TCLP LEAC□ATE (Matrix: WATER)			Client sample ID	B014□0.0□0.□	A006.□□0.0□0.□	□□□	□□□	□□□
			Client samplin□ date / time	□15-Mar-2016□	□16-Mar-2016□	----	----	----
Compound	CAS □um□er	□□□	□nit	ES160□□7□006	ES160□□7□007	□□□□□□	□□□□□□	□□□□□□
				Result	Result	----	----	----
E□00□C: Leachable Metals by ICPAES								
Chro□iu□	7440-47-3	0.1	mg/L	□□□	□□□	□□□	□□□	□□□
Lead	7439-92-1	0.1	mg/L	□□□	0.□	□□□	□□□	□□□
Nickel	7440-02-0	0.1	mg/L	□□□	□□□	□□□	□□□	□□□
E□0□□C: Leachable Mercury by □IMS								
Mercury	7439-97-6	0.001	mg/L	□□□	□□□	□□□	□□□	□□□
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	□g/L	<0.5	<0.5	□□□	□□□	□□□
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	1	%	□□.□	□□.□	□□□	□□□	□□□
□□Chlorophenol□D4	93951-73-6	1	%	6□.□	64.7	□□□	□□□	□□□
□.4.6□Tribro□ophenol	118-79-6	1	%	□6.0	□1.0	□□□	□□□	□□□
EP07□(SIM)T: PA□ Surro□ates								
□□□luorobiphenyl	321-60-8	1	%	6□.4	7□.7	□□□	□□□	□□□
Anthracene□d10	1719-06-8	1	%	71.□	□□.□	□□□	□□□	□□□
4□Terphenyl□d14	1718-51-0	1	%	7□.7	□□.7	□□□	□□□	□□□

Surro□ate Control Limits

Sub-Matrix: **TCLP LEAC□ATE**		Reco□ery Limits (□)	
Compound	*CAS □um□er*	*Lo□*	*□i□h*
EP07□(SIM)S: Phenolic Co□pound Surro□ates			
Phenol□d6	13127-88-3	10	44
□Chlorophenol□D4	93951-73-6	14	94
□.4.6□Tribro□ophenol	118-79-6	17	125
EP07□(SIM)T: PA□ Surro□ates			
□□luorobiphenyl	321-60-8	20	104
Anthracene□d10	1719-06-8	27	113
4□Terphenyl□d14	1718-51-0	32	112

QUALITY CONTROL REPORT

Work Order	: **ES160□□7□**	Page	: 1 of 3
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 8934 0000	Telephone	: +61 2 8784 8503
Project	: 60488804/1.2 Caltex Kurnell	Date Samples Received	: 20-Apr-2016
Order number	: 60488804/1.2	Date Analysis Commenced	: 21-Apr-2016
C-O-C number	: ----	Issue Date	: 28-Apr-2016
Sampler	: KATE PIGRAM		
Site	: ----		
Quote number	: ----		
No. of samples received	: 7		
No. of samples analysed	: 7		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

WORLD RECOGNISED
ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Si□natories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Si□natories	*Position*	*Accreditation Cate□ory*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
- CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
- LOR = Limit of reporting
- RPD = Relative Percentage Difference
- # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005C: Leachable Metals by ICPAES (QC Lot: 4□□774)									
ES1608493-001	Anonymous	EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Lead	7439-92-1	0.1	mg/L	0.4	0.4	0.00	No Limit
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.00	No Limit
ES1608587-001	Anonymous	EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	0.00	No Limit
		EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EG035C: Leachable Mercury by FIMS (QC Lot: 4□□666)									
ES1608579-001	B001□0.0-0.2	EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High
EN□□: TCLP Leach (QCLot: 4□1□□1)								
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High
E□00□C: Leachable Metals by ICPAES (QCLot: 4□□774)								
EG005C: Chromium	7440-47-3	0.1	mg/L	<0.1	0.1 mg/L	102	88	114
EG005C: Lead	7439-92-1	0.1	mg/L	<0.1	0.1 mg/L	108	80	118
EG005C: Nickel	7440-02-0	0.1	mg/L	<0.1	0.1 mg/L	101	83	115
E□0□□C: Leachable Mercury by □IMS (QCLot: 4□□666)								
EG035C: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	100	79	109
EP07□(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4□□76□)								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	97.5	63	117

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	Recovery Limits (%) High
E□00□C: Leachable Metals by ICPAES (QCLot: 4□□774)							
ES1608539-001	Anonymous	EG005C: Chromium	7440-47-3	1 mg/L	103	70	130
		EG005C: Lead	7439-92-1	1 mg/L	101	70	130
		EG005C: Nickel	7440-02-0	1 mg/L	97.8	70	130
E□0□□C: Leachable Mercury by □IMS (QCLot: 4□□666)							
ES1608579-004	B010.5□0.0-0.2	EG035C: Mercury	7439-97-6	0.01 mg/L	102	70	130

ALS Environmental

QA□QC Co□pliance Assess□ent to assist □ith Quality Re□ie□

Work Order	: **ES160□□7□**	Page	: 1 of 4
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Telephone	: +61 2 8784 8503
Project	: 60488804/1.2 Caltex Kurnell	Date Samples Received	: 20-Apr-2016
Site	: ----	Issue Date	: 28-Apr-2016
Sampler	: KATE PIGRAM	No. of samples received	: 7
Order number	: 60488804/1.2	No. of samples analysed	: 7

This report is auto□atically □enerated by the ALS LIMS throu□h interpretation o□the ALS Quality Control Report and se□eral Quality Assurance para□eters □easured by ALS. This auto□ated reportin□ hi□hli□hts any non□con□or□ances□□acilitates □aster and □ore accurate data □alidation and is desi□ned to assist internal expert and external Auditor re□ie□. Many co□ponents o□this report contribute to the o□erall DQO assess□ent and reportin□ □or □uideline co□pliance.

Brief method summaries and references are also provided to assist in traceability.

Summary o□□utliers

□utliers □□uality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank □alue outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **□or all re□ular sa□ple □atrices□NO surro□ate reco□ery outliers occur.**

□utliers □□nalysis □oldin□ □ime Compliance

- **NO Analysis □oldin□ Ti□e Outliers exist.**

□utliers □□re□uency o□□uality Control Samples

- **Quality Control Sa□ple □requency Outliers exist □please see □ollo□in□ pa□es □or □ull details.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	8	0.00	10.00	NEPM 2013 B3 □ ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	8	0.00	5.00	NEPM 2013 B3 □ ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days □ other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
E□00□C: Leachable Metals by ICPAES								
Clear Plastic Bottle - Nitric Acid; Unfiltered (E□00□C)								
B036□0.0-0.2,	B032□0.0-0.2,	**□1-Apr-□016**	**□□-Apr-□016**	18-Oct-2016	✓	**□□-Apr-□016**	18-Oct-2016	✓
B010.5□0.0-0.2,	B003.5□0.0-0.2,							
A006.5□0.0-0.2								
E□0□□C: Leachable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (E□0□□C)								
B001□0.0-0.2,	B010.5□0.0-0.2	**□1-Apr-□016**	□□□□	----	----	**□6-Apr-□016**	19-May-2016	✓
EP07□(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP07□(SIM))								
B001□0.0-0.2,	B014□0.0-0.2,	**□1-Apr-□016**	**□□-Apr-□016**	28-Apr-2016	✓	**□□-Apr-□016**	01-Jun-2016	✓
A006.5□0.0-0.2								

□uality Control Parameter □re□uency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		□ate (□)			□uality Control Specification
Analytical Methods	*Method*	*□C*	*□e□ular*	***□ctual***	***□xpected***	*Evaluation*	
Method Blanks (MB)							
TCLP for Non □ Semivolatile Analytes	EN33a	1	11	**□.0□**	**□.0□**	✓	NEPM 2013 B3 □ ALS QC Standard

Matrix: **WATER**

Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		□ate (□)			□uality Control Specification
Analytical Methods	*Method*	*□C*	*□e□ular*	***□ctual***	***□xpected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Leachable Mercury by FIMS	EG035C	1	8	**1□.□0**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Leachable Metals by ICPAES	EG005C	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 □ ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	8	**0.00**	**10.00**	✗	NEPM 2013 B3 □ ALS QC Standard
Laboratory Control Samples (LCS)							
Leachable Mercury by FIMS	EG035C	1	8	**1□.□0**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	12	**□.□□**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	**1□.□0**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Method Blanks (MB)							
Leachable Mercury by FIMS	EG035C	1	8	**1□.□0**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	12	**□.□□**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	8	**1□.□0**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Matrix Spikes (MS)							
Leachable Mercury by FIMS	EG035C	1	8	**1□.□0**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
Leachable Metals by ICPAES	EG005C	1	12	**□.□□**	**□.00**	✓	NEPM 2013 B3 □ ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	8	**0.00**	**□.00**	✗	NEPM 2013 B3 □ ALS QC Standard

Brie Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Leachable Metals by ICPAES	EG005C	SOIL	In house: referenced to APHA 3120; USEPA SW 846 - 6010: The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (2013) Schedule B(3)
Leachable Mercury by FIMS	EG035C	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
TCLP for Non Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
Separatory Funnel Extraction of Liquids	ORG14	SOIL	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Eurofins

AECOM

443555

Chain of Custody

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Laboratory Details

Lab. Name: ALS
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No:

Sampled By: Kate Pigram | AECOM Project No: 60488804/1.2 | Project Name: Caltex Kurnell | PO No.

Specifications: | Yes (tick)

1. Urgent TAT required? (please circle: 24hr 48hr ______ days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details:)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email

Analysis Request | Other

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)
1	B001_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
2	B003.5_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
3	B007.5_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
4	B009.5_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
5	B010.5_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
6	B012.5_0.0-0.2	14/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
7	B036_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
8	B036_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
9	B035_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
10	B035_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
11	B034_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
12	B034_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X

Environmental Division
Sydney
Work Order Reference
ES1606083

Telephone : + 61-2-8784 8555

Second / Forward Lab / Split WO: Newcastle: Asbestos
Lab / Analysis: Eurofins: QC151, QC155, QC158
Organised by / Date: Frank
Relinquished by / Date:
Connote / Courier:
WO No: ES1606083
Attach By PO / Internal Sheet:

Lab Report No. | Esky ID

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Relinquished by:	Kate Pigram	Signed:	Kate Pigram	Date:	17/03/2016
Recieved by:	Frank	Signed:	[signature]	Date:	17-3-16 1500
Relinquished by:		Signed:	[signature]	Date:	
Recieved by:	Elena GEHing	Signed:	[signature]	Date:	18/03/16 14:00

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AECOM

Chain of Custody

AECOM - Sydney
Level 21, 420 George Street,
Sydney, NSW 2000
Tel: (02) 8934 0000
Fax: (02) 8934 0001
E-mail: Stephen.Randall@aecom.com

Laboratory Details
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Lab Quote No:

Sampled By: Kate Pigram
AECOM Project No: 60488804/1.2
Project Name: Caltex Kurnell
PO No.

Specifications: Yes (tick)

1. Urgent TAT required? (please circle: 24hr 48hr _______days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: ______________________________)
6. Shell Quality Partnership:
7. Report Format. Fax Hardcopy Email :

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)	Other
13	B033_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
14	B033_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
15	B032_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
16	B032_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
17	B031_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
18	B031_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
19	B016.5_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
20	B016.5_0.4-0.5	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
21	B016_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
22	B015.5_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
23	B014_0.0-0.2	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
24	B014_0.5-0.6	15/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Lab Report No.
Esky ID

Relinquished by: Kate Pigram	Signed: Kate Pigram	Date: 17/03/2016	Relinquished by:	Signed:	Date:
Recieved by: Frank	Signed:	Date: 17-3-16 1500	Recieved by:	Signed:	Date:

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AECOM

Chain of Custody

AECOM - Sydney
Level 21, 420 George Street,
Sydney, NSW 2000
Tel: (02) 8934 0000
Fax: (02) 8934 0001
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Final Report by:
Lab Quote No:

Sampled By: Kate Pigram
AECOM Project No: 60488804/1.2
Project Name: Caltex Kurnell
PO No.

Specifications: Yes (tick)

1. Urgent TAT required? (please circle: 24hr 48hr _______days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: ________________________________)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email :

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	other	Preservation: filt'ed	acid	ice	other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)	Other
25	A003.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
26	A005.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
27	A006.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
28	A007.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
29	A008.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
30	A009.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
31	A013.5_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
32	A013.5_0.4-0.5	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
33	A014.5_0.4-0.5	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
34	C011_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
35	C012_0.0-0.2	16/03/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
36	QC150	14/03/2016	X					X		1 x 125 mL jar		X	X	

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Lab Report No. Esky ID

Relinquished by: Kate Pigram	Signed: Kate Pigram	Date: 17/03/2016	Relinquished by:	Signed:	Date:
Recieved by: Frank	Signed:	Date: 17-3-16 1500	Recieved by:	Signed:	Date:

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AECOM

Chain of Custody

AECOM - Sydney
Level 21, 420 George Street
Sydney, NSW 2000
Tel: (02) 8934 0000
Fax: (02) 8934 0001
E-mail: Stephen.Randall@aecom.com

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Preliminary Report by:
Final Report by:
Lab Quote No:

Sampled By: Kate Pigram
AECOM Project No: 60488804/1.2
Project Name: Caltex Kurnell
PO No.

Specifications: Yes (tick)

1. Urgent TAT required? (please circle: 24hr 48hr ______ days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details ______)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)	TRH C6-C10 & BTEXN	Other
37	QC153	14/03/2016	X					X		1 x 125 mL jar				X	
✗	QC151	15/03/2016	X					X		1 x 125 mL jar		X	X		PLEASE FORWARD SAMPLE AND COC TO EUROFINS
38	QC152	15/03/2016	X					X		1 x 125 mL jar		X	X		
39	QC154	15/03/2016	X					X		1 x 125 mL jar		X	X		
40	QC156	15/03/2016		X				X		2 x vials; 1 x 100 mL plastic; 1 x amber		X	X		
✗	QC155	16/03/2016	X					X		1 x 125 mL jar		X	X		PLEASE FORWARD SAMPLE AND COC TO EUROFINS
41	QC157	16/03/2016	X					X		1 x 125 mL jar		X	X		
✗	QC158	16/03/2016	X					X		1 x 125 mL jar		X	X		PLEASE FORWARD SAMPLE AND COC TO EUROFINS
42	QC161	16/03/2016		X				X		2 x vials; 1 x 100 mL plastic; 1 x amber		X	X		
43	QC162	16/03/2016		X				X		2 x vials				X	

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Lab Report No. Esky ID

Relinquished by: Kate Pigram Signed: Kate Pigram Date: 17/03/2016
Recieved by: [signature] Signed: [signature] Date: 17-3-16 1500

Relinquished by: Signed: Date:
Recieved by: Ellen Ng Eurofins Signed: [signature] Date: 18/03/16 1400

BMS-PM-DV-F046

AECOM

Chain of Custody

ES60883

AECOM - Sydney
Level 21, 420 George Street,
Sydney, NSW 2000

Tel: (02) 8934 0000
Fax: (02) 8934 0001
E-mail: Stephen.Randall@aecom.com

Laboratory Details
Lab. Name: ALS
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No:

Sampled By: Kate Pigram | AECOM Project No: 60488804/1.2 | Project Name: Caltex Kurnell | PO No.

