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FURTHER SITE INVESTIGATION, REMEDIATION AND VALIDATION PROGRAM 27-33 DELHI ROAD, NORTH RYDE, NEW SOUTH WALES

FOR

GOODMAN PROPERTY SERVICES

PROJECT NO. 19257/3243C **OCTOBER 2013**
REPORT NO. 13/1310

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EXECUTIVE SUMMARY

A further site investigation (PSI) was performed for the property at 27-33 Delhi Road, North Ryde, New South Wales (the 'site') for Goodman Property Services. The objectives of the investigation were to determine the potential for environmental exposures at the property due to land contamination that may be significant for a high-density residential land use setting. The investigation was performed in accordance with Environment Protection Authority (EPA) and national guidelines for the assessment and management of site contamination.

The site is approximately 1.8 hectares in area and is known to have been the subject of six previous environmental investigations performed by others between 2002 and 2012. The reports on these investigations were provided for our review. Based on information provided in these reports, the site was developed as a television studio complex in the mid-1960s and this use continued until at least 2002. All previously existing buildings and structures have since been demolished, apart from a small workshop/storage building which remains in the east of the site. Further, a number of potential contamination sources are known to have been present on the site including up to six underground petroleum storage systems (UPSSs), two diesel-containing above ground storage tanks (AGSTs), a substation, a paint shop and a below ground grease trap. Further, the site is known to have been filled with imported soil, and as the origin of the fill cannot be confirmed it had the potential to be chemically contaminated.

Soil sampling was performed from a total of 34 locations across the site as part of the previous assessments, and three on-site groundwater monitoring wells were also installed and sampled. The results of the soil sampling programs show that the concentrations chemical contaminants in the soils across the site are generally low and below criteria that are protective of human-health for a high-density residential land use setting. Further, the results of previous groundwater sampling show that the site is not expected to be the source of any unacceptable groundwater impacts. However, elevated concentrations of light fraction petroleum hydrocarbons (TPH) were measured in the soil at one location in the north-east of the site where two UPSSs previously existed. In addition, soil impacted with heavy fraction TPH was identified in an area where an AGST had previously existed adjacent to the eastern boundary of the property. Elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) were also measured in a number of soil samples retrieved from across the site, and whilst no asbestos fibres were identified in the soil, several fragment of bonded asbestos were identified on the land surface in the north-east of the site.

Our review of available environmental reports has shown that the previous assessments were largely suitable to have confirmed the contamination related risks associated with the site. However, our review identified several minor data gaps in the assessment record. In particular, the location of only five of the six known UPSSs had been confirmed and there was insufficient information to determine the significance of the PAHs in the soil. Further, the extent to which the light fraction petroleum hydrocarbon impacts in the soil may have naturally attenuated over time remained undefined. Therefore, further assessment was recommended, including additional soil sampling and also a ground penetrating radar (GPR) survey to determine if any UPSSs remained on the property.

The GPR survey performed as part of this 2013 investigation did not identify any sub-surface anomalies that are consistent with remnant UPSSs. Further, no backfilled pits were identified apart from those at the locations where five UPSSs are known to have previously existed. That is, no UPSSs are expected to remain on the site and it is likely that the sixth UPSS was located in the areas where the other UPSSs are known to have existed and was removed at the same time as these facilities.

Further soil sampling was also performed from a total of 19 locations across the site for this investigation, the results of which show that the concentrations of PAHs and light fraction petroleum hydrocarbons in the soils across the site do not present an unacceptable risk to human-health for a high-density residential land use setting. However, the soils in the vicinity of where the AGST previously existed adjacent to the eastern boundary of the site were confirmed to be impacted with heavy fraction TPH at concentrations that could present a potential risk to human-health. Further, isolated fragments of bonded asbestos were identified on the land surface in the north-east of the site in the area where these materials had previously been identified. In view of this, remediation of the heavy fraction TPH impacted soil and removal of the bonded asbestos would be necessary to make the site suitable for a high density residential land use.

Remedial works were subsequently undertaken as part of this investigation, which involved the excavation and off-site disposal of the TPH impacted soil. Validation soil sampling was performed across the excavated area, the results of which show that the residual concentrations of TPH are below the adopted clean up criteria. The fragments of bonded asbestos have also been removed from the site, and the affected area was validated by way of visual inspection.

Based on the result of this 2013 investigation and validation program, and also those from the previous assessments performed by others, the residual concentrations of chemical contaminants in the soils across the site are not considered to present a risk to human-health for a residential land use setting with limited minimal opportunities for soil access. That is, the site is considered to be suitable for a high-density residential land use in its current condition.

1. INTRODUCTION

SMEC Testing Services Pty Limited (STS) was engaged by Goodman Property Services (Goodman) to undertake a further site investigation (PSI) for the property at 27-33 Delhi Road, North Ryde, NSW (the 'site').

The objectives of the investigation were to provide advice on the potential for environmental exposures at the property due to land contamination that may be significant for a high density residential land use setting. However, in view of hydrocarbon impacted soil and bonded asbestos materials being identified on the site a remediation and validation program was subsequently undertaken, the results of which are included in this report. The investigation was performed in accordance with Environment Protection Authority (EPA) and national guidelines for the assessment and management of site contamination.

The scope of the further investigation, remediation and validation program included:

- Site inspection;
- Review of six environmental assessment reports that were prepared for the site by others between 2002 and 2012;
- Appraisal of local geology and hydrogeology;
- Soil sampling from 19 locations across the site and laboratory analysis of selected soil samples retrieved for key contaminants of concern;
- Assessment of analytical data and quality assurance (QA);
- Appraisal of the contaminant concentrations in the soil on the site based on the results of this and previous investigations, including an appraisal of potential harm to human-health and the environment, potential exposure pathways and off-site impacts;
- Excavation and off-site disposal of hydrocarbon impacted soil identified in the east of the site;
- Validation soil sampling from the excavated area;

- Removal of residual fragments of bonded asbestos identified on the land surface in the north-east of the site;
- Recommendations for the site in accordance with EPA guidelines; and
- Preparation of a confidential report on the results of the investigation and remediation program.

2. REDEVELOPMENT AND PROPOSED LAND USE

We understand that the site is proposed to be redeveloped for a high density residential land use, which will likely involve the construction of multi-story unit towers on the land. Further, it is expected that basement car parking facilities would also form part of the redevelopment.

3. SITE IDENTIFICATION

The site at 27-33 Delhi Road, North Ryde has an area of approximately 1.8 hectares. Further, it is defined as Lot 160 in Deposited Plan (DP) 1136651, Parish of Hunters Hill, County of Cumberland. The location of the site is shown on Drawing No. 13/1310/1.

4. PREVIOUS ENVIRONMENTAL REPORTS

Six previous environmental reports that were prepared for the site by others were provided for our review. These were titled:

- *Environmental Audit for Due Diligence of Property at 27-37 Delhi Road, North Ryde, New South Wales, 4 July 2002* (2002 Assessment), prepared by Peter J Ramsay & Associates Pty Ltd (PJRA);
- *Hazardous Materials Survey Report, ING Real Estate, Global TV – Delhi Road, North Ryde, NSW, Ref: S10028:56796 – Revision No.1, June 2007*, prepared by Noel Arnold & Associates (NAA)*;*
- *Targeted Soil Sampling Program at the Property 27-37 Delhi Road, North Ryde, New South Wales, 20 October 2009 (2009 Assessment)*, prepared by PJRA;

- *Report on Phase 1 Contamination Assessment, North Ryde Station Precinct, Prepared for Transport Construction Authority, Project 72518.01, August 2011* (2011 Assessment), prepared by prepared by Douglas Partners Pty Ltd (DP);
- *UPSS Stage 1 Inspection Program: Global Business Park, 18 November 2011* (2011 Environmental Appraisal), prepared by AECOM Australia Pty Ltd (AECOM); and
- *Report on Limited Phase 2 Contamination Assessment, Station Site North, Station Suite South, OSL Site & Part RMS Site of North Ryde Station Precinct, North Ryde, Prepared for Transport for NSW, Document No. ADP-1207-CON-4022, Project 72518.02 Rev 1, November 2012* (2012 Assessment), prepared by DP.

The pertinent information from our review of the available reports is outlined below.

4.1 Site History Review

A review of site's land use history was undertaken as part of PJRA's 2002 Assessment, DP's 2011 Assessment and also AECOM's 2011 Environmental Appraisal. In addition, DP's 2012 assessment report summaries the results of the historical appraisal performed as part of their earlier PSI. The combined site history appraisal completed for the previous assessments has involved a review of a number of key information sources including aerial photographs of the site and surrounds, historical land titles, records held by Ryde City Council, the Department of Energy and Utilities and WorkCover NSW, EPA databases and information provided by the Royal Australian Historical Society. Anecdotal information provided by site occupants was also considered. We consider the available site history information to be comprehensive.

Based on the information provided in the previous assessment reports, the site was developed as a television studio complex in the mid-1960s, a use which continued until at least 2002. A single large studio building was located in the central portion of the site, whilst a smaller workshop/warehouse building was located in the east of the site. The land surrounding the buildings comprised access roads, paved carparks and landscaping/garden areas. However, by the time of PJRA's 2009 Assessment the main studio building had been demolished and the site was unoccupied, although the previously existing access roads and the small workshop/warehouse building remained. Prior to the 1960s the site comprised largely undeveloped rural land, although there is evidence that orchards and market gardens may have been active on the land between the 1940s and early 1960s.

A number of potentially contaminating facilities/installations are also reported to have been located on the site including up to six underground petroleum storage systems (UPSSs), two above ground storage tanks (AGSTs) used to store diesel fuel, a substation, a paint shop and a below ground grease trap. The transformers and one AGST were located adjacent to a workshop/warehouse building in the east of the site, whilst the grease trap was located in the southern portion of a site adjacent to an associated kitchen. The second AGST is reported to have been located in the north-west of the site, and the paint shop is reported to have been located in the north-east of the main studio building. The UPSSs are further discussed in Section 4.2 below.

4.2 Underground Petroleum Storage Systems

The purpose of AECOM's 2011 Environmental Appraisal was to evaluate the presence of UPSSs at the site, and involved a site inspection and review of WorkCover NSW records. Six UPSSs are expected to have been located at the site, and their locations (where known) are shown on Drawing No. 13/1310/2.

Based on the information provided by WorkCover, one UPSS was located immediately to the north of the workshop/warehouse building in the east of the site. PJRA's 2002 Assessment confirmed that this UPSS had a capacity of approximately 27 000 L and contained diesel fuel. However, by the time of PJRA's 2009 Assessment this facility had been removed with the excavated area having been partially backfilled.

Site plans provided by WorkCover also show that two UPSSs (at least one of which contained petrol) were located beneath a driveway immediately to the west of the abovementioned diesel UPSS. In addition, based on anecdotal information obtain by PJRA in 2002, two additional UPSSs which contained aviation fuel were once located in the north-east of the site (and now removed), and were associated with a helipad located on adjacent land.

The information provided by WorkCover also shows that a sixth UPSS was located on the site, however, the location of this facility cannot be confirmed.

4.3 Hazardous Building Materials

NAA's hazardous materials survey of June 2007 involved an inspection of all built structures of the site for the presence of hazardous building materials including asbestos, polychlorinated biphenyls (PCBs), lead-based paints, synthetic mineral fibres (SMFs) and ozone depleting substances. Laboratory analysis of materials potentially containing asbestos was also performed as part of the survey, as were field swab tests to determine if paints are lead based.

NAA identified asbestos containing materials, synthetic mineral fibres, lead based paint and also polychlorinated biphenyl containing capacitors (in light fittings) within the fabric of the buildings. No lead-based paints were identified. The majority of these materials were present in the main studio building which occupied the site and also in two gatehouses which have since been demolished. However, asbestos cement sheeting was also identified in the small workshop/warehouse building which remains on the site, including in paneling below a window and also in the external eaves. NAA report that approximately 82 m^2 of asbestos-based sheeting remains in this building. It is also noted that NAA did not identify any SMFs, PCBs or ozone depleting substances in within the building which remains.

4.4 Soil Sampling and Analysis

Soil was sampled from 13 boreholes positioned across the site as part of PJRA's 2002 Assessment, including six across the general site, six positioned in the three areas where UPSSs were confirmed to be/have been located, and one borehole was also targeted to the substation in the east of the site. Sampling from an additional 10 boreholes was subsequently undertaken as part of PJRA's 2009 Assessment, six of which were positioned in and around the footprint of a former studio building which is known to have contained asbestos cement sheeting and one borehole was targeted to the former grease trap. The remaining three sampling points were positioned in and around the pit where the diesel UPSS had been removed.

Sampling from a further 11 locations on the site was later undertaken as part of DP's 2012 Assessment. Six of these sampling points were positioned across the general site, two were targeted to UPSS areas in the east of the site, one was positioned where the paint shop is believed to have been located and two were positioned in the areas where the diesel AGSTs previously existed.

The results of the soil sampling performed by PJRA and DP showed that the concentrations of chemical contaminants in the soils across the site are generally low. However, elevated concentrations of light fraction total petroleum hydrocarbons (TPH C_6-C_9) above the adopted screening criteria were identified (by PJRA in 2002) in the soil in the north east of the site where UPSSs containing aviation fuel were previously located. In addition, the results of DP's 2012 sampling program showed that the soils in the east of the site where the diesel AGST had been located are impacted with petroleum hydrocarbons. Further, elevated polycyclic aromatic hydrocarbon (PAH) concentrations were measured in a number of soil samples retrieved during both PJRA's and DP's assessments, and several heavy metals were also identified in the soil at concentrations exceeding adopted screening criteria. The PAH and metals impacts are expected to be due to imported fill material rather than the contamination point sources.

In addition, during DP's 2012 Assessment a fragment of fibre cement sheeting is reported to have been identified on the land surface in the north-east of the site within the footprint of where the main studio building was located. A sample of this material was collected and analysed, and confirmed to contain asbestos.

It should be noted that the purpose of PJRA's assessments were to evaluate the environmental condition of the site with regard to an ongoing commercial/industrial land use. Further, since both PJRA and DP completed their assessments a new set of screening criteria which are designed to be protective of both human-health and the environment have been released. In view of this, the conclusions and recommendations provided in the previous reports need to be evaluated based on a comparison of the data with regard to the most current screening criteria. An appraisal of the previous assessment results with regard to the current criteria is provided in Section 12 of this report.