Specifications: | Yes (tick)

1. Urgent TAT required? (please circle: 24hr 48hr _______days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: _______________________________)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email :

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)	TRH C6-C10 & BTEXN	Other
37	QC153	14/03/2016	X					X		1 x 125 mL jar				X	
*	QC151	15/03/2016	X					X		1 x 125 mL jar		X	X		PLEASE FORWARD SAMPLE AND COC TO EUROFINS
38	QC152	15/03/2016	X					X		1 x 125 mL jar		X	X		
39	QC154	15/03/2016	X					X		1 x 125 mL jar		X	X		
40	QC156	15/03/2016		X				X		2 x vials; 1 x 100 mL plastic; 1 x amber		X	X		
*	QC155	16/03/2016	X					X		1 x 125 mL jar		X	X		PLEASE FORWARD SAMPLE AND COC TO EUROFINS
41	QC157	16/03/2016	X					X		1 x 125 mL jar		X	X		
*	QC158	16/03/2016	X					X		1 x 125 mL jar		X	X		PLEASE FORWARD SAMPLE AND COC TO EUROFINS
42	QC161	16/03/2016		X				X		2 x vials; 1 x 100 mL plastic; 1 x amber		X	X		
43	QC162	16/03/2016		X				X		2 x vials				X	

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments: | Lab Report No | Esky ID

Relinquished by: Kate Pigram	Signed: Kate Pigram	Date: 17/03/2016	Relinquished by:	Signed:	Date:
Recieved by: Frank	Signed: [signature]	Date: 17-3-16 1500	Recieved by:	Signed:	Date:

BMS-PM-DV-F046

Sample Receipt Advice

Company name:	**AECOM Aust Pty Ltd Sydney**
Contact name:	Stephen Randall
Project name:	CALTEX KURNELL
Project ID:	60488804/1.2
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Mar 18, 2016 2:00 PM
Eurofins | mgt reference:	**493555**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : .1 degrees Celsius.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Stephen Randall - Stephen.Randall@aecom.com.

Company Name: AECOM Aust Pty Ltd Sydney
Address: Level 21, 420 George St
Sydney
NSW 2000

Project Name: CALTEX KURNELL
Project ID: 60488804/1.2

Order No.:
Report #: 493555
Phone: 02 8934 0000
Fax: 02 8934 0001

Received: Mar 18, 2016 2:00 PM
Due: Mar 29, 2016
Priority: 5 Day
Contact Name: Stephen Randall

Eurofins | mgt Client Manager: Nibha Vaidya

Sample Detail					BTEX	Benzo[a]pyrene	NEPM 2013 Metals : Metals M13	Moisture Set	Total Recoverable Hydrocarbons
Laboratory where analysis is conducted									
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
External Laboratory									
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
QC151	Mar 15, 2016		Soil	S16-Ma18366	X	X	X	X	X
QC155	Mar 16, 2016		Soil	S16-Ma18367	X	X	X	X	X
QC158	Mar 16, 2016		Soil	S16-Ma18368	X	X	X	X	X

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

AECOM Aust Pty Ltd Sydney
Level 21, 420 George St
Sydney
NSW 2000

Attention: **Stephen Randall**

Report	**493555-S**
Project name	CALTEX KURNELL
Project ID	60488804/1.2
Received Date	Mar 18, 2016

Client Sample ID			**QC151**	**QC155**	**QC158**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S16-Ma18366**	**S16-Ma18367**	**S16-Ma18368**
Date Sampled			**Mar 15, 2016**	**Mar 16, 2016**	**Mar 16, 2016**
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	65
TRH C15-C28	50	mg/kg	< 50	2900	1200
TRH C29-C36	50	mg/kg	58	390	< 50
TRH C10-36 (Total)	50	mg/kg	58	3300	1300
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	89	73	75
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	240
Benzo[a]pyrene					
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
p-Terphenyl-d14 (surr.)	1	%	106	100	110
2-Fluorobiphenyl (surr.)	1	%	87	71	86
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH >C10-C16	50	mg/kg	< 50	< 50	240
TRH >C16-C34	100	mg/kg	< 100	3300	1000
TRH >C34-C40	100	mg/kg	170	200	< 100
Chromium (hexavalent)	1	mg/kg	< 1	< 1	< 1
% Moisture	1	%	23	< 1	21
Heavy Metals					
Arsenic	2	mg/kg	< 2	6.0	8.8
Beryllium	2	mg/kg	< 2	< 2	< 2
Boron	10	mg/kg	< 10	< 10	< 10
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Cobalt	5	mg/kg	< 5	< 5	< 5

Client Sample ID			QC151	QC155	QC158
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S16-Ma18366**	**S16-Ma18367**	**S16-Ma18368**
Date Sampled			**Mar 15, 2016**	**Mar 16, 2016**	**Mar 16, 2016**
Test/Reference	LOR	Unit			
Heavy Metals					
Copper	5	mg/kg	< 5	84	8.3
Lead	5	mg/kg	< 5	140	15
Manganese	5	mg/kg	< 5	28	12
Mercury	0.05	mg/kg	< 0.05	0.13	0.30
Nickel	5	mg/kg	< 5	5.6	< 5
Selenium	2	mg/kg	< 2	< 2	< 2
Zinc	5	mg/kg	< 5	700	130

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Mar 24, 2016	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 24, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 24, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
BTEX	Sydney	Mar 24, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Benzo[a]pyrene	Sydney	Mar 24, 2016	14 Day
- Method: E007 Benzo[a]pyrene			
Chromium (hexavalent)	Sydney	Mar 24, 2016	28 Day
- Method: E043 /E057 Total Speciated Chromium			
Heavy Metals	Sydney	Mar 24, 2016	180 Day
- Method: LTM-MET-3030 by ICP-OES (hydride ICP-OES for Mercury)			
% Moisture	Sydney	Mar 18, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

Company Name:	AECOM Aust Pty Ltd Sydney	**Order No.:**		**Received:** Mar 18, 2016 2:00 PM
Address:	Level 21, 420 George St Sydney NSW 2000	**Report #:**	493555	**Due:** Mar 29, 2016
		Phone:	02 8934 0000	**Priority:** 5 Day
		Fax:	02 8934 0001	**Contact Name:** Stephen Randall
Project Name:	CALTEX KURNELL			
Project ID:	60488804/1.2			

Eurofins | mgt Client Manager: Nibha Vaidya

Sample Detail					BTEX	Benzo[a]pyrene	NEPM 2013 Metals : Metals M13	Moisture Set	Total Recoverable Hydrocarbons
Laboratory where analysis is conducted									
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
External Laboratory									
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
QC151	Mar 15, 2016		Soil	S16-Ma18366	X	X	X	X	X
QC155	Mar 16, 2016		Soil	S16-Ma18367	X	X	X	X	X
QC158	Mar 16, 2016		Soil	S16-Ma18368	X	X	X	X	X

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (Eurofins | mgt uses NATA accredited in-house method LTM-GEN-7010)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Benzo[a]pyrene							
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Chromium (hexavalent)	mg/kg	< 1			1	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Beryllium	mg/kg	< 2			2	Pass	
Boron	mg/kg	< 10			10	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Cobalt	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.05			0.05	Pass	
Nickel	mg/kg	< 5			5	Pass	
Selenium	mg/kg	< 2			2	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	81			70-130	Pass	
TRH C10-C14	%	94			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	110			70-130	Pass	
Toluene	%	93			70-130	Pass	
Ethylbenzene	%	102			70-130	Pass	
m&p-Xylenes	%	111			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
o-Xylene	%	109			70-130	Pass	
Xylenes - Total	%	110			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	124			70-130	Pass	
TRH C6-C10	%	90			70-130	Pass	
LCS - % Recovery							
Benzo[a]pyrene							
Benzo(a)pyrene	%	104			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	95			70-130	Pass	
LCS - % Recovery							
Chromium (hexavalent)	%	88			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	89			70-130	Pass	
Beryllium	%	92			70-130	Pass	
Boron	%	92			70-130	Pass	
Cadmium	%	91			70-130	Pass	
Cobalt	%	90			70-130	Pass	
Copper	%	92			70-130	Pass	
Lead	%	93			70-130	Pass	
Manganese	%	94			70-130	Pass	
Mercury	%	98			70-130	Pass	
Nickel	%	93			70-130	Pass	
Selenium	%	94			70-130	Pass	
Zinc	%	90			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S16-Ma22656	NCP	%	82			70-130	Pass	
TRH C10-C14	S16-Ma17913	NCP	%	75			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S16-Ma22656	NCP	%	102			70-130	Pass	
Toluene	S16-Ma22656	NCP	%	92			70-130	Pass	
Ethylbenzene	S16-Ma22656	NCP	%	109			70-130	Pass	
m&p-Xylenes	S16-Ma22656	NCP	%	126			70-130	Pass	
o-Xylene	S16-Ma22656	NCP	%	120			70-130	Pass	
Xylenes - Total	S16-Ma22656	NCP	%	124			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S16-Ma22656	NCP	%	107			70-130	Pass	
TRH C6-C10	S16-Ma22656	NCP	%	92			70-130	Pass	
Spike - % Recovery									
Benzo[a]pyrene				Result 1					
Benzo(a)pyrene	S16-Ma17655	NCP	%	92			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S16-Ma17913	NCP	%	75			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S16-Ma21052	NCP	%	84			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Beryllium	S16-Ma21052	NCP	%	88			70-130	Pass	
Boron	S16-Ma21052	NCP	%	77			70-130	Pass	
Cadmium	S16-Ma21052	NCP	%	92			70-130	Pass	
Cobalt	S16-Ma18474	NCP	%	82			70-130	Pass	
Copper	S16-Ma18474	NCP	%	83			70-130	Pass	
Lead	S16-Ma18474	NCP	%	85			70-130	Pass	
Manganese	S16-Ma18474	NCP	%	83			70-130	Pass	
Mercury	S16-Ma18474	NCP	%	89			70-130	Pass	
Nickel	S16-Ma18474	NCP	%	83			70-130	Pass	
Selenium	S16-Ma18474	NCP	%	95			70-130	Pass	
Zinc	S16-Ma18474	NCP	%	83			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chromium (hexavalent)	S16-Ma18367	CP	%	122			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S16-Ma22655	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S16-Ma21449	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S16-Ma21449	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S16-Ma21449	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S16-Ma22655	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S16-Ma22655	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S16-Ma22655	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S16-Ma22655	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S16-Ma22655	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S16-Ma22655	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S16-Ma22655	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S16-Ma22655	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Benzo[a]pyrene				Result 1	Result 2	RPD			
Benzo(a)pyrene	S16-Ma21449	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S16-Ma21449	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S16-Ma21449	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S16-Ma21449	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chromium (hexavalent)	S16-Ma18366	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S16-Ma18368	CP	%	21	17	17	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S16-Ma18368	CP	mg/kg	8.8	6.7	26	30%	Pass	
Beryllium	S16-Ma18368	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Boron	S16-Ma18368	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Cadmium	S16-Ma18368	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Cobalt	S16-Ma18368	CP	mg/kg	< 5	< 5	<1	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S16-Ma18368	CP	mg/kg	8.3	9.4	12	30%	Pass	
Lead	S16-Ma18368	CP	mg/kg	15	20	28	30%	Pass	
Manganese	S16-Ma18368	CP	mg/kg	12	9.9	21	30%	Pass	
Mercury	S16-Ma18368	CP	mg/kg	0.30	0.30	<1	30%	Pass	
Nickel	S16-Ma18368	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Selenium	S16-Ma18368	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Zinc	S16-Ma18368	CP	mg/kg	130	130	5.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

Authorised By

Nibha Vaidya	Analytical Services Manager
Bob Symons	Senior Analyst-Inorganic (NSW)
Ivan Taylor	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

AECOM

Chain of Custody

(2)

AECOM - Sydney Level 21, 420 George Street, Sydney, NSW 2000	Tel: (02) 8934 0000 Fax: (02) 8934 0001 E-mail: Stephen.Randall@aecom.com	**Laboratory Details** Lab. Name: ALS Lab. Address: Contact Name: Lab. Ref:	Tel: Fax: Preliminary Report by: Final Report by: Lab Quote No:
Sampled By: Pedro Balbachevesky	AECOM Project No: 60488804/2.4	Project Name: Caltex Kurnell	PO No.

Specifications:	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr _______days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: ______________________)	
6. Shell Quality Partnership:	
7. Report Format: Fax Hardcopy Email :	

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	other	Preservation: filt'ed	acid	ice	other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)
1	A020_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
2	B043_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
3	B044_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
4	B045_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
5	B046_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
6	B047_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
7	B048_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
8	B049_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
9	B050_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
10	B051_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
11	B052_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
12	C013_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X

Environmental Division
Sydney
Work Order Reference
ES1625474
Telephone : + 61-2-8784 8555

Subcon / Forward Lab / Split WO
Lab / Analysis: Asbestos
Organised By / Date:
Relinquished By / Date:
Connote / Courier: Newcastle
WO No: [illegible]
Attach By PO / Internal Sheet:

* Metals Required (Delete elements not required):	As Cd Cr Cu Ni Pb Zn Hg	Comments:		Lab Report No.	Esky ID
Relinquished by:	Pedro Balbachevesky	Signed: Pedro Balbachevesky	Date: 9/11/2016	Relinquished by: Signed:	Date:
Recieved by:	Frank	Signed:	Date: 9-11-16 1815	Recieved by: Signed:	Date:

BMS-PM-DV-F046

2/2

AECOM

Chain of Custody

AECOM - Sydney
Level 21, 420 George Street,
Sydney, NSW 2000

Tel: (02) 8934 0000
Fax: (02) 8934 0001
E-mail: Stephen.Randall@aecom.com

Laboratory Details

Lab. Name: ALS
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No:

Sampled By: Pedro Balbachevesky | AECOM Project No: 60488804/2.4 | Project Name: Caltex Kurnell | PO No.