4.5 Groundwater Sampling and Analysis

Piezometers were constructed in three boreholes on the site (BH124, BH125 and BH126) as part of DP's 2012 Assessment, and which are reported to have been installed to depths of between 10 m and 13 m. BH124 was positioned in the far north-east of the site in the access road to the property, whilst BH125 was positioned in the east of the site in the vicinity of where three UPSSs are known to have been located. BH126 was positioned further downslope to the south. The wells are considered to be appropriately positioned to determine the extent of groundwater impacts associated with leakage from the UPSS facilities.

The sampling of the wells is reported to have been performed using a low-flow methodology in accordance with EPA guidelines and current best practice, however, due to insufficient water in BH126 the sample was collected using a disposable bailer.

The results of DP's groundwater sampling show that the concentrations of chemical contaminants in the groundwater are generally low and representative of the expected background levels in the regional aquifer. However, elevated xylene concentrations (8 ug/L and 4 ug/L) are reported for wells BH125 and BH126, and an elevated TPH (C_6-C_9) concentration (16 ug/L) was also measured in the sample retrieved from BH126. These impacts are likely to be associated with leakages from the UPSSs on the site. However, the TPH and xylene concentrations measured in the groundwater are very low would be expected to attenuate naturally prior to the groundwater discharging to the nearest down-gradient receiving environment at potentially harmful levels, this being Lane Cove River located approximately 730 m to the south-east. That is, the site is not considered to be a source of unacceptable groundwater impacts.

4.6 Outcomes of Previous Assessments and Recommendations

In total, soil sampling was performed at 34 locations across the site as part of the previous assessments, which is considered generally appropriate to screen the 1.8 hectare property for potential contamination. Further, targeted soil sampling has been performed at the potentially contamination sources that have been identified at the site (as defined in Sections 4.1 and 4.2). In addition, the number of samples analysed from each sampling location and the suite of chemical contaminants tested for in the samples is considered to be generally appropriate to have determined the nature and extent of contamination at the site. Also, the groundwater sampling performed as part of DP's 2012 Assessment is considered sufficient to appraise the risks associated with chemically impacted groundwater, and in our opinion the results of the groundwater sampling have demonstrated that the site is not likely to be the source of any unacceptable groundwater impacts. That is, further assessment or remediation of groundwater is not considered necessary.

However, our review of the previous environmental reports has identified some minor data gaps in the assessment record. In particular:

- WorkCover records have shown that six UPSSs have been located on the site, whilst the location of only five UPSSs has been confirmed. That is, one UPSS remains unaccounted for and could potentially remain on the site;

- PAHs have been identified as a contaminant of concern at the site, however, an insufficient number of samples have been analysed for PAH to determine the extent of PAH impacts using a statistically-based approach; and
- There is the potential for the light fraction petroleum hydrocarbon concentrations identified in the soil during PJRA's 2002 Assessment (at location BH5) to have attenuated naturally over time. Therefore, further soil sampling would be required to determine if unacceptable hydrocarbon concentrations remain in the soil at this location.

In view of these data gaps, further assessment of the site was recommended, including additional soil sampling and also a ground penetrating radar (GPR) survey to determine if any UPSSs remain on the property.

5. SITE FEATURES

The site was inspected on 29 July 2013 to confirm the condition of the land and to identify potential contamination sources. A plan showing the current site configuration is shown on Drawing No.13/1310/2. The key site features as determined by the site inspection are:

- The site is currently vacant and unoccupied. The footprint of a large former building is visible in the central portion of the site and which comprises an exposed earth surface. Given the extent of tree growth within the footprint area it appears that the building has been demolished for a number of years. A small workshop/warehouse style building remains in the east of the site, which is in a state of partial demolition. Remnant asphalt access roads are located around the perimeter of the site and are interspersed with residual landscaping areas.

- A partially filled excavation is located immediately to the north of the remnant building, and corresponds to the area where a diesel UPSS is reported to have been removed. Further, a small pit that is located in the south of the site and which has been backfilled with crushed concrete is expected to indicate the area where a below ground grease trap has been removed. In addition, concrete pads are visible behind the building in the east of the site and are expected to be the remnant foundations for the AGST which is was previously at this location. Also, remnant fuel oil pipework which is attached to the building wall is visible at this location.
- Several small fragments of bonded asbestos were observed on the land surface in the north-eastern portion of the large building footprint. This corresponds to the area where DP also identified bonded asbestos during their 2012 Assessment. A thorough inspection of the site was undertaken to identify and locate asbestos materials, and based on the inspection the asbestos impacts appear to be confined to a small 400 m^2 area (as shown on Drawing No. 13/1310/3)
- A small firewater pumphouse remains in the west of the site, and which contains one small AGST that has been used to store diesel fuel.
- The site has a moderate natural slope to the south, however, the land has a stepped profile which suggests that cutting and filling may have occurred. In particular, a steep scarp extends along the northern margin of the building footprint, and shale/fine grained sandstone bedrock was observed along the face of the scarp, which is evidence of extensive cutting. The southern portion of the site is expected to have been extensively filled, and is expected that the material used for filling has been derived from the site.
- The land to the north-west and east of the site is occupied by commercial/industrial properties, although a parcel of vacant and undeveloped land is also located to the east. The recently constructed North Ryde Station and associated car parking area is located to the north. Epping Road and the M2 Motorway are located on the land to the south and west of the site.

6. GEOLOGY AND HYDROGEOLOGY

The Geological Survey of NSW 1:100,000 Sydney Geological Map (Sheet 9130) shows that the site is located on the boundary between two geological units, these being the underlain by the Middle Triassic Age 'Ashfield Shale' and the 'Hawkesbury Sandstone'. The Ashfield Shale comprises black to dark-grey shale and laminiate, whilst the underlying sandstone unit comprises medium to coarse grained quartz sandstone with minor shale and laminite lenses.

The natural soils encountered on the site during this 2013 further investigation predominantly comprised grey and brown silty clays, although brown sandy clays were also observed at two sampling locations. Similar soils were also encountered during the previous soil sampling programs performed by others. These are consistent with natural soils in-situ weathered from the regional soil formations. In addition, shale bedrock was encountered in two of our bores at depths of 1 m and 2.7 m, whilst sandstone bedrock was also encountered in one bore at a depth of 0.4 m. Both shale and fine grained sandstone was also observed in the walls of the basement area of the former building which has been cut to a depth of approximately 4 m below the natural ground surface. Further, our review of the Acid Sulfate Soil (ASS) risk maps available on the EPA NSW Natural Resources Atlas shows that the site is located in an area that is not likely to be affected by ASSs. This is consistent with the soil profile observed at the site and also the geological map review.

A layer of fill material between 0.2 m and 3.8 m in thickness was also identified at the majority of our sampling locations. The fill was observed to comprise silty clay, sandy clay, sandy gravel and gravelly clay. Similar fill material was also encountered during the soil sampling programs performed as part of PJRA's and DP's previous assessments. Further, much of the fill appears to be locally derived natural soil which has most likely been derived from cutting on the site itself. However, some imported soil material is likely to be present.

A search of the Department Natural Resources (DNR) groundwater database was also performed as part of DP's 2011 Assessment to identify wells in the vicinity of the site. The search results identified 16 registered groundwater monitoring wells located within 1 km of the site, all of which are located up-gradient of the site to the north. The aquifer depths for the wells (where reported) are stated as being between approximately 108 m and 160 m below the ground surface, and the aquifer lithology is reported to comprise and sandstone. Further, the depth to groundwater in the three monitoring wells installed on the site as part of DP's 2012 Assessment is reported to be between approximately 2.7 m, 3.5 m and 10.5 m below the ground surface. The groundwater within the wells is expected to primarily be due to perched water flowing along the soil/bedrock interface.

Based on the observations made during our soil sampling activities, the information contained in the previous environmental assessment reports and our review of the site geology and regional groundwater conditions, a summary of the site hydrogeology is summarised in Table 6.1.

TABLE 6.1 – SITE HYDROGEOLOGY

Depth to Aquifer at Site:	Local Perched Water: Approximately 2-5 m[1,2] Regional Aquifer: Approximately 10-20 m[1,2]
Aquifer Type and Lithology:	Clays and shale/sandstone[1,2]
Local Groundwater Flow Direction:	South[1], along axis of hillslope
Regional Groundwater Flow Direction:	South-South-East[1], along axis of local and regional hillslope and drainage depressions
Receiving Environments:	Lane Cove River, located approximately 730 m to the south-east of the site.

[1] Inferred conditions based on site inspection & geological map/groundwater database review.
[2] Actual conditions based on observations made during on-site drilling.

7. GROUND PENETRATING RADAR SURVEY

Based on information provided by WorkCover NSW, six UPSSs are likely to have been located on the site. However, the location of only five UPSS facilities has been confirmed based on the site inspections and historical information provided in the previous environmental reports. That is, one UPSS remained unaccounted for.

The site inspections previously performed by others (as documented in the previous reports) did not identify any visual evidence of the sixth UPSS, although AECOM's 2011 Environmental Appraisal does note the presence of a possible backfilled excavation in the main access driveway in the north-east of the site where a UPSS could possibly have been located. However, our review of satellite imagery available on the Google Earth program has shown that this area is in fact the footprint of a former small gatehouse building (now removed).

In order to determine if any UPSSs remain on the property, Geotrace (a specialist services location company) was engaged to undertake a GPR survey. The survey was performed on a close 3 m grid across the majority of the site. The only area excluded from the GPR survey was the basement area of the former studio building, which has been cut into the underlying bedrock. No evidence of UPSS infrastructure or backfilled pits was identified within the former basement area. The areas covered by the GPR survey are shown in Drawing No. 13/1310/3.

The GPR survey, which was undertaken on 29 July 2013, did not identify any sub-surface anomalies that are consistent with remnant UPSSs. Further, no backfilled pits were identified apart from those at the locations where UPSSs are known to have previously existed. That is, no UPSSs are expected to remain on the site and it is likely that the sixth UPSS was located in the areas where the UPSSs are known to have existed and was removed at the same time as these facilities.

8. DATA QUALITY OBJECTIVES

The *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM), the updated NEPM 2013 and Australian Standard (AS) 4482.1-2005 recommend that data quality objectives (DQOs) be implemented during the investigation of potentially contaminated sites. The DQO process described in AS 4482.1-2005 outlines seven distinct steps which are designed to ensure an investigation is performed in a structured and efficient manner. The seven steps and the associated processes that were implemented to ensure data and decision making quality are outlined below:

Step 1 – State the Problem

The site is proposed to be redeveloped for high density residential purposes. Prior to this assessment there was insufficient data to determine if the site is likely to be suitable for this proposed use.

Step 2 – Identify the Decision

To determine if the concentrations of contaminants in the soil at the site are likely to present an unacceptable risk to human-health or the environment for a residential land use setting where the soil is generally not accessible to site users.

Step 3 – Identify Inputs to the Decision

To enable a decision regarding the nature and extent of soil contamination at the site to be made, the following inputs were required:

- Undertaking a GPR survey to determine if any UPSSs remain on the site;
- Soil sampling from 17 locations across the site, including both general site locations and locations targeted to specific areas where potentially contaminating facilities have been located;
- Analysis of selected soil samples for key contaminants of concern; and
- Implementation of a quality assurance/quality control (QA/QC) program.

Step 4 – Define the Study Boundaries

The assessment was undertaken within the boundaries of the site located at 27-33 Delhi Road, North Ryde, NSW. The boundaries of the site are defined in Section 3 and are shown on Drawing No. 13/1310/2.

Step 5 – Develop a Decision Rule

To determine if any soil impacts at the site are significant for a high density residential land use setting, data was compared to relevant EPA endorsed criteria. The criteria for this assessment are further discussed in Section 11.

Step 6 - Specify Limits on Decision Errors

To ensure the precision, accuracy, completeness and comparability of data a QA program was implemented and acceptable error limits were defined. These are further discussed in Sections 10.2 and 10.3.

Step 7 – Optimize the Design for Obtaining Data

To ensure there are sufficient, reliable data to enable the project objectives to be met the following was implemented:

- Collection, storage and transport of soil samples in an appropriate manner to ensure sample integrity (refer to Section 9.2);
- Obtaining samples from an appropriate number of locations to address the data gaps in the assessment record so that the site has been comprehensively assessed in accordance with EPA guidelines; and
- The collection of an appropriate number of samples from each location and the analysis of samples for an appropriate analytical suite to screen the site for potential soil contamination, based on the potential contamination sources identified from our site inspection and review of previous environmental reports.

9. FIELD INVESTIGATION

The soil sampling activities for the PSI were undertaken by STS on 29 July 2013. The assessment was performed according to:

- EPA guidelines comprising:
  - *Contaminated Sites: Guidelines for Assessing Service Station Sites, 1994*;
  - *Contaminated Sites: Sampling Design Guidelines, 1995*;
  - *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, 1997*;
  - *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition), 2006*;
  - *Guidelines for the Assessment and Management of Groundwater Contamination, 2007*;
- Guidelines issued under Schedule B of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM), December 1999 and the updated NEPM of April 2013;

- *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites* published by the Australian and New Zealand Environment and Conservation Council/National Health and Medical Research Council, January 1992 (ANZECC Guidelines); and
- *Australian Standard 4482.1-2005: Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil – Part 1: Non-volatile and Semi-volatile Compounds, 2 November 2005, Standards Australia.*

9.1 Sampling Methodology

The sampling program was specifically designed to address the data gaps in the previous environmental assessments, and involved the collection of soil samples from 19 locations.

Fifteen of the locations were positioned across the general site. That is, in conjunction with the 18 general site boreholes drilled for the previous assessments, soil has been sampled from 33 boreholes general site locations, which is a sufficient number to determine the nature and extent of soil impacts on a 1.8 hectare property in accordance with EPA guidelines and NEPM. Further, one borehole (BH1) was positioned in the east of the site where UPSSs had been located and two sampling points were also targeted to an area adjacent to the eastern site boundary where a diesel AGST had been previously located. The sample locations and site features are shown on Drawing No. 13/1310/2.

Locations for soil sampling were identified based on the results of our site inspection and review of previous environmental reports prepared by others, and the position of on-site facilities. Sample locations were referenced to existing ground features and positioned subject to on-site services, subsurface conditions and other constraints, which were encountered during fieldwork activities.

The samples were collected by qualified and experienced environmental engineers and/or technicians. A description of all the samples collected and their corresponding sample locations is provided on soil profile log sheets in Appendix A.

9.2 Sample Handling & Equipment Decontamination

A drill rig equipped with solid augers was used to obtain the soil samples, and the samples were retrieved directly from the augers by hand using disposable latex gloves. However, a hand auger was used to advance the boreholes at several locations where drill rig access was not possible. For duplicate samples, the soil was placed directly into a stainless steel bowl before being transferred into new clean jars prepared by Australian Laboratory Services (ALS). No sample mixing was carried out to ensure volatile compounds that may be present are not lost. All sampling equipment was decontaminated prior to use and between sampling locations by thoroughly washing with a mixture of water and DECON 90 and rinsing with potable water.

All jars were filled to the rim to minimize head space. The sample jars were then placed into ice-filled chests and transferred to ALS for analysis. Chain of Custody (COC) documentation was used to record and track the samples. COC documentation detailing the required analyses accompanied the samples to the laboratory. The environmental engineer signed the appropriate section of the COC form before providing the samples to the laboratory.

9.3 Analytical Program

The selection of analytes was based on our review of the previous environmental reports observations made during our site inspection and EPA site assessment guidelines. The analytes for the soil samples included polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH) and monocyclic aromatic hydrocarbons (MAH).

The analytical program for the soil samples is outlined in the COC documentation, which is provided in Appendix B. ALS Sydney was selected as the primary laboratory, whilst ALS Brisbane was selected as the secondary laboratory as part of the quality assurance program. Both ALS Sydney and ALS Brisbane are NATA accredited for the analyses performed.

9.4 Soil Vapour Survey

During the soil sampling program the concentrations of ionisable volatile organic compounds (VOCs) released from the soil matrix were measured using a photoionisation detector (PID). This provides a qualitative screen of the degree to which the soil samples may be impacted with VOCs. The screening methodology involved the placement of a small portion of each sample (up to approximately 50g) into a sealed plastic 'snaplock' bag, which is kept at room temperature and out of direct sunlight for 10-20 minutes before the PID reading as taken in the headspace above the sample. The PID was calibrated using a 100 ppm isobutylene span gas prior to use.

The PID readings obtained during the soil vapour survey are presented in the soil sample log sheets (Appendix A). The concentration of ionisable vapours measured in the headspace above the majority of the soil samples ranged from 0.1 ppm to 5.4 ppm (v/v isobutylene equivalent), which is low and suggests that the soil is not significantly impacted with VOCs.

10. QUALITY ASSURANCE PROGRAM

Quality assurance (QA) of data was a key component of this investigation and val;idation sampling program in order to appraise the representativeness and integrity of samples and accuracy and reliability of the analytical results. This is in accordance with the NEPM and AS 4482.1-2005.

The QA procedures, actions and checks implemented during the investigation included:

- The utilisation of appropriate sampling methods in accordance with the EPA requirements, the NEPM and other key guidelines;
- Appropriate sample handling and transportation, and analysis of samples within recommended holding times;
- The collection and analysis of quality control (QC) samples;
- Implementation of internal laboratory QC analyses; and
- The use of National Association of Testing Authorities (NATA) registered laboratories (primary and secondary) and methods.

10.1 Quality Control Sampling

Inaccuracies in sampling and analytical programs can result from many causes, including collection of unrepresentative samples, cross contamination between samples, unanticipated interferences between elements during laboratory analyses, equipment malfunctions and operator error. Inappropriate sampling, preservation, handling, storage and analytical techniques can also reduce the precision and accuracy of results.

In order to address these potential data quality issues, a field-based QC program was undertaken to measure the effectiveness of the QA procedures by comparison with acceptance criteria. The NEPM has documented procedures for QC sampling and analysis to ensure that the required degree of accuracy and precision is obtained. The NEPM and EPA guidelines recommend the use of two laboratories for the implementation of a field QC program in addition to the internal QC procedures followed by the laboratories, which are required in accordance with their NATA registration.

According to the NEPM the collection of intra and inter-laboratory duplicate samples is required, along with blank samples. Intra-laboratory and inter-laboratory samples are duplicates of primary samples that are collected in the field. Intra-laboratory samples are analysed by the primary laboratory and are used as a check on the precision of the sampling and analytical procedures. Inter-laboratory samples are analysed by a secondary laboratory and provide a check as to the accuracy of the analytical data. Field blank samples include rinsate blanks and trip blank samples.

Rinsate blanks are samples of water collected from field equipment after decontamination, and are used to determine the effectiveness of the decontamination procedures. Trip blanks are samples of deionised water prepared prior to sampling, and are stored and transported with the samples. They are used to identify laboratory errors or to identify sources of contamination due to sample storage and handling.

According to the NEPM a split of a minimum of 10% of the primary samples as field duplicate samples (5% inter-laboratory and 5% intra-laboratory) as well as blanks is required. Where less than 20 samples are to be analysed, a minimum of two field duplicate samples (one inter-laboratory and one intra-laboratory) and a blank is generally considered sufficient. Blanks are generally collected on each day that sampling is performed, and are analysed where necessary.

For this contamination assessment the following field quality control samples were collected for analysis:

- Three intra-laboratory duplicate samples; and
- Three inter-laboratory duplicate samples.

In view of the rigorous field-based decontamination procedures that were implemented during the investigation, the collection of rinsate and trip blank samples was not considered necessary.

10.2 Quality Control Criteria

A check on the comparability of the field duplicate sample results is achieved by calculating the Relative Percent Difference (RPD). RPDs are calculated as the absolute value of the difference between the primary and duplicate sample results, divided by the average value, expressed as a percentage.

According to AS 4482.1-2005 (and referenced in the NEPM) RPDs below 50% are considered to demonstrate good correlation between duplicate sample results. However, AS 4482.1-2005 also states that the acceptable variation between results can be higher for organic analytes than for inorganics, and for low concentrations of analytes. In view of this, and based on STS's experience, RPDs up to 70% are considered to be acceptable for organic species. RPDs of 100% or more are generally considered to demonstrate poor correlation unless results are less than five times the laboratory detection limits.

10.3 Laboratory Quality Control

A laboratory QC program involves the preparation and analysis of their own duplicate samples, reagent blanks and control samples (where the analyte concentration is known) or matrix spikes. Duplicate samples are subjected to the same preparation and analytical procedures as primary samples. The laboratories are required to analyse matrix spikes or control samples at a minimum frequency of 5% of the total number of primary samples in each sample batch.

The results of method blanks, duplicates and control sample analyses are compared by the laboratory to established quality assurance criteria for data precision and accuracy. If the results do not meet the criteria, then the analyses should be repeated. The relevant criteria are:

- Method blanks should not return any positives on analysis;
- Duplicate samples should not vary by more than 35% from the mean result; and
- Control samples should generally give a recovery of 75-125%.

11. ASSESSMENT CRITERIA

Current EPA guidelines state that the key criteria for assessing potentially contaminated sites in New South Wales are the Soil Investigation Levels (SILs), which are outlined in *Guidelines for the NSW Site Auditor Scheme, 2nd Edition* (DEC, 2006). The SILs have been adopted from Schedule B(1) of the National Environmental Protection Council document *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (NEPM).

The NEPM criteria comprise Health-Based Investigation Levels (HILs) and the Ecologically-Based Investigation Levels (EILs). The HILs are threshold values that are indicative of potential adverse impacts to human health, whilst the EILs are values that indicate a potential phytotoxic effect to plants.

In recent years the 1999 NEPM has been under review, with an updated draft document being released in 2010. In April 2013 the updated NEPM was officially released and has been endorsed by EPA. The new 2013 NEPM has been developed using essentially the same framework as the 1999 version, however, it does provide updated HIL criteria for a range of chemical contaminants. It also builds on the EILs provided in the 1999 NEPM by outlining a more comprehensive set of environmental screening levels (ESLs), which are designed not only to be indicative thresholds for phytotoxic effects to plants, but to be protective of ecosystems generally. Further, the 2013 NEPM outlines criteria for key volatile hydrocarbon compounds which are designed to be protective of human-health via a soil vapour inhalation exposure pathway (termed Health Screening Levels (HSLs)). The 2013 NEPM criteria should now be used for environmental assessments in the Australian context as they are the most current and comprehensive set of screening criteria available. That is, they are used in preference to the SILs.

There are four main categories of HIL/HSL outlined in the 2013 NEPM, which are each used to appraise the risks posed by site contamination for different land use settings. These include:

Residential A: for a 'standard' residential land use with gardens and accessible soil, including children's day care centres, preschools and primary schools.

Residential B: for a residential land use with minimal opportunities for soil access, including properties with fully and permanently paved yard space such as high-rise apartments and flats

Recreational C: for parks, recreational open space, playing fields, including secondary schools

Commercial/Industrial D: for a commercial/industrial land use.

It is noted that the NEPM HILs do not provide criteria for some petroleum hydrocarbon compounds. In the absence of HIL criteria the '*threshold concentrations for a sensitive land use*' (EPA Threshold Concentrations) outlined in EPA's "*Guidelines for Assessing Service Station Sites*" (EPA, 1994) are used, however, the 1999 NEPM HILs do provide threshold values for hydrocarbon fractions that may be adopted provided that speciation testing is undertaken for specific aromatic and aliphatic components.

Where a proposed land use will include more than one land use category (e.g. mixed residential/commercial development) the criteria which are protective of the most sensitive of the combined land uses should be adopted.

11.1 Criteria for this Assessment

A high-density residential land use is proposed for the site, which is likely to include the construction of numerous multi-story unit towers. Therefore, the HILs (Residential B) criteria are the most applicable and have been adopted for this investigation. The EPA Threshold Concentrations have also been adopted for petroleum hydrocarbon compounds in the absence of HIL criteria. In addition, the HSLs for vapour intrusion have been considered with regard to a residential land use setting.

Given that landscaping zones may form part of a future redevelopment, the ESLs should also be considered. However, it should be noted that the use of the ESLs with regard to heavy metal contaminants requires soil data for pH and cation exchange capacity (CEC), and that these parameters were not tested for during the previous environmental assessments. In view of this, the phytotoxicity-based investigation levels (PILs) outlined in the *Guidelines for the NSW Site Auditor Scheme, 2nd Edition* (DEC, 2006) have been used. The PILs are generic values that are indicative of potential phytotoxic effect to plants for a sandy loam soil and within an urban context.

The criteria adopted for this investigation are outlined in Table 11.1 below.

TABLE 11.1 – SITE SOIL ASSESSMENT CRITERIA
(all concentrations in units of mg/kg)

Contaminant	HIL (Residential B)	HSL A and B (Low-High Density Residential)[3]	EPA Threshold Concentrations	PILs
Inorganics				
Arsenic (total)	500			20
Beryllium	90			
Cadmium	150			3
Chromium	500[1]			400
Cobalt	600			
Copper	30000			100
Lead	1200			600
Manganese	14000			500
Mercury	120[2]			1
Nickel	1200			60
Vanadium				
Zinc	60000			200
Organic Contaminants				
TPH (C_6-C_9)			65	
TPH (C_{10}-C_{36})			1000	
F1 TPH		45[4]		
F2 TPH		110[5]		
Benzene		0.5	1	
Toluene		160	1.4	
Ethyl benzene		55	3.1	
Total Xylenes		40	14	
Naphthalene		3		
Total PAHs	400			
Carcinogenic PAHs	4			
Aldrin + Dieldrin	10			
Chlordane	90			
DDT+DDD+ DDE	600			
Heptachlor	10			
PCBs	1			
Phenols	45000			

[1] Criterion for hexavalent chromium
[2] Criterion for inorganic mercury
[3] HSL for sandy soils within 1 m of the land surface
[4] F1 TPH = TPH (C_6-C_9) minus BTEX fraction
[5] F2 TPH = TPH (C_{10}-C_{16}) minus naphthalene fraction

12. ANALYTICAL RESULTS AND INTERPRETATION

The analytical results for the soil samples retrieved during this investigation are presented in the NATA endorsed laboratory reports included in Appendix C and are summarised in the Table A attached to this report. In addition, the results from the previous assessments have been re-tabulated (in Tables B to D) and compared to the NEPM 2013 criteria. The results exceeding the assessment criteria are highlighted in the tables accordingly.

It should be noted that only the individual, primary sample results for heavy metals, TPH, MAH and PAH from the previous assessments have been re-tabulated, as these were the only contaminants which have been found in the soil at elevated concentrations. As discussed in Section 4.4, the concentrations of other chemical species in the soil are below criteria which are protective of human-health and the environment for a high-density residential land use setting.

An appraisal of the results for each contaminant which has exceeded the adopted assessment criteria is provided below.

12.1 Polycyclic Aromatic Hydrocarbons

The concentrations of PAHs measured in the soil samples retrieved for this 2013 further investigation and also the previous investigations are generally low and below the NEPM 2013 HIL criteria which are protective of human-health for a high density residential land use setting. However, the concentrations of combined carcinogenic PAHs measured in a number of soil samples (4 mg/kg to 8.5 mg/kg) are above these screening criteria.

In order to evaluate whether the elevated carcinogenic PAH concentrations are actually significant for a high density residential land use, the 95% upper confidence limit (UCL) of the arithmetic means of the carcinogenic PAH concentrations in the soil were calculated using the USEPA program 'ProUCL'. This statistical technique in essence models the average contaminant concentrations that site users or occupants may be exposed to during a lifetime of moving about a particular site. It is a methodology that is endorsed by EPA and other international regulatory agencies, such as the USEPA, and is a commonly used a means of evaluating the risks posed by site contamination to human-health.

12.1.1 Statistical Analyses

The combined data from this 2013 further investigation and the previous assessments performed by PJRA and DP shows that PAHs have been tested for in the fill at 36 sampling points evenly spaced across the site. This is a sufficient number of sampling points to characterize the nature and extent of soil contamination for a 1.8 hectare site in accordance with EPA guidelines. Therefore, there is sufficient data to evaluate the potential risks to human-health using a statistical approach. The results of the UCL calculations are presented in Appendix D. It should be noted that where the carcinogenic PAH concentrations have been measured to be below laboratory detection limits, the laboratory detection limit has been used in the statistical calculations, which is adopting a conservative approach.

The 95% UCL for carcinogenic PAHs is calculated to be 3.4 mg/kg based on a gamma data distribution (as recommended by ProUCL). This is below the HIL for a high-density residential land use. That is, the PAH concentrations in the soil do not present an unacceptable risk to human-health for a high density residential land use setting.