Specifications:

Specification	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr _______days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: ________________________)	
6. Shell Quality Partnership:	
7. Report Format: Fax Hardcopy Email :	

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'd	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)		Other
13	QAQC-100_161109	9/11/16	X					X		1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~		
	QAQC-200_161109	9/11/16	X					X		1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~		*Please forward to Eurofins
14	QAQC-300_161109	9/11/16		X				X		1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~	4 Bottles	
	~~QAQC-400_161109~~	~~9/11/16~~								1 x 125 mL jar; 1 x 500 mL bag	~~X~~	~~X~~	~~X~~		
										1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~		
										1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~		
										1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~		
										1 x 125 mL jar; 1 x 500 mL bag	X	X	X		
										1 x 125 mL jar; 1 x 500 mL bag	X	X	X		
										1 x 125 mL jar; 1 x 500 mL bag	X	X	X		
										1 x 125 mL jar; 1 x 500 mL bag	X	X	X		
										1 x 125 mL jar; 1 x 500 mL bag	X	X	X		

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Lab Report No.
Esky ID

Relinquished by: Pedro Balbachevesky	Signed: Pedro Balbachevesky	Date: 9/11/2016	Relinquished by:	Signed:	Date:
Recieved by: Earle	Signed:	Date: 9-11-16 1815	Recieved by:	Signed:	Date:

Printed copies of this document are uncontrolled

BMS-PM-DV-F046

Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1624474**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: Stephen.Randall@aecom.com	E-mail	: loren.schiavon@alsglobal.com
Telephone	: 02 8934 0000	Telephone	: +61 2 8784 8503
Facsimile	: 02 8934 0001	Facsimile	: +61-2-8784 8500
Project	: 60488804/2.4 CALTEX KURNELL	Page	: 1 of 3
Order number	: 60488804/2.4	Quote number	: EB2015AECOMAU0580 (EN/004/16)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: PEDRO BALBACHEVSKY		

Dates

Date Samples Received	: 09-Nov-2016 4:15 PM	Issue Date	: 09-Nov-2016
Client Requested Due Date	: 16-Nov-2016	Scheduled Reporting Date	: **16-Nov-2016**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 2.9°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 15 / 15

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Sample QAQC200 forwarded to Eurofins.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Asbestos analysis will be conducted by ALS Newcastle.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EP075 SIM PAH only SIM - PAH only	SOIL - S-03 15 Metals (NEPM 2013 Suite - incl. Digestion)	SOIL - S-04 TRH/BTEXN
ES1625474-001	[09-Nov-2016]	A020_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-002	[09-Nov-2016]	B043_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-003	[09-Nov-2016]	B044_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-004	[09-Nov-2016]	B045_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-005	[09-Nov-2016]	B046_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-006	[09-Nov-2016]	B047_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-007	[09-Nov-2016]	B048_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-008	[09-Nov-2016]	B049_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-009	[09-Nov-2016]	B50_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-010	[09-Nov-2016]	B051_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-011	[09-Nov-2016]	B052_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-012	[09-Nov-2016]	C013_0.0-0.2_161109	✓	✓	✓	✓	✓
ES1625474-013	[09-Nov-2016]	QAQC_100_161109	✓		✓		✓

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - S-18 (NO MOIST) TRH(C6-C9)/BTEXN with No Moisture for TBs
ES1625474-015	[09-Nov-2016]	TB	✓

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EP075 SIM PAH only SIM - PAH only	WATER - W-04 TRH/BTEXN
ES1625474-014	09-Nov-2016	QAQC300161109	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)	Email	AP-CustomerService.ANZ@aecom.com

STEPHEN RANDALL

- *AU Certificate of Analysis - NATA (COA)	Email	Stephen.Randall@aecom.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Stephen.Randall@aecom.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Stephen.Randall@aecom.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	Stephen.Randall@aecom.com
- A4 - AU Tax Invoice (INV)	Email	Stephen.Randall@aecom.com
- Chain of Custody (CoC) (COC)	Email	Stephen.Randall@aecom.com
- EDI Format - ENMRG (ENMRG)	Email	Stephen.Randall@aecom.com
- EDI Format - EQUIS V5 URS (EQUIS_V5_URS)	Email	Stephen.Randall@aecom.com
- EDI Format - ESDAT (ESDAT)	Email	Stephen.Randall@aecom.com
- EDI Format - XTab (XTAB)	Email	Stephen.Randall@aecom.com
- Electronic SRN for EQuIS (ESRN_EQUIS)	Email	Stephen.Randall@aecom.com

ALS Environmental

CERTI□ICATE O□ ANALYSIS

Work Order	: **ES16□□474**		Page	: 1 of 11	
Client	: **AECOM Australia Pty Ltd**		Laboratory	: Environmental Division Sydney	
Contact	: MR STEPHEN RANDALL		Contact	: Loren Schiavon	
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000		Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164	
Telephone	: 02 8934 0000		Telephone	: +61 2 8784 8503	
Project	: 60488804/2.4 CALTE□ KURNELL		Date Samples Received	: 09-Nov-2016 16:15	
Order number	: 60488804/2.4		Date Analysis Commenced	: 10-Nov-2016	
C-O-C number	: ----		Issue Date	: 16-Nov-2016 15:23	
Sampler	: PEDRO BALBACHEVSKY				
Site	: ----				
Quote number	: ----				
No. of samples received	: 15				
No. of samples analysed	: 15				

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional in□or□ation pertinent to this report □ill be □ound in the □ollo□in□ separate attach□ents: Quality Control Report□ QA□QC Co□pliance Assess□ent to assist □ith Quality Re□ie□ and Sa□ple Receipt Noti□ication.

Si□natories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Si□natories	*Position*	*Accreditation Cate□ory*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
 = This result is computed from individual analyte detections at or above the level of reporting
 = ALS is not NATA accredited for these tests.
 = Indicates an estimated value.

- EP071: Results of sample QAQC 100 161109 have been confirmed by re-extraction and re-analysis.
- EA200 Am Amosite (brown asbestos)
- EA200 Cr Crocidolite (blue asbestos)
- EA200 Trace - Asbestos fibres (Free Fibres) detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable respirable asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 Ch Chrysotile (white asbestos)
- EA200: UMF Unknown Mineral Fibres. - indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for TEQ ero are treated as zero, for TEQ 1/2LOR are treated as half the reported LOR, and for TEQ LOR are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for TEQ ero are treated as zero.
- EA200: Yes - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: No - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: No - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

□nalytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

			Client sample ID	A0□0□0.0□0.□□16110□	B04□□0.0□0.□□16110□	B044□0.0□0.□□16110□	B04□□0.0□0.□□16110□	B046□0.0□0.□□16110□
			Client samplin□ date / time	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□
Compound	CAS □um□er	□□□	□nit	ES16□□474□001	ES16□□474□00□	ES16□□474□00□	ES16□□474□004	ES16□□474□00□
				Result	Result	Result	Result	Result
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	17.6	1□.□	1□.□	□7.7	□6.□
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	Yes □Trace	No	No	No□	No
Asbestos Type	1332-21-4	-	--	Ch □A□	□	□	A□	□
Sa□ple □ei□ht (dry)	----	0.01	g	□□.0	□7.0	□□.0	1□.□	14.□
APPROVED IDENTI□IER:	----	-	--	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	<5	6	□1	17	□
Bariu□	7440-39-3	10	mg/kg	<10	□0	□0	170	1□0
Berylliu□	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cad□iu□	7440-43-9	1	mg/kg	<1	<1	<1	□	□
Chro□iu□	7440-47-3	2	mg/kg	14	6	□1	□6	6□
Cobalt	7440-48-4	2	mg/kg	<2	<2	7	14	14
Copper	7440-50-8	5	mg/kg	1□	1□	141	□□4	161
Lead	7439-92-1	5	mg/kg	□4	17	17□	□□7	167
Man□anese	7439-96-5	5	mg/kg	17	1□	□□	□6□	46□
Nickel	7440-02-0	2	mg/kg	4	4	1□	□1	□0
Seleniu□	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadiu□	7440-62-2	5	mg/kg	<5	<5	10	□□	□1
□inc	7440-66-6	5	mg/kg	1□6	□□1	17□0	6460	□760
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	0.□	<0.1	0.7	□.□	6.□
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 □C14 □raction	----	50	mg/kg	<50	<50	<50	<50	<50
C1□ □C□□ □raction	----	100	mg/kg	160	460	□□0	□60	□010
C□□ □C□6 □raction	----	100	mg/kg	110	□□0	<100	□60	1□70
□C10 □C□6 □raction (su□)	----	50	mg/kg	□70	□40	□□0	□□0	□□□0
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	<10	<10	<10

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	A0□0□0.0□0.□□16110□	B04□□0.0□0.□□16110□	B044□0.0□0.□□16110□	B04□□0.0□0.□□16110□	B046□0.0□0.□□16110□
			Client samplin□ date / time	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□
Compound	CAS □um□er	□□□	□nit	ES16□□474□001	ES16□□474□00□	ES16□□474□00□	ES16□□474□004	ES16□□474□00□
				Result	Result	Result	Result	Result
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□ **C6 □C10 □raction □inus BTE□ (□1)**	C6□C10-BTE□	10	mg/kg	<10	<10	<10	<10	<10
□C10 □C16 □raction	----	50	mg/kg	<50	<50	<50	<50	<50
□C16 □C□4 □raction	----	100	mg/kg	**□40**	**740**	**□00**	**760**	**□600**
□C□4 □C40 □raction	----	100	mg/kg	<100	**□□0**	<100	**□□0**	**700**
□ **□C10 □C40 □raction (su□)**	----	50	mg/kg	**□40**	**□70**	**□00**	**1140**	**4□00**
□ **□C10 □C16 □raction □inus Naphthalene (□□)**	----	50	mg/kg	<50	<50	<50	<50	<50
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	**0.6**	<0.5
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ **eta□□ para□□ylene**	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	**0.6**	<0.5
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ **Su□ o□BTE□**	----	0.2	mg/kg	<0.2	<0.2	<0.2	**1.□**	<0.2
□ **Total □ylenes**	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	**0.6**	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	**□6.□**	**□□.□**	**□6.1**	**10□**	**□□.□**
□Chlorophenol□D4	93951-73-6	0.5	%	**□□.0**	**□7.4**	**□7.7**	**10□**	**□□.□**
□.4.6□Tribro□ophenol	118-79-6	0.5	%	**□1.□**	**77.0**	**□4.7**	**□1.□**	**□6.0**
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	0.5	%	**□6.1**	**□□.□**	**□□.0**	**10□**	**□1.6**
Anthracene□d10	1719-06-8	0.5	%	**114**	**11□**	**110**	**114**	**11□**
4□Terphenyl□d14	1718-51-0	0.5	%	**□4.□**	**□□.□**	**□□.0**	**10□**	**□□.□**
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□Dichloroethane□D4	17060-07-0	0.2	%	**□□.1**	**□6.7**	**□0.0**	**77.4**	**□□.4**
Toluene□D□	2037-26-5	0.2	%	**□0.0**	**□□.4**	**□□.4**	**□1.□**	**□1.6**
4□Bro□o□luoroben□ene	460-00-4	0.2	%	**□□.□**	**□□.7**	**□□.7**	**□7.4**	**□□.7**

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B047□0.0□0.□□16110□	B04□□0.0□0.□□16110□	B04□□0.0□0.□□16110□	B□0□0.0□0.□□16110□	B0□1□0.0□0.□□16110□
			Client samplin□ date / time	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□
Compound	CAS □um□er	□□□	□nit	ES16□□474□006	ES16□□474□007	ES16□□474□00□	ES16□□474□00□	ES16□□474□010
				Result	Result	Result	Result	Result
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	1□.□	□□.4	16.□	6.6	□.4
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	Yes □Trace	No□	No	No□
Asbestos Type	1332-21-4	-	--	A□	Ch □A□	A□	□	A□
Sa□ple □ei□ht (dry)	----	0.01	g	1□.1	□□.□	61.□	4□.6	□□.□
APPROVED IDENTI□IER:	----	-	--	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER	S.SPOONER
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	1□	1□	<5	<5	<5
Bariu□	7440-39-3	10	mg/kg	110	1□0	60	□0	10
Berylliu□	7440-41-7	1	mg/kg	<1	<1	<1	<1	<1
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	<50
Cad□iu□	7440-43-9	1	mg/kg	1	□	<1	<1	<1
Chro□iu□	7440-47-3	2	mg/kg	□□	1□□	□□	□6	□
Cobalt	7440-48-4	2	mg/kg	16	□6	17	14	<2
Copper	7440-50-8	5	mg/kg	1□4	□□□	10□	□0□	□
Lead	7439-92-1	5	mg/kg	17□	□64	□4	□4□	10
Man□anese	7439-96-5	5	mg/kg	□67	□□7	40□	1□□	40
Nickel	7440-02-0	2	mg/kg	47	1□□	□□	□4	4
Seleniu□	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Vanadiu□	7440-62-2	5	mg/kg	□□	4□	□□	11	6
□inc	7440-66-6	5	mg/kg	□□□0	□4□0	10□0	□160	114
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	□□.6	11.□	□.□	0.□	<0.1
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	<10	<10	<10
C10 □C14 □raction	----	50	mg/kg	70	<50	<50	<50	<50
C1□ □C□□ □raction	----	100	mg/kg	6□□0	740	□70	<100	<100
C□□ □C□6 □raction	----	100	mg/kg	6□□0	□□0	400	<100	<100
□C10 □C□6 □raction (su□)	----	50	mg/kg	1□400	1670	770	<50	<50
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	<10	<10	<10

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B047□0.0□0.□□16110□	B04□□0.0□0.□□16110□	B04□□0.0□0.□□16110□	B□0□0.0□0.□□16110□	B0□1□0.0□0.□□16110□
			Client samplin□ date / time	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□
Compound	CAS □um□er	□□□	□nit	ES16□□474□006	ES16□□474□007	ES16□□474□00□	ES16□□474□00□	ES16□□474□010
				Result	Result	Result	Result	Result
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□ **C6 □C10 □raction □ inus BTE□ (□1)**	C6□C10-BTE□	10	mg/kg	<10	<10	<10	<10	<10
□C10 □C16 □raction	----	50	mg/kg	**□00**	<50	<50	<50	<50
□C16 □C□4 □raction	----	100	mg/kg	**11600**	**14□0**	**670**	<100	<100
□C□4 □C40 □raction	----	100	mg/kg	**□□□0**	**470**	**□□0**	<100	<100
□ **□C10 □C40 □raction (su□)**	----	50	mg/kg	**1□□00**	**1□□0**	**□□0**	<50	<50
□ **□C10 □C16 □raction □ inus Naphthalene (□□)**	----	50	mg/kg	**□00**	<50	<50	<50	<50
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ **eta□□ para□□ylene**	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
□ **Su□ o□BTE□**	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
□ **Total □ylenes**	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP07□(SIM)S: Phenolic Co□ pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	□□.□	**10□**	□6.□	□□.□	□□.1
□Chlorophenol□D4	93951-73-6	0.5	%	□7.4	**10□**	□□.□	□6.□	□□.□
□.4.6□Tribro□ ophenol	118-79-6	0.5	%	□0.4	□0.6	□1.□	**6□0**	**6□.□**
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	0.5	%	□□.□	□□.7	□□.□	**10□**	□□.6
Anthracene□d10	1719-06-8	0.5	%	**107**	**116**	**106**	**111**	**110**
4□Terphenyl□d14	1718-51-0	0.5	%	□7.4	□6.□	**10□**	□□.1	□1.□
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□Dichloroethane□D4	17060-07-0	0.2	%	□□.6	□□.4	□□.□	□6.□	□6.□
Toluene□D□	2037-26-5	0.2	%	□1.1	□□.□	□7.□	**10□**	□6.□
4□Bro□ o□luoroben□ene	460-00-4	0.2	%	□1.0	□6.□	□4.0	**100**	□7.4