12.2 Petroleum Hydrocarbons

The TPH and BTEX concentrations measured in the soils on the site are generally low and below the NEPM HIL screening criteria. However, elevated TPH (C_{10}-C_{36}) concentrations (1 870 mg/kg to 33 700 mg/kg) well above the NSW EPA Threshold Concentration of 1 000 mg/kg have been measured in the near surface soil in the east of the site where a diesel AGST previously existed. Further, the TPH (C_{10}-C_{16}) fraction measured in two samples retrieved from this area (350 mg/kg and 8 579 mg/kg) are above the NEPM HSL criterion of 280 mg/kg for vapour intrusion in clay soils. That is, as the TPH impacted soil is present at the near surface where it may be readily accessible to site users and at concentrations which present a potential risk to human-health, remediation is considered necessary to make the site suitable for a high-density residential land use.

Further, the light fraction TPH (C_6-C_9) concentrations measured in the soil at one sample location (BH5) from PJRA's 2002 assessment (300 mg/kg) was above the relevant EPA Threshold Concentrations criterion of 65 mg/kg. BH5 was positioned adjacent to where two UPSSs were previously located in the east of the site, and the TPH impacts were measured in samples collected from below 2.5 m depth. The TPH (C_6-C_{10}) fraction measured in three soil samples retrieved from this location (50 mg/kg, 57 mg/kg and 300-370 mg/kg) are also above the adopted NEPM 2013 HSL criterion of 50 mg/kg for vapour intrusion in clay soils within 1 m of the surface. However, as these soil samples were retrieved from depths greater than 2.5 m, the HSL of 150 mg/kg (for soils 2-4 m depth) should be applied. Therefore, the HSLs are exceeded in only one sample.

Further, a total of four boreholes have been drilled adjacent to the UPSSs in the east of the site, and elevated TPH concentrations have only been detected in BH5 from PJRA's 2002 Assessment. This indicates that the volume of residual TPH impacted soil is this area is likely to be small. Further, BH1 from this 2013 investigation was positioned immediately adjacent to PJRA's BH5, and no elevated TPH concentrations were measured in the soil samples retrieved from this borehole, which also shows that the TPH concentrations are likely to have reduced over time through natural attenuation.

12.2.1 Appraisal of Potential Soil Vapour Impacts at Location BH5

It should be noted that the HSLs are not threshold levels, which when exceeded, are indicative of actual soil gas emissions that would be harmful to human-health. Rather, these criteria are designed to indicate a potential that soil vapour issues may exist and which would then require further consideration.

The samples retrieved from PJRA's BH5 (from the 2002 Assessment) and the other three boreholes targeted to this UPSS area (as part of both DP's 2012 assessment and this 2013 further investigation) were screened with a PID to determine if the soil is emitting volatile organic compounds in gaseous form. The results of the PID surveys are presented on the soil profile logs from PJRA's and DP's previous assessments, and on the soil logs from this assessment provided in Appendix A of this report. These show that whilst elevated PID readings were measured in BH5 at the depths where soil impacts were identified, the readings in the upper 1 m of soil ranged from 1.2 ppm to 2.0 ppm, which is low and suggests that the TPH impacted soil identified below 2.5 m depth is not resulting in vapour impacts at the land surface. Further, the PID readings recorded for the soil samples retrieved from the other three boreholes positioned in the vicinity of BH5 (which were collected between the near surface and 3.6 m depth) ranged from <1 ppm to 3.5 ppm which are low and also suggest that the soil at these locations is not affected by elevated concentrations of hydrocarbon vapours.

In view of the above, and that the volume of TPH affected soil in the vicinity of BH5 is expected to be small (refer to Section 12.2 above), any residual TPH in the soil at this location is not likely to present an unacceptable risk to human-health via a vapour inhalation exposure pathway. That is, active remediation of the hydrocarbon affected soil at location BH5 would not be necessary.

12.3 Heavy Metals

The analytical results from the previous assessments performed by PJRA and DP show that the concentrations of copper (110 mg/kg to 160 mg/kg), manganese (520 mg/kg to 1 300 mg/kg) and nickel (61 mg/kg to 150 mg/kg) measured in several soil samples are above their PILs of 100 mg/kg, 850 mg/kg and 60 mg/kg respectively. However, these nickel concentrations are within the NEPM background ranges for Australian soils. Further, the soils derived from Sydney shale landscapes (including the Ashfield Shale) are characterized by naturally elevated natural manganese, often occurring in concentrations up to 10 000 mg/kg. That is, the manganese and nickel concentrations measured in the soils on the site are within the expected range of natural variability for Sydney soils and therefore do not present an unacceptable risk to plant health.

In addition, whilst the copper concentrations which exceed the PIL criteria are also above the expected background ranges for this metal, they only marginally exceed the PILs and have been identified at isolated locations across the site. Further, the vegetation growing on the site was observed to be in a healthy condition and displays no signs of obvious phytotoxic stress. In view of this, the PIL exceedences for copper and not considered to be significant for a high-density residential land use setting.

12.4 Recommendations Based on Soil Sampling Results

Based on the results of this further site investigation and also those from the previous environmental assessments performed by others, the site is considered to be suitable for a high-density residential land use setting provided that the area of heavy fraction petroleum hydrocarbon (TPH C_{10}-C_{36}) impacted soil in the east of the site is remediated and that the fragments of bonded asbestos identified on the land surface in the north-east of the former building footprint are removed.

12.5 Duty to Report Site Contamination

Under the provisions of the *Contaminated Land Management Act 1997* (CLM Act), a site owner or occupant has a duty to notify EPA of any significant contamination that has the potential to cause human-health or environmental impacts. The requirements for reporting contamination are outlined in EPA's Guidelines on the *Duty to Report Contamination Under the Contaminated Land Management Act 1997* (Duty to Report Guidelines), which became effective on 1 December 2009. This guideline outlines the specific triggers which need to be considered for notifiable contamination under the CLM Act.

Where contaminants exceed their SIL criteria by more than 2.5 times or where the average concentrations of contaminants in soil exceed the applicable SILs, EPA must be notified. In the case of asbestos for which no SIL is available, the presence of free asbestos fibres in soil that is accessible to humans and susceptible to the generation of dust would present sufficient risk as to necessitate notification. Further, it should be noted that the Duty to Report Guidelines do not define notification thresholds for all contaminants. EPA has advised that where no criteria are listed, the need to submit a notification (or otherwise) should be based on advice provided by an environmental consultant.

The concentrations of chemical contaminants measured in the soils on the site are below the abovementioned notification thresholds listed in the Duty to Report Guidelines for the current (commercial/industrial) land use and also for a high-density residential land use setting. Whilst there are currently no specific notification thresholds for TPH in soil or in relation to bonded asbestos materials, the TPH impacted soil on the site does present a potential risk to human-health as it is located at the land surface and could therefore be readily accessible to site users. Further, although the presence of bonded asbestos materials does not present an immediate risk to human-health, there is the potential for these materials to break down over time and release asbestos fibres into the environment. However, there would be no need to notify EPA of contamination provided that the TPH impacted soil and bonded asbestos materials are removed from the site/remediated in the short term.

13. REMEDIATION AND VALIDATION

STS was subsequently engaged by Goodman to remediation both the petroleum hydrocarbon (TPH C_{10}-C_{36}) impacted soil in the east of the site and the fragments of bonded asbestos which had been identified on the land surface in the north-east of the former building footprint. The approach to the remedial works is outlined below, and the results of the validation program are also discussed.

13.1 Remediation of Hydrocarbon Impacted Soil

Initially, soil was removed to 0.05 m depth over an 8 m^2 area where heavy fraction petroleum hydrocarbon impacted soil had been identified based on the results of this further investigation and also previous soil sampling performed by DP. The affected area is located on an embankment between the eastern property boundary and the remnant workshop/warehouse building, and corresponds to the area where an AGST which contained diesel fuel was previously located (refer to Drawing No. 13/1310/2). The affected area is also shown in detail on Drawing No. 13/1310/4.

The results of the initial validation sampling showed that a number of samples had failed. Three additional phases of excavation would subsequently be required to remove all the hydrocarbon impacted soil, and validation sampling was performed after each excavation phase. The validation sampling program is further discussed in Sections 13.4 to 13.6.

At the completion of the remedial works, the excavation covered an area approximately 10 m^2 (4 m x 2.5 m) and was between 0.1 m and 0.3 m in depth. In total, approximately 1.8 m^3 of hydrocarbon impacted waste soil was generated, and had been placed directly into a small skip bin provided by Dial a Dump Industries. The bin was subsequently collected by Dial a Dump and disposed of to a licensed landfill facility as General Solid Waste. At the time of writing this report the documentation issued by the landfill confirming the disposal of the waste soil was still pending. This will be provided as soon as it is received.

13.2 Remediation of Bonded Asbestos Materials

The remedial program to remove the bonded asbestos materials involved hand picking the fragments from the land surface across the affected area (defined on Drawing No. 13/1310/3). The methodology comprised dividing the affected area into 1 m grid lines on both a north-south and east-west axis, and walking each grid line three times. All visible bonded asbestos materials were collected on each pass and stored in a sealable plastic bag prior to being removed from the site and placed into a specific asbestos materials bin at SMEC Testing Services' soil and rock laboratory (which is collected periodically by a licensed waste contractor).

13.3 Clean Up Criteria

The adopted clean up criteria were that the residual concentrations of heavy fraction petroleum hydrocarbons (TPH C_{10}-C_{36}) in the soils on the site must below the NEPM 2013 HILs (Residential B) criteria, the EPA Threshold Concentrations and the HSLs for vapour intrusion for a residential land use setting.

With regard to the bonded asbestos materials, the clean-up criteria were that no visible fragments can remain on the land surface.

13.4 Validation Sampling & Analysis Methodology

Validation soil samples were retrieved from across the base of the hydrocarbon remediation area after each phase of excavation works. Eight samples were collected after each of the first two episodes of soil removal, nine were collected after the third phase and six were collected after the final (fourth) phase of excavation. In total, 31 primary soil samples were retrieved. The number of samples retrieved was appropriate to validate a shallow excavation of approximately 10 m^2 in accordance with EPA guidelines. A description of the samples collected is provided in Appendix A, whilst the validation sample locations are shown on Drawing No. 13/1310/4.

The samples were collected directly from the excavation face by hand using a stainless steel trowel, and were placed directly into a new clean jars prepared by Australian Laboratory Services (ALS). No sample mixing was carried out to ensure volatile compounds that may be present are not lost. All sampling equipment was decontaminated prior to use and between sampling locations by washing with a mixture of water and DECON 90 and rinsing with potable water.

All jars were filled to the rim to minimize head space. The sample jars were then placed into ice-filled chests and transferred to ALS for analysis. Chain of Custody (COC) documentation was used to record and track the samples. COC documentation detailing the required analyses accompanied the samples to the laboratory. The environmental engineer signed the appropriate section of the COC form before providing the samples to the laboratory.

Each sample collected was analysed for the contaminants of concern, these being TPH and MAH. The analytical program for the soil samples is outlined in the COC documentation, which is provided in Appendix E. ALS Sydney was selected as the primary laboratory, whilst ALS Brisbane was selected as the secondary laboratory. Both ALS Sydney and ALS Brisbane are NATA accredited for the analyses performed.

13.5 Validation Soil Vapour Survey

During the validation sampling program the concentrations of ionisable volatile organic compounds (VOCs) released from the soil matrix were measured using a photoionisation detector (PID). This provides a qualitative screen of the degree to which the soil samples may be impacted with VOCs. The screening methodology involved the placement of a small portion of each sample (up to approximately 50g) into a sealed plastic ‘snaplock’ bag, which is kept at room temperature and out of direct sunlight for 10-20 minutes before the PID reading as taken in the headspace above the sample. The PID was calibrated using a 100 ppm isobutylene span gas prior to use.

The PID readings obtained during the soil vapour survey are presented in the soil sample log sheets (Appendix A). The concentration of ionisable vapours measured in the headspace above the majority of the soil samples ranged from 0.9 ppm to 6.7 ppm (v/v isobutylene equivalent), which is low and suggests that the soil is not significantly impacted with VOCs.

13.6 Validation Soil Sampling Results

The analytical results for the validation sampling program are summarised in the Table E, where the contaminant concentrations in the soil samples have been compared with the designated clean up criteria. The analytical laboratory reports for the validation sampling program are also provided in Appendix C.

The results show that elevated TPH (C_{10}-C_{36}) between 1270 mg/kg and 15 400 mg/kg were measured in the soil during the first three validation sampling episodes, which are above the clean-up criteria. The TPH concentrations were generally decreasing with each sampling event, and after the final (fourth) sampling episode the measured residual concentrations of TPH in the soil samples were all below the clean-up criteria. This demonstrates that the heavy fraction TPH impacted soil identified in the east of the site has been effectively remediated.

13.7 Validation of Bonded Asbestos Affected Area

Twenty one small fragments of bonded asbestos were collected during the remedial program. During the first of the three hand picking events, 17 fragments were retrieved, and four fragments were collected during the second event. No fragments of bonded asbestos were identified during the third and final screening episode. That is, at the completion of the asbestos removal works no visible bonded asbestos materials remained on the land surface in the area where these materials had initially been identified.

14. EVALUATION OF QUALITY ASSURANCE

14.1 Field Duplicate Sample Results

The results of the field intra and inter-laboratory duplicate sample analyses for soils are compared to those of the corresponding primary samples in Table F. The results show that the variations between the primary and duplicate sample results are all below the allowable Relative Percentage Difference (RPD) criteria of 70% for organic species in all but five of the 66 comparable data sets, which is an acceptable rate of correlation.

The discrepancies encountered are expected to be due to the natural heterogeneous distribution of petroleum hydrocarbons in the soil. Further, the higher contaminant concentrations were measured in the primary soil samples, the results for which have been used as the primary data upon which our conclusions have been based. Therefore, the RPD discrepancies do not affect the outcome of the investigation.

14.2 Laboratory Quality Control Program

Our review of the laboratory's internal QC program has shown that the majority of internal duplicate samples, spike recoveries, surrogate standards and laboratory blanks were within the laboratories' recommended range for acceptable reproducibility. Therefore, STS considers the laboratory data obtained in the sampling program to be of acceptable precision, accuracy and reliability and representative of the site conditions encountered.

14.3 Procedure Based Quality Control

An appraisal of the key procedure-based quality control aspects of the investigation are summarized in Table 14.1 below.