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B0□□□0.0□0.□□16110□	C01□□0.0□0.□□16110□	QAQC□100□16110□	TB	□□□□
			Client samplin□ date / time	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	----
Compound	CAS □um□er	□□□	□nit	ES16□□474□011	ES16□□474□01□	ES16□□474□01□	ES16□□474□01□	□□□□□□□□
				Result	Result	Result	Result	----
EA0□□: Moisture Content								
Moisture Content (dried □ 10□□C)	----	1	%	**6.4**	**□.4**	**□1.1**	□□□□	□□□□
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	**Yes**	**No**	□□□□	□□□□	□□□□
Asbestos Type	1332-21-4	-	--	**Ch □A□**	□	□□□□	□□□□	□□□□
Sa□ple □ei□ht (dry)	----	0.01	g	**4□.□**	**□1.7**	□□□□	□□□□	□□□□
APPROVED IDENTI□IER:	----	-	--	**S.SPOONER**	**S.SPOONER**	□□□□	□□□□	□□□□
E□00□T: Total Metals by ICP□AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	□□□□	□□□□	□□□□
Bariu□	7440-39-3	10	mg/kg	**□0**	<10	□□□□	□□□□	□□□□
Berylliu□	7440-41-7	1	mg/kg	<1	<1	□□□□	□□□□	□□□□
Boron	7440-42-8	50	mg/kg	<50	<50	□□□□	□□□□	□□□□
Cad□iu□	7440-43-9	1	mg/kg	<1	<1	□□□□	□□□□	□□□□
Chro□iu□	7440-47-3	2	mg/kg	□	**□6**	□□□□	□□□□	□□□□
Cobalt	7440-48-4	2	mg/kg	**4**	**4**	□□□□	□□□□	□□□□
Copper	7440-50-8	5	mg/kg	**1□**	□□	□□□□	□□□□	□□□□
Lead	7439-92-1	5	mg/kg	**14**	**6□**	□□□□	□□□□	□□□□
Man□anese	7439-96-5	5	mg/kg	□□	**6□**	□□□□	□□□□	□□□□
Nickel	7440-02-0	2	mg/kg	**14**	**7**	□□□□	□□□□	□□□□
Seleniu□	7782-49-2	5	mg/kg	<5	<5	□□□□	□□□□	□□□□
Vanadiu□	7440-62-2	5	mg/kg	□	**7**	□□□□	□□□□	□□□□
□inc	7440-66-6	5	mg/kg	**1□□**	**□77**	□□□□	□□□□	□□□□
E□0□□T: Total Reco□erable Mercury by □IMS								
Mercury	7439-97-6	0.1	mg/kg	**0.□**	<0.1	□□□□	□□□□	□□□□
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	□□□□	□□□□
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	10	mg/kg	<10	<10	**1□□0**	<10	□□□□
C10 □C14 □raction	----	50	mg/kg	<50	<50	**1□□0**	□□□□	□□□□
C1□ □C□□ □raction	----	100	mg/kg	<100	<100	**10□00**	□□□□	□□□□
C□□ □C□6 □raction	----	100	mg/kg	<100	<100	**41□0**	□□□□	□□□□
□C10 □C□6 □raction (su□)	----	50	mg/kg	<50	<50	**16□00**	□□□□	□□□□
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	10	mg/kg	<10	<10	**16□0**	<10	□□□□

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B0□□□0.0□0.□□16110□	C01□□0.0□0.□□16110□	QAQC□100□16110□	TB	□□□□
			Client samplin□ date / time	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	----
Compound	CAS □um□er	□□□	□nit	ES16□□474□011	ES16□□474□01□	ES16□□474□01□	ES16□□474□01□	□□□□□□□□
				Result	Result	Result	Result	----
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions □Continued								
□C6 □C10 □raction □inus BTE□ (□1)	C6□C10-BTE□	10	mg/kg	<10	<10	**16□0**	<10	□□□□
□C10 □C16 □raction	----	50	mg/kg	<50	<50	**47□0**	□□□□	□□□□
□C16 □C□4 □raction	----	100	mg/kg	<100	<100	**11□00**	□□□□	□□□□
□C□4 □C40 □raction	----	100	mg/kg	<100	<100	**□1□0**	□□□□	□□□□
□ □C10 □C40 □raction (su□)	----	50	mg/kg	<50	<50	**1□100**	□□□□	□□□□
□ □C10 □C16 □raction □inus Naphthalene (□□)	----	50	mg/kg	<50	<50	**47□0**	□□□□	□□□□
EP0□0: BTE□N								
Ben□ene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	□□□□
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	□□□□
Ethylben□ene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	□□□□
□eta□□ para□□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	□□□□
ortho□□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	□□□□
□ Su□ o□BTE□	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	□□□□
□ Total □ylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	□□□□
Naphthalene	91-20-3	1	mg/kg	<1	<1	□	<1	□□□□
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	0.5	%	□□.□	□4.0	□□.□	□□□□	□□□□
□□Chlorophenol□D4	93951-73-6	0.5	%	10□	□□.4	□□.6	□□□□	□□□□
□.4.6□Tribro□ophenol	118-79-6	0.5	%	67.□	7□.7	106	□□□□	□□□□
EP07□(SIM)T: PA□ Surro□ates								
□□□luorobiphenyl	321-60-8	0.5	%	□□.0	□□.□	□1.□	□□□□	□□□□
Anthracene□d10	1719-06-8	0.5	%	104	11□	10□	□□□□	□□□□
4□Terphenyl□d14	1718-51-0	0.5	%	10□	□□.□	□1.6	□□□□	□□□□
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□□Dichloroethane□D4	17060-07-0	0.2	%	□□.6	□□.6	□1.□	10□	□□□□
Toluene□D□	2037-26-5	0.2	%	10□	□1.□	10□	100	□□□□
4□Bro□o□luoroben□ene	460-00-4	0.2	%	101	□1.7	□□.0	10□	□□□□

□nalytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	QAQC□□00□16110□	□□□□	□□□□	□□□□	□□□□
			Client samplin□ date / time	□09-Nov-2016□	----	----	----	----
Compound	CAS □um□er	□□□	□nit	ES16□□474□014	□□□□□□□□	□□□□□□□□	□□□□□□□□	□□□□□□□□
				Result	----	----	----	----
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons								
Ben□o(a)pyrene	50-32-8	0.5	□g/L	<0.5	□□□□	□□□□	□□□□	□□□□
EP0□0□071: Total Petroleu□ □ydrocarbons								
C6 □C□ □raction	----	20	□g/L	<20	□□□□	□□□□	□□□□	□□□□
C10 □C14 □raction	----	50	□g/L	<50	□□□□	□□□□	□□□□	□□□□
C1□ □C□□ □raction	----	100	□g/L	<100	□□□□	□□□□	□□□□	□□□□
C□□ □C□6 □raction	----	50	□g/L	<50	□□□□	□□□□	□□□□	□□□□
□ **C10 □C□6 □raction (su□)**	----	50	□g/L	<50	□□□□	□□□□	□□□□	□□□□
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
C6 □C10 □raction	C6□C10	20	□g/L	<20	□□□□	□□□□	□□□□	□□□□
□ **C6 □C10 □raction □inus BTE□ (□1)**	C6□C10-BTE□	20	□g/L	<20	□□□□	□□□□	□□□□	□□□□
□C10 □C16 □raction	----	100	□g/L	<100	□□□□	□□□□	□□□□	□□□□
□C16 □C□4 □raction	----	100	□g/L	<100	□□□□	□□□□	□□□□	□□□□
□C□4 □C40 □raction	----	100	□g/L	<100	□□□□	□□□□	□□□□	□□□□
□ **□C10 □C40 □raction (su□)**	----	100	□g/L	<100	□□□□	□□□□	□□□□	□□□□
□ **□C10 □C16 □raction □inus Naphthalene (□□)**	----	100	□g/L	<100	□□□□	□□□□	□□□□	□□□□
EP0□0: BTE□N								
Ben□ene	71-43-2	1	□g/L	<1	□□□□	□□□□	□□□□	□□□□
Toluene	108-88-3	2	□g/L	<2	□□□□	□□□□	□□□□	□□□□
Ethylben□ene	100-41-4	2	□g/L	<2	□□□□	□□□□	□□□□	□□□□
□eta□□ para□□ylene	108-38-3 106-42-3	2	□g/L	<2	□□□□	□□□□	□□□□	□□□□
ortho□□ylene	95-47-6	2	□g/L	<2	□□□□	□□□□	□□□□	□□□□
□ **Total □ylenes**	1330-20-7	2	□g/L	<2	□□□□	□□□□	□□□□	□□□□
□ **Su□ o□BTE□**	----	1	□g/L	<1	□□□□	□□□□	□□□□	□□□□
Naphthalene	91-20-3	5	□g/L	<5	□□□□	□□□□	□□□□	□□□□
EP07□(SIM)S: Phenolic Co□pound Surro□ates								
Phenol□d6	13127-88-3	1	%	□□.4	□□□□	□□□□	□□□□	□□□□
□Chlorophenol□D4	93951-73-6	1	%	□□.6	□□□□	□□□□	□□□□	□□□□
□.4.6□Tribro□ophenol	118-79-6	1	%	60.4	□□□□	□□□□	□□□□	□□□□
EP07□(SIM)T: PA□ Surro□ates								
□□luorobiphenyl	321-60-8	1	%	□6.□	□□□□	□□□□	□□□□	□□□□
Anthracene□d10	1719-06-8	1	%	6□.7	□□□□	□□□□	□□□□	□□□□
4□Terphenyl□d14	1718-51-0	1	%	70.□	□□□□	□□□□	□□□□	□□□□

□nalytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER)**

			Client sample ID	**QAQC□□00□16110□**	□□□□	□□□□	□□□□	□□□□
			Client samplin□ date / time	□09-Nov-2016□	----	----	----	----
Compound	CAS □um□er	□□□	□nit	**ES16□□474□014**	□□□□□□□□	□□□□□□□□	□□□□□□□□	□□□□□□□□
				Result	----	----	----	----
EP0□0S: TP□(V)□BTE□ Surro□ates								
1.□□Dichloroethane□D4	17060-07-0	2	%	**11□**	□□□□	□□□□	□□□□	□□□□
Toluene□D□	2037-26-5	2	%	**106**	□□□□	□□□□	□□□□	□□□□
4□Bro□o□luoroben□ene	460-00-4	2	%	□□.□	□□□□	□□□□	□□□□	□□□□

□nalytical Results

Descripti□e Results

Sub-Matrix: **SOIL**

Method□Compound	Client sample ID □Client samplin□ date / time	Analytical □esults
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils		
EA200: Description	A020□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil with two pieces of asbestos fibre board approx 4 x 3 x 1 mm as well as several loose bundles of asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	B043□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil.
EA200: Description	B044□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil.
EA200: Description	B045□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil with two loose bundles of asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	B046□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil containing synthetic mineral fibres.
EA200: Description	B047□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil with several loose bundles of asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	B048□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil with several loose bundles of asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	B049□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil with one loose bundle of asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	B50□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil.
EA200: Description	B051□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil with one loose bundle of asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	B052□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil with one piece of asbestos fibre board approx 4 x 3 x 2 mm plus several loose bundles of asbestos fibres approx 2 x 1 x 0.5 mm.
EA200: Description	C013□0.0-0.2□161109 - □09-Nov-2016□	Mid brown sandy soil.

Surro□ate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS □um□er	Reco□ery Limits (□) Lo□	Reco□ery Limits (□) □i□h
EP07□(SIM)S: Phenolic Co□ pound Surro□ates			
Phenol□d6	13127-88-3	63	123
□Chlorophenol□D4	93951-73-6	66	122
□.4.6□Tribro□ ophenol	118-79-6	40	138
EP07□(SIM)T: PA□ Surro□ates			
□□luorobiphenyl	321-60-8	70	122
Anthracene□d10	1719-06-8	66	128
4□Terphenyl□d14	1718-51-0	65	129
EP0□0S: TP□(V)□BTE□ Surro□ates			
1.□Dichloroethane□D4	17060-07-0	73	133
Toluene□D□	2037-26-5	74	132
4□Bro□ o□luoroben□ene	460-00-4	72	130

Sub-Matrix: **WATER**

Compound	CAS □um□er	Reco□ery Limits (□) Lo□	Reco□ery Limits (□) □i□h
EP07□(SIM)S: Phenolic Co□ pound Surro□ates			
Phenol□d6	13127-88-3	10	44
□Chlorophenol□D4	93951-73-6	14	94
□.4.6□Tribro□ ophenol	118-79-6	17	125
EP07□(SIM)T: PA□ Surro□ates			
□□luorobiphenyl	321-60-8	20	104
Anthracene□d10	1719-06-8	27	113
4□Terphenyl□d14	1718-51-0	32	112
EP0□0S: TP□(V)□BTE□ Surro□ates			
1.□Dichloroethane□D4	17060-07-0	71	137
Toluene□D□	2037-26-5	79	131
4□Bro□ o□luoroben□ene	460-00-4	70	128

ALS Environmental

CERTI□ICATE O□ ANALYSIS

Work Order	: **ES16□67□1**	Page	: 1 of 6
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 8934 0000	Telephone	: +61 2 8784 8503
Project	: 60488804/2.4 CALTE□ KURNELL	Date Samples Received	: 23-Nov-2016 08:50
Order number	: 60488804/2.4	Date Analysis Commenced	: 25-Nov-2016
C-O-C number	: ----	Issue Date	: 28-Nov-2016 16:19
Sampler	: PEDRO BALBACHEVSKY		
Site	: ----		
Quote number	: ----		
No. of samples received	: 7		
No. of samples analysed	: 7		

NATA

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional in□or□ation pertinent to this report □ill be □ound in the □ollo□in□ separate attach□ents: Quality Control Report□ QA□QC Co□pliance Assess□ent to assist □ith Quality Re□ie□ and Sa□ple Receipt Noti□ication.

Si□natories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Si□natories	*Position*	*Accreditation Cate□ory*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
= This result is computed from individual analyte detections at or above the level of reporting
= ALS is not NATA accredited for these tests.
= Indicates an estimated value.

□nalytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	B044□0.0□0.□	B04□□0.0□0.□	B046□0.0□0.□	B047□0.0□0.□	B04□□0.0□0.□
			Client samplin□ date / time	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□
Compound	CAS □um□er	□□□	□nit	ES16□67□1□001	ES16□67□1□00□	ES16□67□1□00□	ES16□67□1□004	ES16□67□1□00□
				Result	Result	Result	Result	Result
EN□□: TCLP Leach								
Initial p□	----	0.1	pH Unit	□.□	□.□	□.0	□.□	□.□
A□ter □Cl p□	----	0.1	pH Unit	1.7	1.7	1.□	1.7	1.□
Extraction □luid Nu□ber	----	1	-	1	1	1	1	1
□inal p□	----	0.1	pH Unit	□.0	□.□	6.0	□.□	□.0

□nalytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

				Client sample ID	B04□□0.0□0.□	B0□0□0.0□0.□	□□□□	□□□□	□□□□
				Client samplin□ date / time	□09-Nov-2016□	□09-Nov-2016□	----	----	----
Compound	*CAS □um□er*	□□ □	□nit		ES16□67□1□006	ES16□67□1□007	□□□□□□□□	□□□□□□□□	□□□□□□□□
					Result	Result	----	----	----
EN□□: TCLP Leach									
Initial p□	----	0.1	pH Unit		**□.□**	**7.□**	□□□□	□□□□	□□□□
A□ter □Cl p□	----	0.1	pH Unit		**1.6**	**1.7**	□□□□	□□□□	□□□□
Extraction □luid Nu□ber	----	1	-		**1**	**1**	□□□□	□□□□	□□□□
□inal p□	----	0.1	pH Unit		**□.□**	**4.□**	□□□□	□□□□	□□□□

□nalytical Results

Sub-Matrix: TCLP LEAC□ATE (Matrix: WATER)			Client sample ID	B044□0.0□0.□	B04□□0.0□0.□	B046□0.0□0.□	B047□0.0□0.□	B04□□0.0□0.□
			Client samplin□ date / time	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□	□09-Nov-2016□
Compound	CAS □um□er	□□□	□nit	ES16□67□1□001	ES16□67□1□00□	ES16□67□1□00□	ES16□67□1□004	ES16□67□1□00□
				Result	Result	Result	Result	Result
E□00□C: Leachable Metals by ICPAES								
Lead	7439-92-1	0.1	mg/L	**0.1**	**0.1**	<0.1	□□□□	<0.1
Nickel	7440-02-0	0.1	mg/L	□□□□	<0.1	<0.1	□□□□	**0.□**
E□0□□C: Leachable Mercury by □IMS								
Mercury	7439-97-6	0.001	mg/L	□□□□	<0.0010	<0.0010	<0.0010	<0.0010

□nalytical Results

Sub-Matrix: **TCLP LEAC□ATE**
(Matrix: **WATER)**

Client sample ID				B04□□0.0□0.□	B0□0□0.0□0.□	□□□□	□□□□	□□□□
Client samplin□ date / time				□09-Nov-2016□	□09-Nov-2016□	----	----	----
Compound	CAS □um□er	□□ □	□nit	ES16□67□1□006	ES16□67□1□007	□□□□□□□□	□□□□□□□□	□□□□□□□□
				Result	Result	----	----	----
E□00□C: Leachable Metals by ICPAES								
Lead	7439-92-1	0.1	mg/L	□□□□	<0.1	□□□□	□□□□	□□□□
Nickel	7440-02-0	0.1	mg/L	<0.1	□□□□	□□□□	□□□□	□□□□
E□0□□C: Leachable Mercury by □IMS								
Mercury	7439-97-6	0.001	mg/L	□□□□	□□□□	□□□□	□□□□	□□□□

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES16□□474**	Page	: 1 of 8
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Contact	: Loren Schiavon
Address	: LEVEL 21, 420 GEORGE STREET SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 8934 0000	Telephone	: +61 2 8784 8503
Project	: 60488804/2.4 CALTE□ KURNELL	Date Samples Received	: 09-Nov-2016
Order number	: 60488804/2.4	Date Analysis Commenced	: 10-Nov-2016
C-O-C number	: ----	Issue Date	: 16-Nov-2016
Sampler	: PEDRO BALBACHEVSKY		
Site	: ----		
Quote number	: ----		
No. of samples received	: 15		
No. of samples analysed	: 15		

NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Si□natories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Si□natories	*Position*	*Accreditation Cate□ory*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

Work Order : ES1625474
Client : AECOM Australia Pty Ltd
Project : 60488804/2.4 CALTE□ KURNELL

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample □D	*Client sample □D*	*Method□Compound*	*C□S □umber*	*L□R*	*Unit*	*□ri□inal Result*	*Duplicate Result*	*RPD (□)*	*Reco□ery Limits (□)*
EA0□□: Moisture Content (QC Lot: 64□□47)									
ES1625365-041	Anonymous	EA055-103: Moisture Content (dried □ 103□C)	----	1	%	12.9	13.6	4.90	0% - 50%
ES1625445-001	Anonymous	EA055-103: Moisture Content (dried □ 103□C)	----	1	%	13.8	14.5	5.03	0% - 50%
EA0□□: Moisture Content (QC Lot: 64□□4□)									
ES1625474-005	B046□0.0-0.2□161109	EA055-103: Moisture Content (dried □ 103□C)	----	1	%	26.3	25.2	4.26	0% - 20%
ES1625539-001	Anonymous	EA055-103: Moisture Content (dried □ 103□C)	----	1	%	7.2	7.1	0.00	No Limit
E□00□T: Total Metals by ICP□AES (QC Lot: 6□061□)									
EM1613417-004	Anonymous	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	50	50	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	13	13	0.00	No Limit
		EG005T: Cobalt	7440-48-4	2	mg/kg	4	4	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	10	10	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	18	17	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	51	47	8.62	0% - 50%
		EG005T: Manganese	7439-96-5	5	mg/kg	102	108	5.94	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	17	20	13.1	No Limit
		EG005T: □inc	7440-66-6	5	mg/kg	91	93	2.08	0% - 50%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
ES1625474-009	B50□0.0-0.2□161109	EG005T: Beryllium	7440-41-7	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Barium	7440-39-3	10	mg/kg	30	30	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	56	50	10.2	0% - 20%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	L□R	Unit	□ri□inal Result	Duplicate Result	RPD (□)	Reco□ery Limits (□)
E□00□T: Total Metals by ICP□AES (QC Lot: 6□061□) □continued									
ES1625474-009	B50□0.0-0.2□161109	EG005T: Cobalt	7440-48-4	2	mg/kg	14	14	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	24	26	9.47	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	502	511	1.72	0% - 20%
		EG005T: Lead	7439-92-1	5	mg/kg	549	538	2.01	0% - 20%
		EG005T: Manganese	7439-96-5	5	mg/kg	122	120	1.65	0% - 20%
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Vanadium	7440-62-2	5	mg/kg	11	10	0.00	No Limit
		EG005T: □inc	7440-66-6	5	mg/kg	5160	4780	7.78	0% - 20%
		EG005T: Boron	7440-42-8	50	mg/kg	<50	<50	0.00	No Limit
E□0□□T: Total Reco□erable Mercury by □IMS (QC Lot: 6□0616)									
EM1613417-004	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1625474-009	B50□0.0-0.2□161109	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.3	0.00	No Limit
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons (QC Lot: 64□□□□)									
ES1625471-001	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1625474-007	B048□0.0-0.2□161109	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP0□0□071: Total Petroleu□ □ydrocarbons (QC Lot: 647□□6)									
ES1625366-048	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	12	16	24.8	No Limit
ES1625474-005	B046□0.0-0.2□161109	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP0□0□071: Total Petroleu□ □ydrocarbons (QC Lot: 64□□□□)									
ES1625471-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1625474-007	B048□0.0-0.2□161109	EP071: C15 - C28 Fraction	----	100	mg/kg	740	560	28.5	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	930	880	5.82	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QC Lot: 647□□6)									
ES1625366-048	Anonymous	EP080: C6 - C10 Fraction	C6□C10	10	mg/kg	17	22	23.8	No Limit
ES1625474-005	B046□0.0-0.2□161109	EP080: C6 - C10 Fraction	C6□C10	10	mg/kg	<10	<10	0.00	No Limit
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QC Lot: 64□□□□)									
ES1625471-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1625474-007	B048□0.0-0.2□161109	EP071: >C16 - C34 Fraction	----	100	mg/kg	1480	1180	22.3	0% - 50%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	470	660	33.6	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP0□0: BTE□N (QC Lot: 647□□6)									
ES1625366-048	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	L□R	Unit	□ri□inal Result	Duplicate Result	RPD (□)	Reco□ery Limits (□)
				Laboratory Duplicate (DUP) Report					
EP0□0: BTE□N (QC Lot: 647□□6) □continued									
ES1625366-048	Anonymous	EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1625474-005	B046□0.0-0.2□161109	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-□ylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	L□R	Unit	□ri□inal Result	Duplicate Result	RPD (□)	Reco□ery Limits (□)
				Laboratory Duplicate (DUP) Report					
EP0□0□071: Total Petroleu□ □ydrocarbons (QC Lot: 6□1446)									
EP1610709-001	Anonymous	EP080: C6 - C9 Fraction	----	20	□g/L	<20	<20	0.00	No Limit
ES1625516-001	Anonymous	EP080: C6 - C9 Fraction	----	20	□g/L	<20	<20	0.00	No Limit
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QC Lot: 6□1446)									
EP1610709-001	Anonymous	EP080: C6 - C10 Fraction	C6□C10	20	□g/L	<20	<20	0.00	No Limit
ES1625516-001	Anonymous	EP080: C6 - C10 Fraction	C6□C10	20	□g/L	<20	<20	0.00	No Limit
EP0□0: BTE□N (QC Lot: 6□1446)									
EP1610709-001	Anonymous	EP080: Benzene	71-43-2	1	□g/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	□g/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	□g/L	<2	<2	0.00	No Limit
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	2	□g/L	<2	<2	0.00	No Limit
		EP080: ortho-□ylene	95-47-6	2	□g/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	□g/L	<5	<5	0.00	No Limit
ES1625516-001	Anonymous	EP080: Benzene	71-43-2	1	□g/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	□g/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	□g/L	<2	<2	0.00	No Limit
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	2	□g/L	<2	<2	0.00	No Limit
		EP080: ortho-□ylene	95-47-6	2	□g/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	□g/L	<5	<5	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Reco□ery (□)	Reco□ery Limits (□)	
Method□Compound	C□S □umber	L□R	Unit	Result	Concentration	LCS	Lo□	□i□h
E□00□T: Total Metals by ICP□AES (QCLot: 6□061□)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	105	86	126
EG005T: Barium	7440-39-3	10	mg/kg	<10	143 mg/kg	106	85	115
EG005T: Beryllium	7440-41-7	1	mg/kg	<1	5.63 mg/kg	92.3	90	112628
EG005T: Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	95.3	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	112	76	128
EG005T: Cobalt	7440-48-4	2	mg/kg	<2	16 mg/kg	97.9	88	120
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	100	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	99.6	80	114
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	101	85	117
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	105	87	123
EG005T: Selenium	7782-49-2	5	mg/kg	<5	5.37 mg/kg	85.0	75	131
EG005T: Vanadium	7440-62-2	5	mg/kg	<5	29.6 mg/kg	101	92	122
EG005T: □inc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	106	80	122
E□0□□T: Total Reco□erable Mercury by □IMS (QCLot: 6□0616)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	86.3	70	105
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons (QCLot: 64□□□□)								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	93.7	70	126
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: 647□□6)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	84.9	68	128
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: 64□□□□)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	99.2	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	101	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	107	71	129
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: 647□□6)								
EP080: C6 - C10 Fraction	C6□C10	10	mg/kg	<10	31 mg/kg	84.5	68	128
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: 64□□□□)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	104	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	105	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	91.6	63	131
EP0□0: BTE□N (QCLot: 647□□6)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	83.5	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	86.1	67	121

Sub-Matrix: **SOIL**

Method□Compound	C□S □umber	L□R	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Reco□ery (□)	Reco□ery Limits (□)	
				Result	Concentration	LCS	Lo□	□i□h
EP0□0: BTE□N (QCLot: 647□□6) □continued								
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	86.7	65	117
EP080: meta- □ para-□ylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	87.5	66	118
EP080: ortho-□ylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	88.0	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	86.2	63	119

Sub-Matrix: **WATER**

Method□Compound	C□S □umber	L□R	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Reco□ery (□)	Reco□ery Limits (□)	
				Result	Concentration	LCS	Lo□	□i□h
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons (QCLot: 64□□1□)								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	□g/L	<0.5	5 □g/L	70.7	63	117
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: 64□□16)								
EP071: C10 - C14 Fraction	----	50	□g/L	<50	2000 □g/L	91.2	76	116
EP071: C15 - C28 Fraction	----	100	□g/L	<100	3000 □g/L	95.1	83	109
EP071: C29 - C36 Fraction	----	50	□g/L	<50	2000 □g/L	95.8	75	113
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: 6□1446)								
EP080: C6 - C9 Fraction	----	20	□g/L	<20	260 □g/L	89.6	75	127
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: 64□□16)								
EP071: >C10 - C16 Fraction	----	100	□g/L	<100	2500 □g/L	90.2	76	114
EP071: >C16 - C34 Fraction	----	100	□g/L	<100	3500 □g/L	97.5	81	111
EP071: >C34 - C40 Fraction	----	100	□g/L	<100	1500 □g/L	100	77	119
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: 6□1446)								
EP080: C6 - C10 Fraction	C6□C10	20	□g/L	<20	310 □g/L	91.7	75	127
EP0□0: BTE□N (QCLot: 6□1446)								
EP080: Benzene	71-43-2	1	□g/L	<1	10 □g/L	91.3	70	122
EP080: Toluene	108-88-3	2	□g/L	<2	10 □g/L	85.6	69	123
EP080: Ethylbenzene	100-41-4	2	□g/L	<2	10 □g/L	81.4	70	120
EP080: meta- □ para-□ylene	108-38-3 106-42-3	2	□g/L	<2	10 □g/L	78.7	69	121
EP080: ortho-□ylene	95-47-6	2	□g/L	<2	10 □g/L	83.9	72	122
EP080: Naphthalene	91-20-3	5	□g/L	<5	10 □g/L	90.6	70	120

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	Matrix Spike (MS) Report			
				Spike	SpikeReco□ery(□)	Reco□ery Limits (□)	
				Concentration	MS	Lo□	□i□h

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeReco□ery(□)	Reco□ery Limits (□)	
Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	Concentration	MS	Lo□	□i□h
E□00□T: Total Metals by ICP□AES (QCLot: 6□061□)							
EM1613417-004	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	98.8	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	101	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	102	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	104	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	102	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	106	70	130
		EG005T: □inc	7440-66-6	250 mg/kg	104	70	130
E□0□□T: Total Reco□erable Mercury by □IMS (QCLot: 6□0616)							
EM1613417-004	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	97.3	70	130
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: 647□□6)							
ES1625366-058	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	104	70	130
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: 64□□□□)							
ES1625471-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	104	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	124	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	122	52	132
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: 647□□6)							
ES1625366-058	Anonymous	EP080: C6 - C10 Fraction	C6□C10	37.5 mg/kg	105	70	130
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: 64□□□□)							
ES1625471-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	122	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	123	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	94.5	52	132
EP0□0: BTE□N (QCLot: 647□□6)							
ES1625366-058	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	86.4	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	89.4	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	98.9	70	130
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	2.5 mg/kg	98.8	70	130
		EP080: ortho-□ylene	95-47-6	2.5 mg/kg	97.4	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	97.1	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeReco□ery(□)	Reco□ery Limits (□)	
Laboratory sample □D	Client sample □D	Method□Compound	C□S □umber	Concentration	MS	Lo□	□i□h
EP0□0□071: Total Petroleu□ □ydrocarbons (QCLot: 6□1446)							
EP1610709-001	Anonymous	EP080: C6 - C9 Fraction	----	325 □g/L	97.5	70	130
EP0□0□071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions (QCLot: 6□1446)							
EP1610709-001	Anonymous	EP080: C6 - C10 Fraction	C6□C10	375 □g/L	97.9	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeReco□ery(□)	Reco□ery Limits (□)	
Laboratory sample □D	*Client sample □D*	*Method□Compound*	*C□S □umber*	*Concentration*	*MS*	*Lo□*	*□i□h*
EP0□0: BTE□N (QCLot: 6□1446)							
EP1610709-001	Anonymous	EP080: Benzene	71-43-2	25 □g/L	89.0	70	130
		EP080: Toluene	108-88-3	25 □g/L	88.3	70	130
		EP080: Ethylbenzene	100-41-4	25 □g/L	93.3	70	130
		EP080: meta- □ para-□ylene	108-38-3 106-42-3	25 □g/L	88.3	70	130
		EP080: ortho-□ylene	95-47-6	25 □g/L	96.8	70	130
		EP080: Naphthalene	91-20-3	25 □g/L	100.0	70	130

QA□QC Co□pliance Assess□ent to assist □ith Quality Re□ie□

Work Order	: **ES16□□474**	Page	: 1 of 9
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: MR STEPHEN RANDALL	Telephone	: +61 2 8784 8503
Project	: 60488804/2.4 CALTE□ KURNELL	Date Samples Received	: 09-Nov-2016
Site	: ----	Issue Date	: 16-Nov-2016
Sampler	: PEDRO BALBACHEVSKY	No. of samples received	: 15
Order number	: 60488804/2.4	No. of samples analysed	: 15

This report is auto□atically □enerated by the ALS LIMS throu□h interpretation o□the ALS Quality Control Report and se□eral Quality Assurance para□eters □easured by ALS. This auto□ated reportin□ hi□hli□hts any non□con□or□ances□□acilitates □aster and □ore accurate data □alidation and is desi□ned to assist internal expert and external Auditor re□ie□. Many co□ponents o□this report contribute to the o□erall DQO assess□ent and reportin□ □or □uideline co□pliance.