Table 14.1 Appraisal of Procedure-Based Quality Control

Item	Compliance	Reference/Comments
Appropriate sampling methods adopted?	Yes	Refer to Sections 9.1 and 9.2
Appropriate sample handling and transportation procedures implemented?	Yes	Refer to Sections 9.2 and COC documentation in Appendix B
Samples analysed within recommended laboratory holding times?	Yes	Refer to COC documentation in Appendix B and laboratory reports in Appendix C
NATA accredited laboratory testing methods used?	Yes	Refer to laboratory reports in Appendix C

15. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this investigation, the following conclusions and recommendations are made:

- The results of previous environmental assessments performed by Peter J Ramsay & Associates Pty Ltd (PJRA), Douglas Partners Pty Ltd (DP) and AECOM Australia Pty Ltd (AECOM) show that the site was developed as a television studio complex in the mid-1960s and this use continued until at least 2002. The previously existing buildings and structures have since been demolished, apart from a small workshop/storage building which remains in the east of the site.
- Based on the site history information provided in the previous reports, the key potential contamination sources which have been located on the land include up to six underground petroleum storage systems (UPSSs), two diesel-containing above ground storage tanks (AGSTs), a substation, a paint shop and a below ground grease trap. Further, the site was confirmed to have been filled with imported soil. As the origin of the fill cannot be confirmed it had the potential to be chemically contaminated.

- Soil sampling was performed from a total of 34 locations across the site as part of PJRA's and DP's previous assessments. DP also installed and sampled three on-site groundwater monitoring wells. The results of the soil sampling programs show that the concentrations chemical contaminants in the soils across the site are generally low and below criteria that are protective of human-health for a high-density residential land use setting. Further, the results of DP's groundwater sampling show that the site is not expected to be the source of any unacceptable groundwater impacts. However, elevated concentrations of light fraction petroleum hydrocarbons (TPH) were measured (by PJRA in 2002) in the soil at one location in the north-east of the site where two UPSSs previously existed. In addition, DP (in 2012) identified the presence of soil impacted with heavy fraction TPH in an area where an AGST had previously existed adjacent to the eastern boundary of the property. Elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) were also measured in a number of soil samples retrieved during both PJRA's and DP's assessments. Also, whilst no asbestos fibres were measured in the soil samples retrieved from the site, DP identified a fragment of asbestos cement sheeting in the north-east of the site within the footprint of a former building. This is expected to have resulted from the demolition of the former buildings, which are known to have contained bonded asbestos materials.

- The previous assessments undertaken by PJRA, DP and AECOM are considered largely suitable to have confirmed the contamination related risks associated with the site. However, our review identified several minor data gaps in the assessment record. In particular, the location of only five of the six known UPSSs had been confirmed and there was insufficient information to determine the significance of the PAHs in the soil. Further, the extent to which the light fraction petroleum hydrocarbon impacts in the soil (identified by PJRA in 2002) may have naturally attenuated over time remained undefined. Therefore, further assessment was recommended, including additional soil sampling and also a ground penetrating radar (GPR) survey to determine if any UPSSs remained on the property.

- The GPR survey performed as part of this 2013 investigation did not identify any sub-surface anomalies that are consistent with remnant UPSSs. Further, no backfilled pits were identified apart from those at the locations where five UPSSs are known to have previously existed. That is, no UPSSs are expected to remain on the site and it is likely that the sixth UPSS was located in the areas where the other UPSSs are known to have existed and was removed at the same time as these facilities.
- The results of our further soil sampling program show that the concentrations of PAHs and light fraction petroleum hydrocarbons in the soils across the site do not present an unacceptable risk to human-health for a high-density residential land use setting. However, the soils in the vicinity of where an AGST previously existed adjacent to the eastern boundary of the site were confirmed to be impacted with heavy fraction TPH at concentrations that present a potential risk to human-health for a residential land use setting. Further, isolated fragments of bonded asbestos were identified on the land surface in the north-east of the site in the area where DP had previously identified these materials. In view of this, remediation of the heavy fraction TPH impacted soil and removal of the bonded asbestos would be necessary to make the site suitable for a high density residential land use.
- Remedial works were subsequently undertaken as part of this investigation, which included the excavation of the soil impacted with heavy fraction TPH and off-site disposal of the material to a licensed landfill facility. Following the removal of the soil, validation sampling was performed across the excavated area, the results of which show that the residual concentrations of TPH are below the adopted clean up criteria. The fragments of bonded asbestos were also removed, and the affected area was validated by way of visual inspection.
- Based on the result of this 2013 investigation and validation program, and also those from the previous assessments performed by PJRA, DP and AECOM, the residual concentrations of chemical contaminants in the soils across the site are not considered to present a risk to human-health for a residential land use setting with limited minimal opportunities for soil access. That is, the site is considered to be suitable for a high-density residential land use in its current condition.

16. LIMITATIONS

SMEC Testing Services Pty Limited has performed its services for this project in accordance with its current professional standards. Laboratory analyses were undertaken as part of this investigation by Australian Laboratory Services, who are NATA accredited for the analyses performed.

Our opinions outlined in this report are based on the results of soil sampling undertaken by SMEC Testing Services Pty Ltd and also information contained in previous environmental assessment reports prepared by others. SMEC Testing Services Pty Ltd accepts no liability for the reliability or otherwise of data provided other consultants' reports.

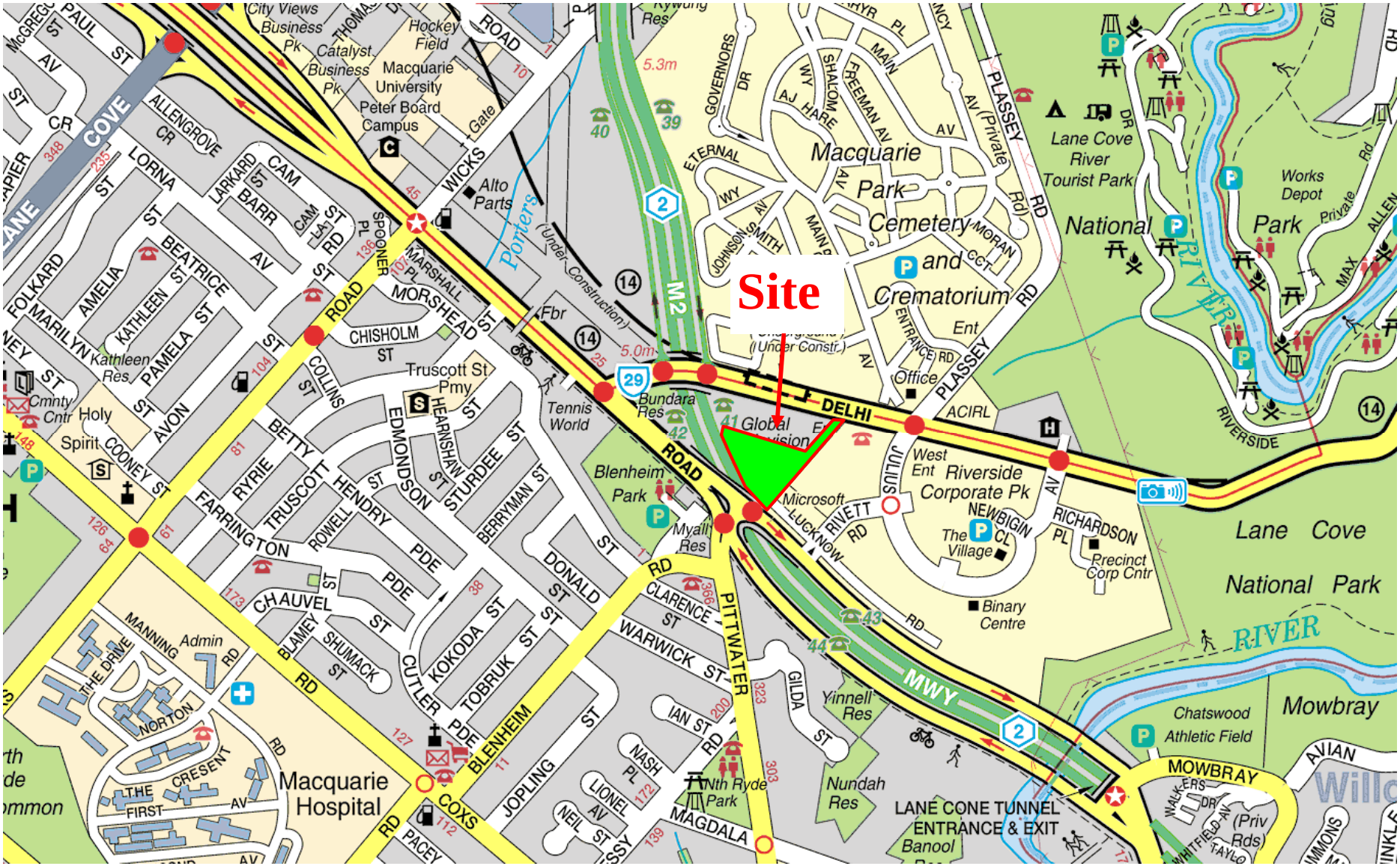
When assessing the extent of contamination across a site from a soil sampling program there is the possibility that variations may occur between sample locations and the actual presence of contaminated material at the site may differ from that referred to herein, since no sampling program, no matter how comprehensive, can reveal all anomalies and hot spots that may be present.

The data collected has been used to form an opinion about site contamination with regard to the proposed use of the site, that being a high density residential use. If the nature of the proposed development changes, the conclusions given in this report may need to be revised. Also, regulatory evaluation criteria are constantly changing and as a consequence, concentrations of contaminants presently considered low may, in the future, fall under different regulatory standards that may alter the outcome of this investigation. Opinions and judgments expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

This document and the information herein have been prepared solely for the use of Goodman Property Services for the purposes nominated in this report. No person or organization other than Goodman Property Services is entitled to rely on any part of the report without the prior written consent of SMEC Testing Services Pty Ltd. Any third party relying on this report shall have no legal recourse against SMEC Testing Services Pty Ltd or its parent organizations or subsidiaries and shall indemnify and defend them from all and against all claims arising out of, or in conjunction with such use or reliance.

David Yonge (BSc, MSc)
Environmental Manager,
SMEC Testing Services Pty Limited

FIGURES



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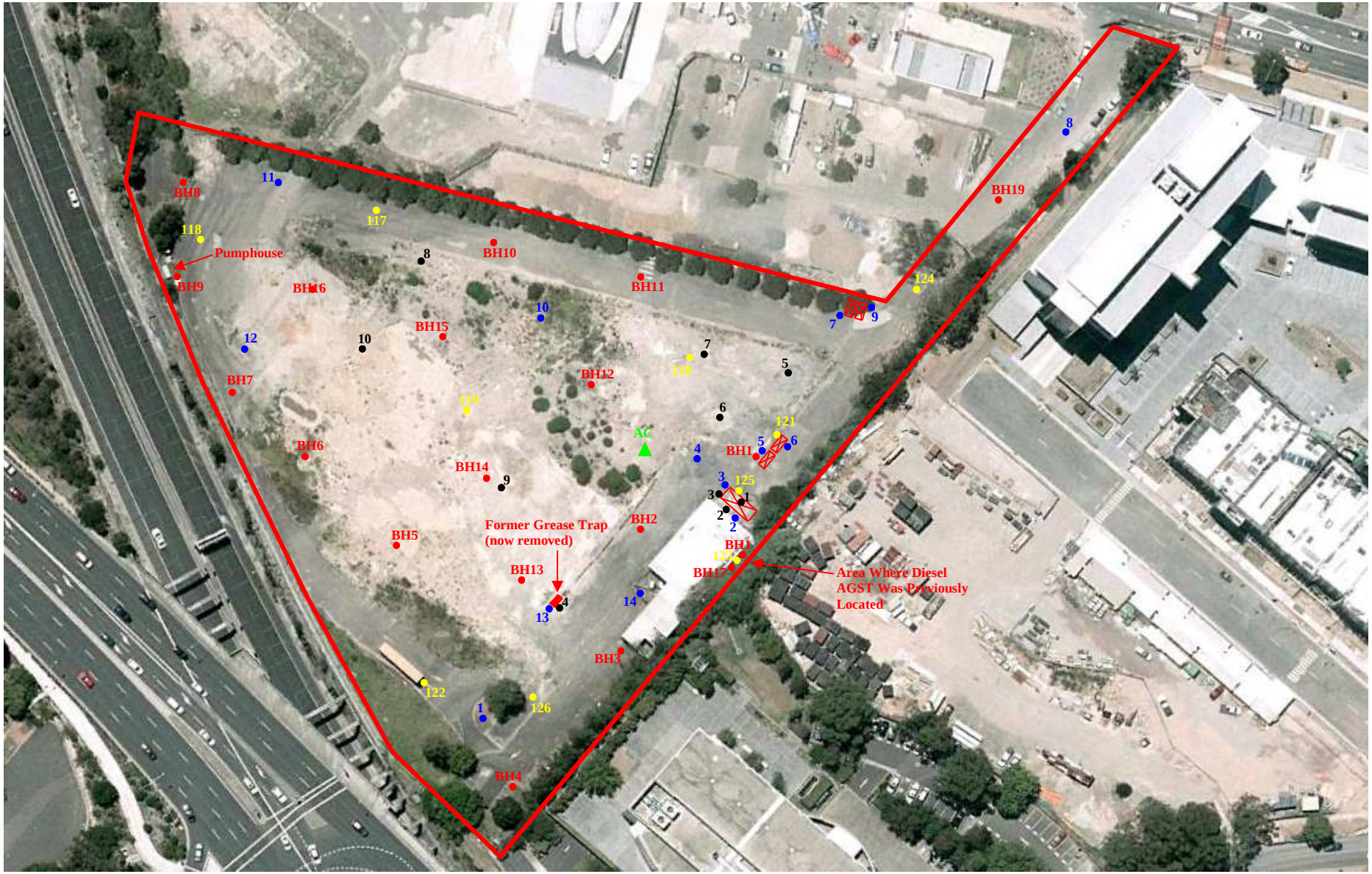
SMEC TESTING SERVICES Pty Ltd	Scale: 1: 11300 (at A4)	Date: October 2013
Client: Goodman Property Services		
Further Site Investigation, Remediation and Validation: Land at 27-33 Delhi Road, North Ryde, NSW - Site Location	Project No. 19257/3243C	
	Drawing No: 13/1310/1	



Legend

- Boundary of Site
- Former Location of UPSS (now removed)
- AC — Area Where Asbestos Cement Sheeting Was Identified on the Land Surface
- 1 — Borehole Number & Location (PJRA 2002)
- 1 — Borehole Number & Location (PJRA 2009)
- 117 — Borehole Number & Location (DP 2012)
- BH1 — Borehole Number & Location (STS 2013)

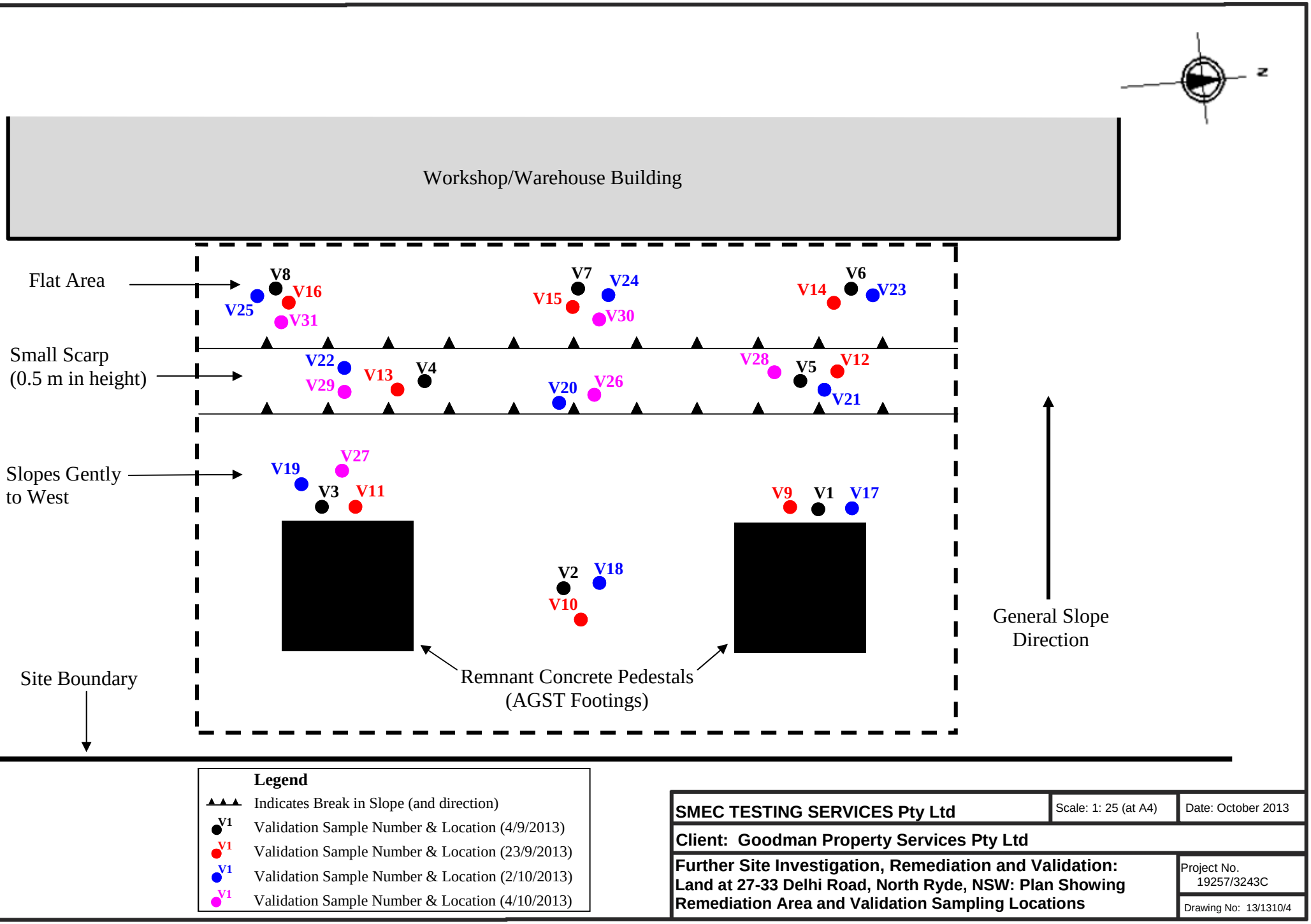
SMEC TESTING SERVICES Pty Ltd	Scale: 1: 1330 (at A4)	Date: October 2013
Client: Goodman Property Services Pty Ltd		
Further Site Investigation, Remediation and Validation: Land at 27-33 Delhi Road, North Ryde, NSW: Plan Showing Site Features and Soil Sampling Locations	Project No. 19257/3243C	
	Drawing No: 13/1310/2	

N

Legend

- Boundary of Site
- Former Location of UPSS (now removed)
- AC — Area Where Asbestos Cement Sheeting Was Identified on the Land Surface
- Area Subject to Asbestos Removal Works
- Area Excluded From GPR Survey

SMEC TESTING SERVICES Pty Ltd	Scale: 1: 1330 (at A4)	Date: October 2013
Client: Goodman Property Services Pty Ltd		
Further Site Investigation, Remediation and Validation: Land at 27-33 Delhi Road, North Ryde, NSW - Plan Showing Areas Subject to GPR Survey and Asbestos Removal Works	Project No. 19257/3243C	
	Drawing No: 13/1310/3	



Legend

- Indicates Break in Slope (and direction)
- V1 Validation Sample Number & Location (4/9/2013)
- V1 Validation Sample Number & Location (23/9/2013)
- V1 Validation Sample Number & Location (2/10/2013)
- V1 Validation Sample Number & Location (4/10/2013)

SMEC TESTING SERVICES Pty Ltd	Scale: 1: 25 (at A4)	Date: October 2013
Client: Goodman Property Services Pty Ltd		
Further Site Investigation, Remediation and Validation: Land at 27-33 Delhi Road, North Ryde, NSW: Plan Showing Remediation Area and Validation Sampling Locations	Project No. 19257/3243C	
	Drawing No: 13/1310/4	

TABLES OF RESULTS

Table A Analytical Results for Soil Samples - 2013 Further Investigation

Analytes	Sample Numbers																								NEPM Background Ranges	NSW EPA Threshold Concentrations	HIL/HSL Residential B Criteria
Borehole No.	BH1	BH1	BH1	BH2	BH3	BH4	BH5	BH5	BH5	BH6	BH6	BH7	BH8	BH9	BH10	BH11	BH12	BH13	BH14	BH15	BH15	BH16	BH17	BH18	BH19			
Sample No.	S1	S3	S4	S4A	S5	S7	S9	S10	S12	S14	S16	S18	S20	S21	S22	S25	S26	S28	S29	S30	S34	S36	S38	S39	S40			
Monocyclic Aromatic Hydrocarbons (MAHs)																												
Benzene		<0.2	<0.2											<0.2									<0.2	<0.2			1	0.5 (b)
Ethylbenzene		<0.5	<0.5											<0.5									<0.5	<0.5			3.1	55 (b)
Toluene		<0.5	<0.5											<0.5									<0.5	<0.5			1.4	160 (b)
Xylenes		<1.0	<1.0											<1.0									<1.0	<1.0			14	40 (b)
Napthalene		<1	<1											<1									<1	<1				3 (b)
Total Petroleum Hydrocarbons (TPHs)																												
Total C_6-C_9		<10	<10											<10									<10	<10			65	
F1 C_6-C_{10} [1]		<10	<10											<10									<10	<10				50 (b)
F2 C_{10}-C_{16} [1]		<49	<49											<49									8579	129				280 (b)
Total C_{10}-C_{36}		<50	<50											<50									33700	3280			1000	
Polycyclic Aromatic Hydrocarbons (PAHs)																												
Carcinogenic PAHs [2]	<0.6			<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6		<0.6	<0.6	<0.6	<0.6	<0.6	1.0	<0.6	<0.6			<0.6			4
Total PAHs above detection limits	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.1	<0.5	<0.5	<0.5		<0.5	2.7	<0.5	<0.5	<0.5	8.5	<0.5	0.7			<0.5	0.95-5 (a)		400

Notes : Results expressed as mg/kg unless otherwise indicated

[1] Calculated in accordance with Table 1A(3) of NEPM 2013

[2] Combined carcinogenic PAHs with relative potency to benzo(a)pyrene

ND = No individual species detected abovelaboratory detection limits.

Results shaded green exceed the NSW EPA threshold concentrations for a sensitive land use.

Results shaded red exceed the NEPM 2013 HILs/HSLs (Residential B) criteria for a residential land use with minimal opportunities for soil access.

(a) ANZECC background range used where no NEPM criteria are available

(b) NEPM 2013 HSL criterion for vapour intrusion, 0-1 m depth in clay soils

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Table B Analytical Results for Soil Samples - PJRA 2002 Assessment

Analytes	Sample Numbers																			NEPM Background Ranges	NSW EPA PILs	NSW EPA Threshold Concentrations	HIL/HSL Residential B Criteria
Borehole No.	1	2	2	2	3	3	3	3	3	4	4	5	5	5	5	5	5	5					
Sample No.	1B	2A	2C	2E	3A	3B	3C	3E	3G	4A	4B	5A	5B	5C	5E	5F	5G	5I					
Metals																							
Antimony	<2	<2	<2		<2		4.5			<2	<2	<2		<2		<2				4-44 (a)			
Arsenic	5.7	3.5	5.5		2.6		3.9			<2	12	9.7		6.7		5				1-50	20		500
Beryllium	1.1	<1	<1		<1		<1			1	<1	<1		1.1		<1							90
Cadmium	<1	2.4	<1		<1		<1			1.7	<1	<1		<1		<1				1	3		150
Chromium	65	69	13		18		32			140	28	20		35		13				5-1 000	400 (b)		500 (d)
Cobalt	18	18	<2		5.6		7.2			42	2.9	<2		17		5.4							600
Copper	40	66	57		33		**160**			54	21	13		34		16				2-100	100		30000
Lead	18	82	21		59		84			6.3	28	27		28	46	27	40	22		2-200	600		1200
Manganese	**520**	**590**	48		180		270			**1300**	73	43		**520**		220				850	500		14000
Mercury	0.04	0.15	0.05		0.08		0.11			0.05	0.03	0.06		0.05		0.03				0.001-0.1 (a)	1 (c)		120 (c)
Nickel	60	**61**	3.9		18		19			**150**	11	3.6		22		8.2				5-500	60		1200
Selenium	<2	<2	<2		<2		<2			<2	2.2	<<2		<2		<2							1400
Tin	<2	6.9	<2		2.9		77			3.1	<2	<2		<2		<2				1-25 (a)			
Zinc	60	99	28		72		85			94	40	22		76		42				10-300	200		60000
Monocyclic Aromatic Hydrocarbons (MAHs)																							
Benzene								<0.1	<0.1						<0.1	<0.1	<0.1	0.1				1	0.5 (e)
Ethylbenzene								<0.1	<0.1						<0.1	<0.1	<0.1	<0.1				3.1	55 (e)
Toluene								<0.1	<0.1						<0.1	<0.1	<0.1	<0.1				1.4	160 (e)
Xylenes								<0.3	<0.3						<0.3	<0.3	<0.3	<0.3				14	40 (e)
Total Petroleum Hydrocarbons (TPHs)																							
Total C_6-C_9			<2	<2			<2	<2	<2					<2	<2	**300**	57	60				65	
F1 C_6-C_{10} [1]			<2	<2			<2	<2	<2					<2	<2	**300-370**	**57**	**60**					50 (e)
F2 C_{10}-C_{16} [1]			<20	<20			<20	<20	<20					<20	<20	70	<20	<20					280 (e)
Total C_{10}-C_{36}			ND	ND			180	180	30					ND	ND	70	ND	ND				1000	
Polycyclic Aromatic Hydrocarbons (PAHs)																							
Carcinogenic PAHs [2]	<0.35				**6.7**	**6.9**	**6.3**	**8.5**	<1.64				<0.35			<0.35							4
Total PAHs above detection limits	ND				48	47	42	64	13				ND			<0.5				0.95-5 (a)			400

Notes : Results expressed as mg/kg unless otherwise indicated

[1] Calculated in accordance with Table 1A(3) of NEPM 2013

[2] Combined carcinogenic PAHs with relative potency to benzo(a)pyrene

ND = No individual species detected abovelaboratory detection limits.

Results shaded yellow exceed the PILs

Results shaded green exceed the NSW EPA threshold concentrations for a sensitive land use.

Results shaded red exceed the NEPM 2013 HILs/HSLs (Residential B) criteria for a residential land use with minimal opportunities for soil access.

(a) ANZECC background range used where no NEPM criteria are available

(b) Criterion for total chromium

(c) Criterion for inorganic mercury.

(d) Criterion for chromium (VI).

(e) NEPM 2013 HSL criterion for vapour intrusion, 0-1 m depth in clay soils

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Table B (cont) Analytical Results for Soil Samples - PJRA 2002 Assessment

Analytes	Sample Numbers																	NEPM Background Ranges	NSW EPA PILs	NSW EPA Threshold Concentrations	HIL/HSL Residential B Criteria
Borehole No.	6	6	6	6	6	7	7	7	7	7	9	10	11	11	12	13	14				
Sample No.	6A	6B	6C	6E	6G	7A	7B	7C	7E	7F	9A	10B	11A	11B	12B	13A	14A				
Metals																					
Antimony	<2	<2		<2			<2		<2		<2	<2		<2			<2	4-44 (a)			
Arsenic	4.3	5		9			6		11		<2	11		7			5	1-50	20		500
Beryllium	<1	<1		1			<1		1		1	<1		<1			<1				90
Cadmium	<1	<1		<1			<1		<1		<1	<1		<1			<1	1	3		150
Chromium	25	12		22			16		10		110	15		17			18	5-1 000	400 (b)		500 (d)
Cobalt	8.8	<2		22			4.3		6.7		34	<2		<2			5.1				600
Copper	46	13		37			53		19		61	24		19			24	2-100	100		30000
Lead	54	23	29	36	24		92		16		4.8	23		21			24	2-200	600		1200
Manganese	360	26		**910**			180		130		**950**	31		23			140	850	500		14000
Mercury	0.15	0.02		0.05			0.1		0.04		0.03	0.06		0.03			0.08	0.001-0.1 (a)	1 (c)		120 (c)
Nickel	20	<2		23			12		11		**120**	4.0		<2			12	5-500	60		1200
Selenium	<2	<2		2			4		<2		<2	<2		<2			<2				1400
Tin	2.6	<2		<2			3.7		<2		<2	<2		<2			<2	1-25 (a)			
Zinc	85	12		76			70		90		59	11		8.1			68	10-300	200		60000
Monocyclic Aromatic Hydrocarbons (MAHs)																					
Benzene				<0.1									<0.1			<0.1				1	0.5 (e)
Ethylbenzene				<0.1									<0.1			<0.1				3.1	55 (e)
Toluene				<0.1									<0.1			<0.1				1.4	160 (e)
Xylenes				<0.3									<1.5			<1.5				14	40 (e)
Total Petroleum Hydrocarbons (TPHs)																					
Total C_6-C_9			<2	<2	<2			<2		<2	<2		<2			<2	<2			65	
F1 C_6-C_{10}[1]			<2	<2	<2			<2		<2	<2		<2			<2	<2				50 (e)
F2 C_{10}-C_{16}[1]			<20	<20	<20			<20		<20	<20		<20			<20	<20				280 (e)
Total C_{10}-C_{36}			ND	ND	ND			30		ND	ND		ND			ND	ND			1000	
Polycyclic Aromatic Hydrocarbons (PAHs)																					
Carcinogenic PAHs[2]						<0.8						<0.35									4
Total PAHs above detection limits						4.3						ND						0.95-5 (a)			400

Notes : Results expressed as mg/kg unless otherwise indicated

[1] Calculated in accordance with Table 1A(3) of NEPM 2013

[2] Combined carcinogenic PAHs with relative potency to benzo(a)pyrene

ND = No individual species detected abovelaboratory detection limits.