Brief method summaries and references are also provided to assist in traceability.

Summary o□□utliers

□utliers □□uality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank □alue outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **□or all re□ular sa□ple □atrices□NO surro□ate reco□ery outliers occur.**

□utliers □□nalysis □oldin□ □ime Compliance

- **NO Analysis □oldin□ Ti□e Outliers exist.**

□utliers □□re□uency o□□uality Control Samples

- **Quality Control Sa□ple □requency Outliers exist □please see □ollo□in□ pa□es □or □ull details.**

□utliers □□re□uency o□□uality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	7	0.00	10.00	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	0	8	0.00	10.00	NEPM 2013 B3 □ ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	7	0.00	5.00	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	0	8	0.00	5.00	NEPM 2013 B3 □ ALS QC Standard

□nalysis □oldin□ □ime Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days □ other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for **□□C in soils** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: □ = Holding time breach ; □ = Within holding time.

Method / Container □Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EA0□□: Moisture Content								
Soil □lass □ar □Unpreser□ed (EA0□□10□)								
A020□0.0-0.2□161109,	B043□0.0-0.2□161109,	**0□No□□016**	□□□	----	----	**11□No□□016**	23-Nov-2016	✓
B044□0.0-0.2□161109,	B045□0.0-0.2□161109,							
B046□0.0-0.2□161109,	B047□0.0-0.2□161109,							
B048□0.0-0.2□161109,	B049□0.0-0.2□161109,							
B50□0.0-0.2□161109,	B051□0.0-0.2□161109,							
B052□0.0-0.2□161109,	C013□0.0-0.2□161109,							
QAQC□100□161109								
EA□00: AS 4□64 □□004 Identi□ication o□Asbestos in Soils								
Snap Lock Ba□: Separate ba□ recei□ed (EA□00)								
A020□0.0-0.2□161109,	B043□0.0-0.2□161109,	**0□No□□016**	□□□	----	----	**11□No□□016**	08-May-2017	✓
B044□0.0-0.2□161109,	B045□0.0-0.2□161109,							
B046□0.0-0.2□161109,	B047□0.0-0.2□161109,							
B048□0.0-0.2□161109,	B049□0.0-0.2□161109,							
B50□0.0-0.2□161109,	B051□0.0-0.2□161109,							
B052□0.0-0.2□161109,	C013□0.0-0.2□161109							

Matrix: **SOIL**

Evaluation: ▯ = Holding time breach ; ▯ = Within holding time.

Method Container □Client Sample ID(s)	Sample Date	Extraction / Preparation Date extracted	Due for extraction	Evaluation	Analysis Date analysed	Due for analysis	Evaluation
E□00□T: Total Metals by ICP□AES							
Soil □lass □ar □Unpreser□ed (E□00□T) A020□0.0-0.2□161109, B043□0.0-0.2□161109, B044□0.0-0.2□161109, B045□0.0-0.2□161109, B046□0.0-0.2□161109, B047□0.0-0.2□161109, B048□0.0-0.2□161109, B049□0.0-0.2□161109, B50□0.0-0.2□161109, B051□0.0-0.2□161109, B052□0.0-0.2□161109, C013□0.0-0.2□161109	**0□No□□016**	**11□No□□016**	08-May-2017	✓	**11□No□□016**	08-May-2017	✓
E□0□□T: Total Reco□erable Mercury by □IMS							
Soil □lass □ar □Unpreser□ed (E□0□□T) A020□0.0-0.2□161109, B043□0.0-0.2□161109, B044□0.0-0.2□161109, B045□0.0-0.2□161109, B046□0.0-0.2□161109, B047□0.0-0.2□161109, B048□0.0-0.2□161109, B049□0.0-0.2□161109, B50□0.0-0.2□161109, B051□0.0-0.2□161109, B052□0.0-0.2□161109, C013□0.0-0.2□161109	**0□No□□016**	**11□No□□016**	07-Dec-2016	✓	**14□No□□016**	07-Dec-2016	✓
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons							
Soil □lass □ar □Unpreser□ed (EP07□(SIM)) A020□0.0-0.2□161109, B043□0.0-0.2□161109, B044□0.0-0.2□161109, B045□0.0-0.2□161109, B046□0.0-0.2□161109, B047□0.0-0.2□161109, B048□0.0-0.2□161109, B049□0.0-0.2□161109, B50□0.0-0.2□161109, B051□0.0-0.2□161109, B052□0.0-0.2□161109, C013□0.0-0.2□161109, QAQC□100□161109	**0□No□□016**	**11□No□□016**	23-Nov-2016	✓	**11□No□□016**	21-Dec-2016	✓
EP0□0□071: Total Petroleu□ □ydrocarbons							
Soil □lass □ar □Unpreser□ed (EP0□0) A020□0.0-0.2□161109, B043□0.0-0.2□161109, B044□0.0-0.2□161109, B045□0.0-0.2□161109, B046□0.0-0.2□161109, B047□0.0-0.2□161109, B048□0.0-0.2□161109, B049□0.0-0.2□161109, B50□0.0-0.2□161109, B051□0.0-0.2□161109, B052□0.0-0.2□161109, C013□0.0-0.2□161109, QAQC□100□161109, TB	**0□No□□016**	**10□No□□016**	23-Nov-2016	✓	**1□No□□016**	23-Nov-2016	✓
Soil □lass □ar □Unpreser□ed (EP071) A020□0.0-0.2□161109, B043□0.0-0.2□161109, B044□0.0-0.2□161109, B045□0.0-0.2□161109, B046□0.0-0.2□161109, B047□0.0-0.2□161109, B048□0.0-0.2□161109, B049□0.0-0.2□161109, B50□0.0-0.2□161109, B051□0.0-0.2□161109, B052□0.0-0.2□161109, C013□0.0-0.2□161109, QAQC□100□161109	**0□No□□016**	**11□No□□016**	23-Nov-2016	✓	**11□No□□016**	21-Dec-2016	✓

Matrix: **SOIL**

Evaluation: □ = Holding time breach ; □ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP0□0/071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions								
Soil □lass □ar □Unpreser□ed (EP0□0)								
A020□0.0-0.2□161109,	B043□0.0-0.2□161109,	**0□No□□016**	**10□No□□016**	23-Nov-2016	Π	**1□No□□016**	23-Nov-2016	Π
B044□0.0-0.2□161109,	B045□0.0-0.2□161109,							
B046□0.0-0.2□161109,	B047□0.0-0.2□161109,							
B048□0.0-0.2□161109,	B049□0.0-0.2□161109,							
B50□0.0-0.2□161109,	B051□0.0-0.2□161109,							
B052□0.0-0.2□161109,	C013□0.0-0.2□161109,							
QAQC□100□161109,	TB							
Soil □lass □ar □Unpreser□ed (EP071)								
A020□0.0-0.2□161109,	B043□0.0-0.2□161109,	**0□No□□016**	**11□No□□016**	23-Nov-2016	Π	**11□No□□016**	21-Dec-2016	Π
B044□0.0-0.2□161109,	B045□0.0-0.2□161109,							
B046□0.0-0.2□161109,	B047□0.0-0.2□161109,							
B048□0.0-0.2□161109,	B049□0.0-0.2□161109,							
B50□0.0-0.2□161109,	B051□0.0-0.2□161109,							
B052□0.0-0.2□161109,	C013□0.0-0.2□161109,							
QAQC□100□161109								
EP0□0: BTE□N								
Soil □lass □ar □Unpreser□ed (EP0□0)								
A020□0.0-0.2□161109,	B043□0.0-0.2□161109,	**0□No□□016**	**10□No□□016**	23-Nov-2016	Π	**1□No□□016**	23-Nov-2016	Π
B044□0.0-0.2□161109,	B045□0.0-0.2□161109,							
B046□0.0-0.2□161109,	B047□0.0-0.2□161109,							
B048□0.0-0.2□161109,	B049□0.0-0.2□161109,							
B50□0.0-0.2□161109,	B051□0.0-0.2□161109,							
B052□0.0-0.2□161109,	C013□0.0-0.2□161109,							
QAQC□100□161109,	TB							

Matrix: **WATER**

Evaluation: □ = Holding time breach ; □ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP07□(SIM)B: Polynuclear Aro□atic □ydrocarbons							
A□ber □lass Bottle □Unpreser□ed (EP07□(SIM))							
QAQC□300□161109	**0□No□□016**	**14□No□□016**	16-Nov-2016	Π	**1□No□□016**	24-Dec-2016	Π
EP0□0/071: Total Petroleu□ □ydrocarbons							
A□ber □lass Bottle □Unpreser□ed (EP071)							
QAQC□300□161109	**0□No□□016**	**14□No□□016**	16-Nov-2016	Π	**1□No□□016**	24-Dec-2016	Π
A□ber VOC Vial □Sul□uric Acid (EP0□0)							
QAQC□300□161109	**0□No□□016**	**1□No□□016**	23-Nov-2016	Π	**1□No□□016**	23-Nov-2016	Π
EP0□0/071: Total Reco□erable □ydrocarbons □NEPM □01□ □ractions							
A□ber □lass Bottle □Unpreser□ed (EP071)							
QAQC□300□161109	**0□No□□016**	**14□No□□016**	16-Nov-2016	Π	**1□No□□016**	24-Dec-2016	Π
A□ber VOC Vial □Sul□uric Acid (EP0□0)							
QAQC□300□161109	**0□No□□016**	**1□No□□016**	23-Nov-2016	Π	**1□No□□016**	23-Nov-2016	Π

Matrix: **WATER**

Evaluation: = Holding time breach ; = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP0 0: BTE N							
A ber VOC Vial Sul uric Acid (EP0 0)							
QAQC 300 161109	**0 No 016**	**1 No 016**	23-Nov-2016		**1 No 016**	23-Nov-2016	

□uality Control Parameter □re□uency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ⊓ = Quality Control frequency not within specification ; ⊓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		□ate (□)			□uality Control Specification
Analytical Methods	*Method*	*□C*	*□e□ular*	*□ctual*	*□xpected*	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	40	**10.00**	**10.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	17	**11.76**	**10.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	**11.11**	**10.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTE□	EP080	2	20	**10.00**	**10.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	17	**□.□□**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**□.00**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**□.00**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**□.□6**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTE□	EP080	1	20	**□.00**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	17	**□.□□**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**□.00**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**□.00**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**□.□6**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTE□	EP080	1	20	**□.00**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	17	**□.□□**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**□.00**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**□.00**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**□.□6**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTE□	EP080	1	20	**□.00**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard

Matrix: **WATER**

Evaluation: ⊓ = Quality Control frequency not within specification ; ⊓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		□ate (□)			□uality Control Specification
Analytical Methods	*Method*	*□C*	*□e□ular*	*□ctual*	*□xpected*	*Evaluation*	
Laboratory Duplicates (DUP)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	7	**0.00**	**10.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	8	**0.00**	**10.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTE□	EP080	2	20	**10.00**	**10.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.□□**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**1□.□0**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTE□	EP080	1	20	**□.00**	**□.00**	⊓	NEPM 2013 B3 □ ALS QC Standard

Matrix: **WATER**

Evaluation: □ = Quality Control frequency not within specification ; □ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*	
Method Blanks (MB)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.□□**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**1□.□0**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**□.00**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	7	**0.00**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	8	**0.00**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**□.00**	**□.00**	□	NEPM 2013 B3 □ ALS QC Standard

Brie Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTE	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTE	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

mgt 84432 AS162 (9/2)

AECOM

Chain of Custody

AECOM - Sydney
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E-mail: Stephen.Randall@aecom.com

Laboratory Details

Lab. Name: ALS
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax: S 23226
Preliminary Report by:
Final Report by:
Lab Quote No:

Sampled By: Pedro Balbachevesky
AECOM Project No: 60488804/2.4
Project Name: Caltex Kurnell
PO No.

Specifications:

	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr ______days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: ______________________________)	
6. Shell Quality Partnership:	
7. Report Format: Fax Hardcopy Email :	

Analysis Request

Environmental Division
Sydney
Work Order Reference
ES1625474

Telephone : + 61-2-8784 8555

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)
1	A020_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
2	B043_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
3	B044_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
4	B045_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
5	B046_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
6	B047_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
7	B048_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
8	B049_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
9	B050_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
10	B051_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
11	B052_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X
12	C013_0.0-0.2_161109	9/11/2016	X					X		1 x 125 mL jar; 1 x 500 mL bag	X	X	X

Subcon / Forward Lab / Split WO
Lab / Analysis: Asbestos
Organised By / Date:
Relinquished By / Date:
Connote / Courier: Newcastle
WO No: EN2C 200 Envirolab
Attach By PO / Internal Sheet:

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Lab Report No. | Esky ID

Relinquished by:	Pedro Balbachevesky	Signed:	Pedro Balbachevesky	Date: 9/11/2016	
Recieved by:	Frank	Signed:	[signature]	Date: 9-11-16 1615	

Relinquished by:		Signed:		Date:	
Recieved by:	Spa	Signed:	[signature]	Date: 10/11 10.52	

BMS-PM-DV-F046

2/2

AECOM

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Laboratory Details
Lab. Name: ALS
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No:

Sampled By: Pedro Balbachevesky
AECOM Project No: 60488804/2.4
Project Name: Caltex Kurnell
PO No.