Results shaded yellow exceed the PILs

Results shaded green exceed the NSW EPA threshold concentrations for a sensitive land use.

Results shaded red exceed the NEPM 2013 HILs/HSLs (Residential B) criteria for a residential land use with minimal opportunities for soil

(a) ANZECC background range used where no NEPM criteria are available

(b) Criterion for total chromium

(c) Criterion for inorganic mercury.

(d) Criterion for chromium (VI).

(e) NEPM 2013 HSL criterion for vapour intrusion, 0-1 m depth in clay soils

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Table C Analytical Results for Soil Samples - PJRA 2009 Assessment

Analytes	Sample Numbers																NEPM Background Ranges	NSW EPA PILs	NSW EPA Threshold Concentrations	HIL/HSL Residential B Criteria
	Borehole No.	1	1	1	1	2	2	2	3	3	3	3	4	4	4	4				
	Sample No.	1A	1C	1E	1H	2B	2E	2I	3B	3D	3F	3H	4A	4C	4D	4E				
Metals																				
Arsenic		4		4						5			3		5.0		1-50	20		500
Cadmium		<0.3		<0.3						<0.3			0.3		0.4		1	3		150
Chromium		19		16						19			39		30		5-1 000	400 (b)		500 (d)
Copper		45		47						45			26		**110**		2-100	100		30000
Lead		40		38						45			13		35		2-200	600		1200
Mercury		0.07		0.07						0.06			0.05		0.2		0.001-0.1 (a)	1 (c)		120 (c)
Nickel		20		12						16			42		22		5-500	60		1200
Zinc		78		59						72			76		100		10-300	200		60000
Monocyclic Aromatic Hydrocarbons (MAHs)																				
Benzene		<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			1	0.5 (e)
Ethylbenzene		<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			3.1	55 (e)
Toluene		<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			1.4	160 (e)
Xylenes		<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5			14	40 (e)
Total Petroleum Hydrocarbons (TPHs)																				
Total C_6-C_9		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20			65	
F1 C_6-C_{10}[1]		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20				50 (e)
F2 C_{10}-C_{16}[1]		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20				280 (e)
Total C_{10}-C_{36}		310	490	186	ND	143	ND	ND	230	410	117	ND	410	121	ND	ND			1000	
Polycyclic Aromatic Hydrocarbons (PAHs)																				
Carcinogenic PAHs[2]		**5.2**	**5.3**	2.3			<0.2			**6.01**										4
Total PAHs above detection limits		44.2	40.5	20.7			ND			44.4							0.95-5 (a)			400

Notes : Results expressed as mg/kg unless otherwise indicated

[1] Calculated in accordance with Table 1A(3) of NEPM 2013

[2] Combined carcinogenic PAHs with relative potency to benzo(a)pyrene

ND = No individual species detected abovelaboratory detection limits.

Results shaded yellow exceed the PILs

Results shaded green exceed the NSW EPA threshold concentrations for a sensitive land use.

Results shaded red exceed the NEPM 2013 HILs/HSLs (Residential B) criteria for a residential land use with minimal opportunities for soil access.

(a) ANZECC background range used where no NEPM criteria are available

(b) Criterion for total chromium

(c) Criterion for inorganic mercury.

(d) Criterion for chromium (VI).

(e) NEPM 2013 HSL criterion for vapour intrusion, 0-1 m depth in clay soils

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Table D Analytical Results for Soil Samples - DP 2012 Assessment

Analytes	Sample Numbers															NEPM Background Ranges	NSW EPA PILs	NSW EPA Threshold Concentrations	HIL/HSL Residential B Criteria
Borehole No.	117	117	118	119	119	120	120	121	122	123	123	124	125	126	126				
Sample No.	117-0.1	117-0.4	118-0.3	119-0.1	119-0.2	120-0.1	120-0.5	121-0.1	122-0.3	123-0.05	123-1.2	124-0.1	125-0.15	126-0.2	126-0.3				
Metals																			
Arsenic	<4	<4	6	<4	<4	<4	7	<4	<4	33	7	<4	15	<4	4	1-50	20		500
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	1	3		150
Chromium	8	13	8	6	7	46	10	41	40	34	10	72	13	17	13	5-1 000	400 (b)		500 (d)
Copper	19	6	29	23	27	26	27	28	19	**160**	24	34	30	51	22	2-100	100		30000
Lead	76	9	14	11	10	9	18	7	8	310	36	13	18	57	22	2-200	600		1200
Mercury	0.3	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	0.001-0.1 (a)	1 (c)		120 (c)
Nickel	3	9	9	5	14	46	6	44	38	11	1	76	8	14	7	5-500	60		1200
Zinc	48	15	21	34	70	48	13	42	32	730	45	48	16	95	35	10-300	200		60000
Monocyclic Aromatic Hydrocarbons (MAHs)																			
Benzene	<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			1	0.5 (e)
Ethylbenzene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			3.1	55 (e)
Toluene	<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			1.4	160 (e)
Xylenes	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3			14	40 (e)
Total Petroleum Hydrocarbons (TPHs)																			
Total C_6-C_9	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25			65	
F1 C_6-C_{10} [1]	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25				50 (e)
F2 C_{10}-C_{16} [1]	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	**350**	<50	<50	<50	<50				280 (e)
Total C_{10}-C_{36}	170	<100	<100	<100	<100	<100	<100	<100	<100	**3310**	**1870**	140	<100	<100	<100			1000	
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Carcinogenic PAHs [2]	<1.3	<0.4	<0.2	<0.4	<0.5	<0.2	<0.2	<0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<1.3	3-4				4
Total PAHs above detection limits	8.84	2.09	ND	1.78	2.88	0.56	ND	0.9	ND	0.3	2.8	0.2	ND	7.53	33.2	0.95-5 (a)			400

Notes : Results expressed as mg/kg unless otherwise indicated

[1] Calculated in accordance with Table 1A(3) of NEPM 2013

[2] Combined carcinogenic PAHs with relative potency to benzo(a)pyrene

ND = No individual species detected abovelaboratory detection limits.

Results shaded yellow exceed the PILs

Results shaded green exceed the NSW EPA threshold concentrations for a sensitive land use.

Results shaded red exceed the NEPM 2013 HILs/HSLs (Residential B) criteria for a residential land use with minimal opportunities for soil access.

(a) ANZECC background range used where no NEPM criteria are available

(b) Criterion for total chromium

(c) Criterion for inorganic mercury.

(d) Criterion for chromium (VI).

(e) NEPM 2013 HSL criterion for vapour intrusion, 0-1 m depth in clay soils

SMEC Testing Services

Table E Analytical Results for Soil Samples - 2013 Validation Program

Analytes	Sample No.	V1*	V2*	V3*	V4*	V5*	V6*	V7*	V8*	V9*	V10*	V11*	V12*	V13*	V14*	V15*	V16*	V17	V18	V19*	V20*	V21*	V22*	V23	V24*	V25*	V26	V27	V28	V29	V30	V31	NSW EPA Threshold Concentrations	HIL/HSL Residential B Criteria
	Sample Numbers																																	
	Date Sampled	4/9/13	4/9/13	4/9/13	4/9/13	4/9/13	4/9/13	4/9/13	4/9/13	23/9/13	23/9/13	23/9/13	23/9/13	23/9/13	23/9/13	23/9/13	23/9/13	2/10/13	2/10/13	2/10/13	2/10/13	2/10/13	2/10/13	2/10/13	2/10/13	2/10/13	4/10/13	4/10/13	4/10/13	4/10/13	4/10/13	4/10/13		
Monocyclic Aromatic Hydrocarbons (MAHs)																																		
Benzene		<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	<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	<0.2	1	0.5 (a)
Ethylbenzene		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<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	3.1	55 (a)
Toluene		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<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	1.4	160 (a)
Xylenes		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	14	40 (a)
Napthalene		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		3 (a)
Total Petroleum Hydrocarbons (TPHs)																																		
Total C_6-C_9		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	65	
F1 C_6-C_{10}[1]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		50 (a)
F2 C_{10}-C_{16}[1]		110	230	1560	1220	910	120	210	580	700	1210	4310	900	510	350	540	650	120	150	1140	500	170	190	50	80	360	<50	<50	<50	<50	<50	<110		280 (a)
Total C_{10}-C_{36}		3780	2230	11000	15400	12700	4220	5400	8320	3330	4500	13200	4760	3360	5450	7730	3960	520	840	3670	1880	1270	1520	780	1310	2440	<50	<50	260	180	160	760	1000	

Notes : Results expressed as mg/kg unless otherwise indicated

*Denotes sample removed during subsequent excavation works

[1] Calculated in accordance with Table 1A(3) of NEPM 2013

(a) NEPM 2013 HSL criterion for vapour intrusion, 0-1 m depth in clay soils

ND = No individual species detected abovelaboratory detection limits.

Results shaded green exceed the NSW EPA threshold concentrations for a sensitive land use.

Results shaded red exceed the NEPM 2013 HILs/HSLs (Residential B) criteria for a residential land use with minimal opportunities for soil access.

SMEC Testing Services

Table F Results of Quality Control - Intra and Inter Laboratory Duplicate Samples

Analyte	Sample Numbers																	
	S9	S10*	RPD (%)	S9	S11#	RPD	(%)	V1	S100A*	RPD (%)	V1	S101B#	RPD (%)	V12	S102C*	RPD (%)	V12	S103D#	RPD (%)
Monocyclic Aromatic Hydrocarbons (MAHs)																			
Benzene								<0.2	<0.2	<70	<0.2	<0.2	<70	<0.2	<0.2	<70	<0.2	<0.2	<70
Ethylbenzene								<0.5	<0.5	<70	<0.5	<0.5	<70	<0.5	<0.5	<70	<0.5	<0.5	<70
Toluene								<0.5	<0.5	<70	<0.5	<0.5	<70	<0.5	<0.5	<70	<0.5	<0.5	<70
Xylenes								<0.5	<0.5	<70	<0.5	<0.5	<70	<0.5	<0.5	<70	<0.5	<0.5	<70
Napthalene								<1	<1	<70	<1	<1	<70	<1	<1	<70	<1	<1	<70
Total Petroleum Hydrocarbons (TPHs)																			
Total C_6-C_9								<10	<10	<70	<10	<10	<70	<10	<10	<70	<10	<10	<70
Total C_{10}-C_{14}								<50	<50	<70	<50	<50	<70	210	110	63	210	100	**71**
Total C_{15}-C_{28}								2410	1790	30	2410	550	**126**	3740	1440	**89**	3740	1460	**88**
Total C_{29}-C_{36}								1370	1070	25	1370	300	**128**	810	530	42	810	510	45
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Acenaphthylene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Anthracene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Benz(a)anthracene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Benzo(a)pyrene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Benzo(b)fluoranthene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Benzo(k)fluoranthene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Benzo(g,h,i)perylene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Chrysene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Dibenzo(a,h)anthracene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Fluoranthene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Fluorene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Indeno(1,2,3-cd)pyrene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Naphthalene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Phenanthrene	<0.5	<0.5	<70	<0.5	<0.5	<70													
Pyrene	<0.5	<0.5	<70	<0.5	<0.5	<70													

Note: Results expressed as mg/kg dry weight.

* Denotes intra-laboratory duplicate sample analysed by primary laboratory (ALS Sydney)

# Denotes inter-laboratory duplicate sample analysed by secondary laboratory (ALS Brisbane)

RPDs that have been shaded exceed the acceptance criteria

SMEC Testing Services

APPENDIX A

SOIL PROFILE AND SAMPLING LOG SHEETS

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 1

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S1 @ 0.1 m		ASPHALT/SANDY GRAVEL PID = 0.2 ppm FILL			D
		0.5	SILTY CLAY: light grey with orange brown, medium to high plasticity	CL/CH		D-M
	S2 @ 1.0 m	1.0	WEATHERED SHALE: light brown with orange brown, clayey seams PID = 0.7 ppm		EXTREMELY LOW STRENGTH	D
		1.5				
	S3 @ 2.0 m	2.0	PID = 0.5 ppm			
		2.5				
	S4 @ 3.0 m		PID = 0.2 ppm BOREHOLE DISCONTINUED AT 3.0 M ON WEATHERED SHALE			

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services	Project No.: 19257/3243C	**BOREHOLE NO.: BH 2**
Project: 27-33 Delhi Road, North Ryde	Date : 29 July 2013	Sheet 1 of 1
Location: Refer to Drawing No. 13/1310/2	Logged: JK	

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S4A @ 0.1 m		ASPHALT/SANDY GRAVEL PID = 0.3 ppm FILL			D
			SILTY CLAY: light grey with orange brown, medium to high plasticity	CL/CH		D-M
			HAND AUGER REFUSAL AT 0.3 M ON SHALE BEDROCK			
		0.5				
		1.0				
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Hand Auger
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 3

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S5 @ 0.1 m		ASPHALT/SANDY GRAVEL PID = 0.1 ppm FILL			D
	S6 @ 0.2 m		SILTY CLAY: mottled dark grey with light grey and orange brown, medium plasticity, trace of gravel PID = 0.2 ppm			D-M
		0.5	FILL			
			SILTY CLAY: light grey with orange brown, low plasticity, trace of fine sand, trace of gravel			M
			BOREHOLE DISCONTINUED AT 0.8 M			
		1.0				
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 4

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S7 @ 0.1 m		ASPHALT/SANDY GRAVEL PID = 0.3 ppm FILL			D
	S8 @ 0.3 m	0.5	SANDY CLAY: dark brown/orange brown, fine to medium grained, low plasticity PID = 0.5 ppm FILL			D-M
		1.0	SILTY CLAY: orange brown with light grey, medium plasticity			M
		1.5	BOREHOLE DISCONTINUED AT 1.0 M			
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 5