Specifications: Yes (tick)

1. Urgent TAT required? (please circle: 24hr 48hr _____days)
2. Fast TAT Guarantee Required?
3. Is any sediment layer present in waters to be excluded from extractions?
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?
5. Special storage requirements? (details: ____________________)
6. Shell Quality Partnership:
7. Report Format: Fax Hardcopy Email :

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Asbestos (Absence/presence)	TRH BTEXN B(a)P	Metals (NEPM 13)	Other
13	QAQC-100_161109	9/11/16	X					X		1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~	*Please forward to Eurofins
	QAQC-200_161109	9/11/16	X					X		1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~	
14	QAQC-300_161109	9/11/16		X				X		~~1 x 125 mL jar;~~ 1 x 500 mL bag	~~X~~	X	~~X~~	4 Bottles
	~~QAQC-400_161109~~	~~9/11/16~~								1 x 125 mL jar; 1 x 500 mL bag	~~X~~	~~X~~	~~X~~	
										1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~	
										1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~	
										1 x 125 mL jar; 1 x 500 mL bag	~~X~~	X	~~X~~	
										1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
										1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
										1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
										1 x 125 mL jar; 1 x 500 mL bag	X	X	X	
										1 x 125 mL jar; 1 x 500 mL bag	X	X	X	

* Metals Required (Delete elements not required): As Cd Cr Cu Ni Pb Zn Hg

Comments:

Lab Report No | Entry ID

Relinquished by: Pedro Balbachevesky	Signed: Pedro Balbachevesky	Date: 9/11/2016	Relinquished by:	Signed:	Date:
Recieved by: Earle	Signed: [signature]	Date: 9-11-16 1815	Recieved by: S.10	Signed:	Date:

BMS-PM-DV-F046

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

AECOM Aust Pty Ltd Sydney
Level 21, 420 George St
Sydney
NSW 2000

Attention: **Stephen Randall**

Report **523226-S**
Project name CALTEX KURNEL
Project ID 60488804/ 2.4
Received Date Nov 10, 2016

Client Sample ID			**QAQC-200_161109**
Sample Matrix			**Soil**
Eurofins | mgt Sample No.			**S16-No09919**
Date Sampled			**Nov 09, 2016**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	20	mg/kg	140
TRH C10-C14	20	mg/kg	1200
TRH C15-C28	50	mg/kg	13000
TRH C29-C36	50	mg/kg	8500
TRH C10-36 (Total)	50	mg/kg	22700
BTEX			
Benzene	0.1	mg/kg	< 0.1
Toluene	0.1	mg/kg	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2
o-Xylene	0.1	mg/kg	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3
4-Bromofluorobenzene (surr.)	1	%	91
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.5	mg/kg	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	2600
TRH C6-C10	20	mg/kg	260
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	260
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene	0.5	mg/kg	< 5
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
TRH >C10-C16	50	mg/kg	2600
TRH >C16-C34	100	mg/kg	20000
TRH >C34-C40	100	mg/kg	2800
% Moisture	1	%	17

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Nov 14, 2016	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Nov 14, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Nov 14, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
BTEX	Sydney	Nov 14, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Nov 14, 2016	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
% Moisture	Sydney	Nov 11, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			

Company Name: AECOM Aust Pty Ltd Sydney
Address: Level 21, 420 George St
Sydney
NSW 2000

Project Name: CALTEX KURNEL
Project ID: 60488804/ 2.4

Order No.:
Report #: 523226
Phone: 02 8934 0000
Fax: 02 8934 0001

Received: Nov 10, 2016 10:52 AM
Due: Nov 17, 2016
Priority: 5 Day
Contact Name: Stephen Randall

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Benzo(a)pyrene	BTEX	Moisture Set	Total Recoverable Hydrocarbons
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 18217									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	QAQC-200_161109	Nov 09, 2016		Soil	S16-No09919	X	X	X	X
Test Counts						1	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs 20-130%

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	97			70-130	Pass	
TRH C10-C14	%	106			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	103			70-130	Pass	
Toluene	%	104			70-130	Pass	
Ethylbenzene	%	105			70-130	Pass	
m&p-Xylenes	%	104			70-130	Pass	
o-Xylene	%	104			70-130	Pass	
Xylenes - Total	%	104			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	104			70-130	Pass	
TRH C6-C10	%	91			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	%	112			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	106			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S16-No09984	NCP	%	103			70-130	Pass	
TRH C10-C14	S16-No12777	NCP	%	124			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S16-No09984	NCP	%	112			70-130	Pass	
Toluene	S16-No09984	NCP	%	114			70-130	Pass	
Ethylbenzene	S16-No09984	NCP	%	114			70-130	Pass	
m&p-Xylenes	S16-No09984	NCP	%	113			70-130	Pass	
o-Xylene	S16-No09984	NCP	%	114			70-130	Pass	
Xylenes - Total	S16-No09984	NCP	%	114			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S16-No09984	NCP	%	103			70-130	Pass	
TRH C6-C10	S16-No09984	NCP	%	98			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Benzo(a)pyrene	S16-No13332	NCP	%	113			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S16-No12777	NCP	%	127			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S16-No09919	CP	mg/kg	140	130	7.0	30%	Pass	
TRH C10-C14	S16-No10545	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S16-No10545	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S16-No10545	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S16-No09919	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S16-No09919	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S16-No09919	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S16-No09919	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S16-No09919	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S16-No09919	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S16-No09919	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S16-No09919	CP	mg/kg	260	230	10	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(a)pyrene	S16-No13770	NCP	mg/kg	< 0.5	0.6	110	30%	Fail	Q15
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S16-No10545	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S16-No10545	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S16-No10545	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S16-Se21625	NCP	%	12	12	2.0	30%	Pass	

eurofins | mgt

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Nibha Vaidya	Analytical Services Manager
Ryan Hamilton	Senior Analyst-Inorganic (NSW)
Ryan Hamilton	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

eurofins | mgt

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NATA # 1261 Site # 18217

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**AECOM Aust Pty Ltd Sydney**
Contact name:	Stephen Randall
Project name:	CALTEX KURNEL
Project ID:	60488804/ 2.4
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Nov 10, 2016 10:52 AM
Eurofins | mgt reference:	**523226**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 7.4 degrees Celsius.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Stephen Randall - Stephen.Randall@aecom.com.

Appendix F

Data Validation

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:** Kate McGrath	**Date:** 03/05/2016
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	QC151, QC155, QC158		
Laboratory:	Eurofins (Secondary),		
Project Manager:	Stephen Randall	**Lab report reference:**	493555

Key Issues:	No QA/QC issues were identified in the field or laboratory datasets that could have a material implication to decision-making on the project.
Field Quality Assurance and Quality Control	
Sampling personnel	All sampling was conducted by Kate Pigram on the 14,15 and 16 March 2016.
Sampling Methodology	Samples were collected directly from the hand auger or solid stem auger.
Chain of Custody (COC)	Chain of custody documents completed by Kate Pigram
Field Blank	No field blanks were utilised.
Rinsate Blank	No rinsate blanks were analysed.
Trip Blank/Spike	No trip spikes or blanks were taken.
Frequency of field QC	Inter-laboratory samples from ES160683
Handling and preservation	Samples were received preserved and chilled (1℃) at the laboratory. All samples were received at the laboratory in appropriate sample containers.
Laboratory QA/QC	
Tests requested/reported	Samples were analysed and reported as requested on the Chain Of Custody (COC).
Holding time compliance	Samples were extracted and analysed within recommended holding times.
Laboratory Accreditation	The laboratory analysis was conducted by Eurofins Pty Ltd (Sydney), which is a National Association of Testing Authorities (NATA) accredited laboratories.
Frequency of laboratory QC	The laboratory reported an insufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision.
Method Blank	Method blank concentrations were not detected above the LOR for all analytes
Laboratory duplicate RPDs	Laboratory duplicates were reported on anonymous samples and the Relative Percentage Differences (RPD) were within control limits.
Laboratory control spike recovery	Laboratory Control Spike (LCS) recoveries were within control limits.
Matrix spike recovery	Matrix spikes (MS) were conducted on anonymous samples and within control limits.
Surrogate spike recovery	Surrogates were not reported.
QA/QC Data Evaluation	
Comparison of Field Observations and Laboratory Results	No anomalous results between field observations and analysis results were noted.

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:** Kate McGrath	**Date:** 03/05/2016
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	QC151, QC155, QC158		
Laboratory:	Eurofins (Secondary),		
Project Manager:	Stephen Randall	**Lab report reference:**	493555

Comparison of the data and Laboratory Results	No anomalous results between data input and laboratory analysis results were noted.
Limits of reporting	Limits of Reporting (LORs) were sufficiently low to enable assessment against adopted guideline criteria.
Intra-laboratory duplicate RPDs	Not applicable.
Inter-laboratory duplicate RPDs	Not applicable.
Trip Spike Recoveries	Not applicable.

Chromatograms

Not applicable.

Other

Comments:

AECOM
DRAFT

DATA VALIDATION REPORT

Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:** Kate McGrath	**Date:** 03/05/2016
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	35 (refer to lab report)		
Laboratory:	ALS (primary), Eurofins (secondary)		
Project Manager:	Stephen Randall	**Lab report reference:**	ES1606083

Key Issues:	No QA/QC issues were identified in the field or laboratory datasets that could have a material implication to decision-making on the project.
Field Quality Assurance and Quality Control	
Sampling personnel	All sampling was conducted by Kate Pigram on the 14,15 and 16 March 2016.
Sampling Methodology	Samples were collected directly from the hand auger or solid stem auger.
Chain of Custody (COC)	Chain of custody documents completed by Kate Pigram.
Field Blank (QC162)	One field blanks were utilised.
Rinsate Blank (QC153 & QC160)	Two rinsate blanks were analysed.
Trip Blank/Spike (QC153)	One trip blank was utilised.
Frequency of field QC	Three inter-laboratory (QC151, QC155 & QC158) and 4 intra-laboratory duplicates (QC150, QC152, QC154 & QC157) were analysed.
Handling and preservation	Samples were received preserved and chilled (4.6℃) at the laboratory. All samples were received at the laboratory in appropriate sample containers.
Laboratory QA/QC	
Tests requested/reported	Samples were analysed and reported as requested on the Chain Of Custody (COC).
Holding time compliance	Samples were extracted and analysed within recommended holding times.
Laboratory Accreditation	The laboratory analysis was conducted by ALS Environmental Pty Ltd (Sydney), which is a National Association of Testing Authorities (NATA) accredited laboratories.
Frequency of laboratory QC	The laboratory reported a sufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision.
Method Blank	Method blank concentrations were not detected above the LOR for all analytes
Laboratory duplicate RPDs	Laboratory duplicates (LD) were conducted on AECOM and anonymous samples. LD Relative Percentage Differences (RPD) were within control limits. Laboratory duplicates were also conducted for water on AECOM sample QC161 and anonymous samples. The laboratory duplicate RPDs are presented in the laboratory Quality Control Report.
Laboratory control spike recovery	Laboratory Control Spike (LCS) recoveries were within control limits.

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:** Kate McGrath	**Date:** 03/05/2016
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	35 (refer to lab report)		
Laboratory:	ALS (primary), Eurofins (secondary)		
Project Manager:	Stephen Randall	**Lab report reference:**	ES1606083

Matrix spike recovery	Matrix spikes (MS) were conducted on AECOM samples. All MS recoveries (where reported) were within control limits with the exception of B001_0.0-0.2 where MS recovery was not determined for C15-28, C29-36, C16-34 and >C34-40.
Surrogate spike recovery	Surrogates were conducted on AECOM Samples. All surrogate recoveries were within control limits with the following exceptions: B016_0.0-0.2 – 2,4,6-Tribromophenol (142%), A013_0.0-0.2 – 2-Fluorobiphenyl (69.5%), QC150 – 2-Fluorobiphenyl (66.4%), QC157 – 2-Fluorobiphenyl (62.6%) and QC154 – 4-Terphenyl-d14 (133%)
QA/QC Data Evaluation	
Comparison of Field Observations and Laboratory Results	No anomalous results between field observations and analysis results were noted.
Comparison of the data and Laboratory Results	No anomalous results between data input and laboratory analysis results were noted.
Limits of reporting	Limits of Reporting (LORs) were sufficiently low to enable assessment against adopted guideline criteria.
Intra-laboratory duplicate RPDs	Three intra-laboratory duplicates were analysed and RPDs were within acceptable control limits, with the exception of the results listed in the comments below.
Inter-laboratory duplicate RPDs	Four inter-laboratory duplicates were analysed and RPDs were within acceptable control limits, with the exception of the results listed in the comments below.
Trip Spike Recoveries	The trip spike recoveries were within the acceptable range.
Chromatograms	
Not required.	
Other	

DATA VALIDATION REPORT

Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:** Kate McGrath	**Date:** 03/05/2016
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	35 (refer to lab report)		
Laboratory:	ALS (primary), Eurofins (secondary)		
Project Manager:	Stephen Randall	**Lab report reference:**	ES1606083

Comments:
The following high RPDs are likely attributed to sample heterogeneity and do not affect the assessment of the results:

- Inter-laboratory duplicate A014.5_0.4-0.5/QC158: RPD for zinc 130%
- Intra-laboratory duplicate A013.5_0.0-0.2/QC157: RPD for TRH C10-C40 fractions 57 to 171%
- Intra-laboratory duplicate B010.5_0.4-0.5/QC150: RPD for zinc 45% and TRH C10-C14 fractions 188%

As mentioned by ALS:

- Poor matric spike recovery was obtained for Mercury on samples EP1602288-1 due to high matrix interface.
- Matrix spike recovery was not determined in the aforementioned analytes due to high concentrations.
- Particular samples required sample matrix dilution.
- Surrogate spike recoveries outside of recovery limits should not influence data integrity as all are outside of the range by <10%.

DATA VALIDATION REPORT

Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:** Kate McGrath	**Date:** 3/05/2016
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	A005.5_0.0-0.2 B007.5_0.0-0.2 B035_0.0-0.3	B009.5_0.0-0.2 B012.5_0.0-0.2 B016_0.0-0.2	
Laboratory:	ALS (primary)		
Project Manager:	Stephen Randell	**Lab report reference:**	ES1607003

Key Issues:	No QA/QC issues were identified in the field or laboratory datasets that could have a material implication to decision-making on the project.

Field Quality Assurance and Quality Control

Sampling personnel	All sampling was conducted by Kate Pigram on the 14,15 and 16 March 2016.
Sampling Methodology	Samples were collected directly from the hand auger or solid stem auger.
Chain of Custody (COC)	Chain of custody documents completed by Kate Pigram on original order. This additional analysis was requested by Stephen Randall.
Field Blank	Not applicable as re-batch of ES1606083.
Rinsate Blank	Not applicable as re-batch of ES1606083.
Trip Blank/Spike	Not applicable as re-batch of ES1606083.
Frequency of field QC	Not applicable as re-batch of ES1606083.
Handling and preservation	Samples were received preserved and chilled (3.5℃) at the laboratory. All samples were received at the laboratory in appropriate sample containers.

Laboratory QA/QC

Tests requested/reported	Samples were analysed and reported as requested on the Chain Of Custody (COC).
Holding time compliance	Samples were extracted and analysed within recommended holding times.
Laboratory Accreditation	The laboratory analysis was conducted by ALS Environmental Pty Ltd (Sydney), which is a National Association of Testing Authorities (NATA) accredited laboratories.
Frequency of laboratory QC	The laboratory reported an insufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision.
Method Blank	Method blank concentrations were not detected above the LOR for all analytes
Laboratory duplicate RPDs	Laboratory duplicates (LD) were conducted on anonymous samples. LD Relative Percentage Differences (RPD) was within control limits. The laboratory duplicate RPDs are presented in the laboratory Quality Control Report.
Laboratory control spike recovery	Laboratory Control Spike (LCS) recoveries were within control limits.
Matrix spike recovery	Matrix spikes (MS) were conducted on anonymous samples. All MS recoveries (where reported) were within control limits.
Surrogate spike recovery	Surrogates were conducted on anonymous Samples. All surrogate recoveries were within control limits

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:** Kate McGrath	**Date:** 3/05/2016
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	A005.5_0.0-0.2 B007.5_0.0-0.2 B035_0.0-0.3	B009.5_0.0-0.2 B012.5_0.0-0.2 B016_0.0-0.2	
Laboratory:	ALS (primary)		
Project Manager:	Stephen Randell	**Lab report reference:**	ES1607003

QA/QC Data Evaluation	
Comparison of Field Observations and Laboratory Results	No anomalous results between field observations and analysis results were noted.
Comparison of the data and Laboratory Results	No anomalous results between data input and laboratory analysis results were noted.
Limits of reporting	Limits of Reporting (LORs) were sufficiently low to enable assessment against adopted guideline criteria.
Intra-laboratory duplicate RPDs	Not applicable as re-batch of ES1606083.
Inter-laboratory duplicate RPDs	Not applicable as re-batch of ES1606083.
Trip Spike Recoveries	Not applicable as re-batch of ES1606083.

Chromatograms
Not applicable

Other
Comments:

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:** Kate McGrath	**Date:** 03/05/2016
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	13 Primary Samples (refer to lab reports)		
Laboratory:	ALS (primary)		
Project Manager:	Stephen Randall	**Lab report reference:**	ES1607647

Key Issues:	No QA/QC issues were identified in the field or laboratory datasets that could have a material implication to decision-making on the project.
Field Quality Assurance and Quality Control	
Sampling personnel	All sampling was conducted by Kate Pigram on the 14,15 and 16 March 2016.
Sampling Methodology	Samples were collected directly from the hand auger or solid stem auger.
Chain of Custody (COC)	Chain of custody documents completed by Kate Pigram.
Field Blank	No field blanks were utilised.
Rinsate Blank	Not applicable.
Trip Blank/Spike	Not applicable.
Frequency of field QC	No inter-laboratory or intra-laboratory duplicates were analysed.
Handling and preservation	All samples were received at the laboratory in appropriate sample containers.
Laboratory QA/QC	
Tests requested/reported	Samples were analysed and reported as requested on the Chain Of Custody (COC).
Holding time compliance	Not applicable.
Laboratory Accreditation	The laboratory analysis was conducted by ALS Environmental Pty Ltd (Sydney), which is a National Association of Testing Authorities (NATA) accredited laboratories.
Frequency of laboratory QC	The laboratory reported an insufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision.
Method Blank	Method blank concentrations were not detected above the LOR for all analytes
Laboratory duplicate RPDs	Not applicable.
Laboratory control spike recovery	Not applicable.
Matrix spike recovery	Not applicable.
Surrogate spike recovery	Not applicable.
QA/QC Data Evaluation	

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:** Kate McGrath	**Date:** 03/05/2016
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	13 Primary Samples (refer to lab reports)		
Laboratory:	ALS (primary)		
Project Manager:	Stephen Randall	**Lab report reference:**	ES1607647

Comparison of Field Observations and Laboratory Results	No anomalous results between field observations and analysis results were noted.
Comparison of the data and Laboratory Results	No anomalous results between data input and laboratory analysis results were noted.
Limits of reporting	Limits of Reporting (LORs) were sufficiently low to enable assessment against adopted guideline criteria.
Intra-laboratory duplicate RPDs	No intra-laboratory duplicates were analysed.
Inter-laboratory duplicate RPDs	No inter-laboratory duplicates were analysed.
Trip Spike Recoveries	Not applicable.

Chromatograms

Not applicable

Other

Comments:

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:**	**Date:**
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	B001_0.0-0.2, B036_0.0-0.2, B032_0.0-0.2, B009.5_0.0-0.2, B010.5_0.0-0.2, B003.5_0.0-0.2, B014_0.0-0.2, A006.5_0.0-0.2		
Laboratory:	ALS (primary),		
Project Manager:	Stephen Randall	**Lab report reference:**	ES1608579

Key Issues:	No QA/QC issues were identified in the field or laboratory datasets that could have a material implication to decision-making on the project.
Field Quality Assurance and Quality Control	
Sampling personnel	All sampling was conducted by Kate Pigram on the 14,15 and 16 March 2016.
Sampling Methodology	Samples were collected directly from the hand auger or solid stem auger.
Chain of Custody (COC)	Chain of custody documents completed by Kate Pigram on original order. This additional analysis was requested by Scott Robinson.
Field Blank	No field blanks were utilised.
Rinsate Blank	No rinsate blanks were analysed.
Trip Blank/Spike	No trip spikes were taken.
Frequency of field QC	No inter-laboratory or intra-laboratory duplicates were analysed.
Handling and preservation	Samples were received preserved and chilled at the laboratory. All samples were received at the laboratory in appropriate sample containers.
Laboratory QA/QC	
Tests requested/reported	Samples were analysed and reported as requested on the Chain Of Custody (COC).
Holding time compliance	Samples were extracted and analysed within recommended holding times.
Laboratory Accreditation	The laboratory analysis was conducted by ALS Environmental Pty Ltd (Sydney), which is a National Association of Testing Authorities (NATA) accredited laboratories.
Frequency of laboratory QC	The laboratory reported an insufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision.
Method Blank	Method blank concentrations were not detected above the LOR for all analytes
Laboratory duplicate RPDs	Laboratory duplicates (LD) were conducted on anonymous and AECOM samples. LD Relative Percentage Differences (RPD) was within control limits. The laboratory duplicate RPDs are presented in the laboratory Quality Control Report.
Laboratory control spike recovery	Laboratory Control Spike (LCS) recoveries were within control limits.

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 02/05/2016
Client:	Caltex	**Data verified by:**	**Date:**
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	B001_0.0-0.2, B036_0.0-0.2, B032_0.0-0.2, B009.5_0.0-0.2, B010.5_0.0-0.2, B003.5_0.0-0.2, B014_0.0-0.2, A006.5_0.0-0.2		
Laboratory:	ALS (primary),		
Project Manager:	Stephen Randall	**Lab report reference:**	ES1608579

Matrix spike recovery	Matrix spikes (MS) were conducted on anonymous and AECOM samples. All MS recoveries (where reported) were within control limits.
Surrogate spike recovery	Surrogates were conducted on anonymous Samples. All surrogate recoveries were within control limits
QA/QC Data Evaluation	
Comparison of Field Observations and Laboratory Results	No anomalous results between field observations and analysis results were noted.
Comparison of the data and Laboratory Results	No anomalous results between data input and laboratory analysis results were noted.
Limits of reporting	Limits of Reporting (LORs) were sufficiently low to enable assessment against adopted guideline criteria.
Intra-laboratory duplicate RPDs	No intra-laboratory duplicates were analysed.
Inter-laboratory duplicate RPDs	No inter-laboratory duplicates were analysed.
Trip Spike Recoveries	No trip spike recoveries were analysed.
Chromatograms	
Other	
Comments:	

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 12/12/2016
Client:	Caltex	**Data verified by:** Tanya Stanton	**Date:** 16/03/2017
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	A020_0.0-0.2_161109, B043_0.0-0.2_161109 to B052_0.00.2_161109, C013_0.0-0.2_161109		
Laboratory:	ALS (primary), Eurofins (523266-S)		
Project Manager:	Stephen Randall	**Lab report reference:**	ES1608579

Key Issues:	No QA/QC issues were identified in the field or laboratory datasets that could have a material implication to decision-making on the project.
Field Quality Assurance and Quality Control	
Sampling personnel	All sampling was conducted by Pedro Balbachevsky and Katherine Dodd on the 9th Nov 2016.
Sampling Methodology	Samples were collected directly from the hand auger.
Chain of Custody (COC)	Chain of custody documents completed by Pedro Balbachevsky.
Field Blank	No field blanks were collected for this batch.
Rinsate Blank	One rinsate blank (QC300_161109) was analysed. All concentrations were less than the Limits of Reporting (LOR).
Trip Blank (TB)	One trip blank was analysed for this batch. All concentrations were less than the LOR.
Frequency of field QC	One inter-laboratory (QC100) and one intra-laboratory (QC200) duplicates were analysed.
Handling and preservation	Samples were received preserved and chilled at the laboratory 2.9°C ALS which was within the recommended temperature (<6ºC). Seals were intact and ice was present. Samples were received by Eurofins at a temperature of 7.4°C.Attempt to chill was evident. All samples were received at the laboratory in appropriate sample containers.
Laboratory QA/QC	
Tests requested/reported	Samples were analysed and reported as requested on the Chain Of Custody (COC).
Holding time compliance	Samples were extracted and analysed within recommended holding times.
Laboratory Accreditation	The laboratory analysis was conducted by ALS Environmental Pty Ltd (Sydney), which is a National Association of Testing Authorities (NATA) accredited laboratories.
Frequency of laboratory QC	The laboratory reported a sufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision with the exception of: Laboratory duplicates (LD) - PAH/Phenols & TRH semi volatile (excepted 10% vs actual 0%) Matrix spikes (MS) - PAH/Phenols & TRH semi volatile (expected 5% vs actual 0%).
Method Blank	_Soil_ **ALS** – Method blank concentrations were not detected above the LOR for all analytes. **Eurofins** – Method blank concentrations were not detected above the LOR for all analytes. _Water_ **ALS** – Method blank concentrations were not detected above the LOR for all analytes.

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 12/12/2016
Client:	Caltex	**Data verified by:** Tanya Stanton	**Date:** 16/03/2017
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	A020_0.0-0.2_161109, B043_0.0-0.2_161109 to B052_0.00.2_161109, C013_0.0-0.2_161109		
Laboratory:	ALS (primary), Eurofins (523266-S)		
Project Manager:	Stephen Randall	**Lab report reference:**	ES1608579

Laboratory duplicate RPDs	*Soil* **ALS** - LD were conducted on AECOM samples for soil on TPH, TRH, BTEXN, PAHs and metals. LD Relative Percentage Differences (RPD) was within control limits. The LD RPDs are presented in the Laboratory Quality Control Report. **Eurofins** – LD were conducted on AECOM soil samples (for TPH C6-C9, TRH C6-10 and BTEXN) and anonymous samples (for TPH C10-C36, TRH >C10-C40 and PAHs). LD RPDs were within control limits with the exception of benzo(a)pyrene. *Water* **ALS** - LD were conducted on anonymous samples for TPH, TRH and BTEXN. LD RPDs was within control limits.
Laboratory control spike recovery	*Soil* **ALS** - Laboratory Control Spike (LCS) recoveries were within control limits. **Eurofins** – LCS recoveries were within control limits. *Water* **ALS** - LCS recoveries were within control limits.
Matrix spike recovery	*Soil* **ALS** - MS were conducted on anonymous soil samples for metals, TPH, TRH and BTEXN. All MS recoveries (where reported) were within control limits. **Eurofins** – MS were conducted on anonymous samples for TPH, TRH, PAHs and BTEXN. All MS recoveries were within control limits. *Water* **ALS** - MS were conducted on anonymous samples for TPH, TRH and BTEXN. All MS recoveries (where reported) were within control limits.
Surrogate spike recovery	*Soil* **ALS** – Surrogates were conducted on anonymous Samples. All surrogate recoveries were within control limits. **Eurofins** – Surrogates were conducted on anonymous Samples. All surrogate recoveries were within control limits. *Water* **ALS** – Surrogates were conducted on anonymous Samples. All surrogate recoveries were within control limits.

QA/QC Data Evaluation	
Comparison of Field Observations and Laboratory Results	No anomalous results between field observations and analysis results were noted.
Comparison of the data and Laboratory Results	No anomalous results between data input and laboratory analysis results were noted.
Limits of Reporting	LORs were sufficiently low to enable assessment against adopted guideline criteria.

DATA VALIDATION REPORT			
Project number:	60488804	**Validation by:** Hamish Watkins	**Date:** 12/12/2016
Client:	Caltex	**Data verified by:** Tanya Stanton	**Date:** 16/03/2017
Site:	Kurnell		
Matrix type:	Soil		
Primary samples:	A020_0.0-0.2_161109, B043_0.0-0.2_161109 to B052_0.00.2_161109, C013_0.0-0.2_161109		
Laboratory:	ALS (primary), Eurofins (523266-S)		
Project Manager:	Stephen Randall	**Lab report reference:**	ES1608579

Intra-laboratory duplicate RPDs *(B047_0.0-0.2_161109 / QAQC100_161109)*	All RPDs were outside the acceptable control limits with the exception of TRH >C16 - C34 Fraction.
Inter-laboratory duplicate RPDs *(B047_0.0-0.2_161109 / QAQC200_161109)*	All RPDs were outside the acceptable control limits with the exception of TRH >C34 - C40 Fraction and Naphthalene.

Chromatograms

Chromatograms have been provided for A02_0.0-0.2, B043_0.0-0.2, B044_0.0-0.2, B045_0.0-0.2, B046_0.0-0.2, B047_0.0-0.2, B048_0.0-0.2, B049_0.0-0.2 and QAQC_100.

Comments

- The temperature on receipt for the Eurofins sample was greater than acceptable limits. This is considered to be as a result of transfer of samples between laboratories and is unlikely to affect data quality.
- High PID readings recorded for the primary, duplicate and triplicate samples indicate the presence of hydrocarbon impacts. These impacts may not have been evenly distributed throughout all three samples, contributing the RPD outliers. For conservative means, the highest concentration will be used for reporting purposes.
- As stated by LAS, results of sample QAQC_100_161109 have been confirmed by re-extraction and re-analysis.
- As stated by Eurofins in regards to the LD outlier, the RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

				Location:	B047_0.0-0.2_161109	B047_0.0-0.2_161109	B047_0.0-0.2_161109				
				Sample ID:	B047_0.0-0.2_161109	QAQC100_161109	QAQC-200_161109				
				Date Sampled:	9/11/2016	9/11/2016	9/11/2016				
				Sample Type:	**Primary**	**Secondary**	**Tertiary**				
Analyte	**LOR1**	**LOR2**	**LOR3**	**Units**				**Primary vs. Duplicate RPDs**	**Primary vs. Triplicate RPDs**	**Primary vs. Duplicate Assessment**	**Primary vs. Triplicate Assessment**
Total Petroleum Hydrocarbons											
C6 - C9 Fraction	10	10	20	mg/kg	<10	1320	140	**196.99%**	**173.33%**	**Fail**	**Fail**
C10 - C14 Fraction	50	50	20	mg/kg	70	1850	1200	**185.41%**	**177.95%**	**Fail**	**Fail**
C15 - C28 Fraction	100	100	50	mg/kg	6920	10800	13000	**43.79%**	**61.04%**	**Fail**	**Fail**
C29 - C36 Fraction	100	100	50	mg/kg	630	4190	8500	**147.72%**	**172.40%**	**Fail**	**Fail**
Total Recoverable Hydrocarbons											
C6 - C10 Fraction	10	10	20	mg/kg	<10	1620	260	**197.55%**	**185.18%**	**Fail**	**Fail**
C6 - C10 Fraction minus BTEX (F1)	10	10	20	mg/kg	<10	1620	260	**197.55%**	**185.18%**	**Fail**	**Fail**
>C10 - C16 Fraction	50	50	50	mg/kg	300	4780	2600	**176.34%**	**158.62%**	**Fail**	**Fail**
TRH >C10-C16 less Naphthalene (F2)	50	50	50	mg/kg	300	4780	2600	**176.34%**	**158.62%**	**Fail**	**Fail**
>C16 - C34 Fraction	100	100	100	mg/kg	11600	11200	20000	3.51%	**53.16%**	Pass	**Fail**
>C34 - C40 Fraction	100	100	100	mg/kg	3330	2130	2800	**43.96%**	17.29%	**Fail**	Pass
BTEXN											
Naphthalene	1	1	0.5	mg/kg	<1	5	<0.5	**133.33%**	NC	**Fail**	Pass

RPD Control Limits
NC - Not calculated
Pass - RPD <= 30%
Pass-1 - RPD > 30%, Analysis results < 10 times Detection Limit
Pass-2 - RPD > 30% and RPD <= 50%, Analysis result > 10 times Detection Limit and < 20 times Detection Limit
Exceeds RPD Control Limits