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S9,S10,S11 @ 0.1 m		SILTY CLAY: dark brown with light grey and orange brown, medium plasticity, trace of gravel PID = 0.5 ppm			D
		0.5				D-M
						M
		1.0				
	S12 @ 1.5 m	1.5	PID = 0.4 ppm			
			FILL			
	S13 @ 2.0 m	2.0	SILTY CLAY: orange brown with light grey, medium to high plasticity PID = 0.3 ppm	CL/CH		M
			BOREHOLE DISCONTINUED AT 2.3 M			
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 6

Sheet 1 of 2

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S14 @ 0.1 m		ASPHALT/SANDY GRAVEL PID = 0.2 ppm FILL			D
	S15 @ 0.3 m	0.5	SILTY CLAY: light brown with orange brown and light grey, medium plasticity PID = 0.2 ppm			D-M
		1.0				M
		1.5				
		2.0				
		2.5	FILL			
	S16 @ 2.3 m		SILTY CLAY: dark grey brown, medium plasticity PID = 0.3 ppm FILL			M

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services	Project No.: 19257/3243C	**BOREHOLE NO.: BH 6**
Project: 27-33 Delhi Road, North Ryde	Date : 29 July 2013	Sheet 2 of 2
Location: Refer to Drawing No. 13/1310/2	Logged: JK	

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			SILTY CLAY: dark brown, medium plasticity			M
			FILL			
		3.5				
	S17 @ 3.8 m		SILTY CLAY: orange brown and light grey, medium to high plasticity PID = 0.1 ppm			M
		4.0	BOREHOLE DISCONTINUED AT 4.0 M			
		4.5				
		5.0				
		5.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 7

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S18 @ 0.1 m		ASPHALT/SANDY GRAVEL PID = 0.2 ppm FILL			D
	S19 @ 0.2 m		SILTY CLAY: dark grey with occasional light grey, medium plasticity, trace of gravel PID = 0.3 ppm			D-M
		0.5	FILL			
			SILTY CLAY: orange brown with light grey, medium to high plasticity	CL/CH		M
		1.0				
		1.5				
			SILTY CLAY: light grey with orange brown, fine to medium gravel			
		2.0				
			BOREHOLE DISCONTINUED AT 2.0 M			
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 8

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S20 @ 0.1 m		ASPHALT/SANDY GRAVEL PID = 0.2 ppm FILL			D
			SANDY CLAY: dark brown with orange brown, fine to medium gravel, low plasticity			D-M
			HAND AUGER REFUSAL AT 0.3 M ON SHALE BEDROCK			
		0.5				
		1.0				
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Hand Auger
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 9

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S21 @ 0.1 m		SILTY CLAY: dark brown, low plasticity, trace of gravel PID = 0.1 ppm FILL			D-M
			HAND AUGER REFUSAL AT 0.2 M			
		0.5				
		1.0				
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Hand Auger
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 10

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S22,S23,S24 @ 0.1 m		ASPHALT/SANDY GRAVEL PID = 0.3 ppm FILL			D
		0.5	CLAYEY SAND: orange brown, fine to medium grained			D-M
			HAND AUGER REFUSAL AT 0.5 M ON SHALE BEDROCK			
		1.0				
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Hand Auger
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 11

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S25 @ 0.1 m		ASPHALT/SANDY GRAVEL PID = 0.2 ppm FILL			D
			CLAYEY SAND: light brown, fine to medium grained			D-M
		0.5	HAND AUGER REFUSAL AT 0.4 M ON SHALE BEDROCK			
		1.0				
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Hand Auger
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 12

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S26 @ 0.1 m		GRAVELLY CLAY: dark grey with orange brown, low plasticity, trace of gravel PID = 0.1 ppm			D
		0.5	FILL			D-M
	S27 @ 1.0 m	1.0	SILTY CLAY: orange brown with light grey, medium to high plasticity PID = 0.3 ppm	CL/CH		M
			BOREHOLE DISCONTINUED AT 1.2 M			
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 13

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S28 @ 0.1 m		GRAVELLY CLAY: dark grey with dark brown, low plasticity PID = 0.4 ppm			D
			FILL			
			WEATHERED SANDSTONE: red brown, fine to medium grained		EXTREMELY LOW STRENGTH	M
		0.5				D
		1.0	BOREHOLE DISCONTINUED AT 0.9 M ON WEATHERED SANDSTONE			
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 14

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S29 @ 0.1 m		GRAVELLY CLAY: dark brown, low plasticity, gravel PID = 0.2 ppm			D
			FILL			D-M
		0.5	HAND AUGER REFUSAL AT 0.5 M ON WEATHERED SANDSTONE			
		1.0				
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Hand Auger
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 15

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S30,S31,S32 @ 0.1 m		SILTY CLAY: dark brown with dark grey, medium plasticity, trace of sand, trace of gravel PID = 0.4 ppm			D
						D-M
		0.5				
						M
	S33 @ 1.0 m	1.0	PID = 0.3 ppm			
		1.5				
	S34 @ 2.0 m	2.0	PID = 0.2 ppm FILL			
		2.5				
	S35 @ 2.5 m		SILTY CLAY: dark grey with light grey and orange brown, medium to high plasticity PID = 0.4 ppm FILL			M
			SHALE: dark grey, fine grained			M-W
						M
			BOREHOLE DISCONTINUED AT 3.0 M ON WEATHERED SHALE			

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services	Project No.: 19257/3243C	**BOREHOLE NO.: BH 16**
Project: 27-33 Delhi Road, North Ryde	Date : 29 July 2013	Sheet 1 of 1
Location: Refer to Drawing No. 13/1310/2	Logged: JK	

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S36 @ 0.1 m		GRAVELLY CLAY: dark grey with dark brown, orange brown and light grey, medium plasticity, gravel PID = 0.3 ppm			D
		0.5				M
			FILL			
		1.0				
	S37 @ 1.0 m		SILTY CLAY: orange brown with light grey, medium to high plasticity PID = 0.1 ppm	CL/CH		M
			BOREHOLE DISCONTINUED AT 1.3 M			
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services	Project No.: 19257/3243C	**BOREHOLE NO.: BH 17**
Project: 27-33 Delhi Road, North Ryde	Date : 29 July 2013	Sheet 1 of 1
Location: Refer to Drawing No. 13/1310/2	Logged: JK	

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S38 @ 0.1 m		SILTY CLAY: dark grey, low plasticity, trace of gravel PID = 5.4 ppm TOPSOIL/FILL			D
			HAND AUGER REFUSAL AT 0.3 M			
		0.5				
		1.0				
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Hand Auger
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 18

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S39 @ 0.1 m		SILTY CLAY: dark brown/grey, low plasticity, trace of gravel PID = 2.5 ppm FILL/TOPSOIL			D
			HAND AUGER REFUSAL AT 0.2 M			
		0.5				
		1.0				
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Hand Auger
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Goodman Property Services
Project: 27-33 Delhi Road, North Ryde
Location: Refer to Drawing No. 13/1310/2

Project No.: 19257/3243C
Date : 29 July 2013
Logged: JK

BOREHOLE NO.: BH 19

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
	S40 @ 0.1 m		ASPHALT/SANDY GRAVEL PID = 0.5 ppm FILL			D
		0.5	SILTY CLAY: light grey with orange brown, medium plasticity			D-M
			HAND AUGER REFUSAL AT 0.5 M ON SHALE BEDROCK			
		1.0				
		1.5				
		2.0				
		2.5				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Hand Auger
Hole Diameter (mm): 100
Angle from Vertical (°) 0

Project No. 19257/3243C

Description: AGST/Petroleum Hydrocarbon Remediation Area Validation

Engineer: DWY

Sample ID	Date Sampled	Depth (m)	Soil Description	PID (ppm)
V1	4/9/13	0.0-0.1	Loamy Sand: grey-brown, organic	3.9
V2	4/9/13	0.0-0.1	Loamy Sand: brown, organic	2.5
V3	4/9/13	0.0-0.1	Silty Sand: brown, organic	5.9
V4	4/9/13	0.0-0.1	Clay: grey-brown	4.6
V5	4/9/13	0.0-0.1	Clay: grey-brown	3.9
V6	4/9/13	0.0-0.1	Loamy Sand: grey-brown, organic	1.5
V7	4/9/13	0.0-0.1	Loamy Sand: grey-brown	2.0
V8	4/9/13	0.0-0.1	Loamy Sand: grey-brown, organic	2.3
V9	23/9/13	0.0-0.1	Clay: grey	3.0
V10	23/9/13	0.0-0.1	Clay: grey	2.7
V11	23/9/13	0.0-0.1	Clay: grey	6.7
V12	23/9/13	0.0-0.1	Clay: grey & orange-brown	3.4
V13	23/9/13	0.0-0.1	Clay: grey & orange-brown	3.7
V14	23/9/13	0.0-0.1	Gravelly Clay: grey & orange-brown	3.2
V15	23/9/13	0.0-0.1	Gravelly Clay: grey & orange-brown	2.2
V16	23/9/13	0.0-0.1	Clay: red-brown & grey	2.5
V17	2/10/13	0.0-0.1	Silty Clay: grey-brown	1.1
V18	2/10/13	0.0-0.1	Silty Clay: grey-brown	1.4
V19	2/10/13	0.0-0.1	Clay: grey-brown & orange-brown	3.0
V20	2/10/13	0.0-0.1	Silty Clay: grey-brown	3.1
V21	2/10/13	0.0-0.1	Clay: grey-brown & orange-brown	2.1
V22	2/10/13	0.0-0.1	Clay: grey-brown & orange-brown	1.9
V23	2/10/13	0.0-0.1	Clayey Gravel: brown & grey	1.5
V24	2/10/13	0.0-0.1	Clayey Gravel: brown & grey	2.0
V25	2/10/13	0.0-0.1	Clayey Gravel: brown & grey	3.1
V26	4/10/13	0.0-0.1	Clay: grey-brown & orange-brown	0.9
V27	4/10/13	0.0-0.1	Clay: grey-brown	1.2
V28	4/10/13	0.0-0.1	Clay: grey-brown & orange-brown	1.0
V29	4/10/13	0.0-0.1	Clay: grey-brown & orange-brown	1.3
V30	4/10/13	0.0-0.1	Clayey Gravel: brown & grey	0.9
V31	4/10/13	0.0-0.1	Clayey Gravel: brown & grey	1.7
S100A[1]	4/9/13	0.0-0.1	Loamy Sand: grey-brown, organic	
S101B[1]	4/9/13	0.0-0.1	Loamy Sand: grey-brown, organic	
S102C[2]	23/9/13	0.0-0.1	Clay: grey & orange-brown	
S103D[2]	23/9/13	0.0-0.1	Clay: grey & orange-brown	

[1] Intra-laboratory duplicate sample of primary sample V1

[2] Inter-laboratory duplicate sample of primary sample V12

APPENDIX B

CHAIN OF CUSTODY DOCUMENTATION

Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **ES1317190**		
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	Page	: 1 of 3
Order number	: 10297		
C-O-C number	: P19257 - COC1	Quote number	: ES2013SMETES0267 (EN/025/13)
Site	: ----		
Sampler	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 01-AUG-2013	Issue Date	: 01-AUG-2013 18:46
Client Requested Due Date	: 08-AUG-2013	Scheduled Reporting Date	: **08-AUG-2013**

Delivery Details

Mode of Delivery	: Client Drop off	Temperature	: 12.8'C
No. of coolers/boxes	: 2 HARD	No. of samples received	: 38
Security Seal	: N/A	No. of samples analysed	: 25

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
- Samples received in appropriately pretreated and preserved containers.
- Samples S11, S24 and S32 to be forwarded to ALS Brisbane.
- **Samples received in appropriately pretreated and preserved containers.**
- **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.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- 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 exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary 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*	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EP075 SIM PAH only SIM - PAH only	SOIL - S-04 TPH/BTEX
ES1317190-001	29-JUL-2013 15:00	S1		✓	✓	
ES1317190-002	29-JUL-2013 15:00	S2	✓			
ES1317190-003	29-JUL-2013 15:00	S3				✓
ES1317190-004	29-JUL-2013 15:00	S4				✓
ES1317190-005	29-JUL-2013 15:00	S4A		✓	✓	
ES1317190-006	29-JUL-2013 15:00	S5		✓	✓	
ES1317190-007	29-JUL-2013 15:00	S6	✓			
ES1317190-008	29-JUL-2013 15:00	S7		✓	✓	
ES1317190-009	29-JUL-2013 15:00	S8	✓			
ES1317190-010	29-JUL-2013 15:00	S9		✓	✓	
ES1317190-011	29-JUL-2013 15:00	S10		✓	✓	
ES1317190-012	29-JUL-2013 15:00	S12		✓	✓	
ES1317190-013	29-JUL-2013 15:00	S13	✓			
ES1317190-014	29-JUL-2013 15:00	S14		✓	✓	
ES1317190-015	29-JUL-2013 15:00	S15	✓			
ES1317190-016	29-JUL-2013 15:00	S16		✓	✓	
ES1317190-017	29-JUL-2013 15:00	S17	✓			
ES1317190-018	29-JUL-2013 15:00	S18		✓	✓	
ES1317190-019	29-JUL-2013 15:00	S19	✓			
ES1317190-020	29-JUL-2013 15:00	S20		✓	✓	
ES1317190-021	29-JUL-2013 15:00	S21				✓
ES1317190-022	29-JUL-2013 15:00	S22		✓	✓	
ES1317190-023	29-JUL-2013 15:00	S23	✓			
ES1317190-024	29-JUL-2013 15:00	S25		✓	✓	
ES1317190-025	29-JUL-2013 15:00	S26		✓	✓	
ES1317190-026	29-JUL-2013 15:00	S27	✓			
ES1317190-027	29-JUL-2013 15:00	S28		✓	✓	
ES1317190-028	29-JUL-2013 15:00	S29		✓	✓	
ES1317190-029	29-JUL-2013 15:00	S30		✓	✓	
ES1317190-030	29-JUL-2013 15:00	S31	✓			
ES1317190-031	29-JUL-2013 15:00	S33	✓			
ES1317190-032	29-JUL-2013 15:00	S34		✓	✓	
ES1317190-033	29-JUL-2013 15:00	S35	✓			
ES1317190-034	29-JUL-2013 15:00	S36		✓	✓	
ES1317190-035	29-JUL-2013 15:00	S37	✓			

			(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EP075 SIM PAH only SIM - PAH only	SOIL - S-04 TPH/BTEX
ES1317190-036	29-JUL-2013 15:00	S38				✓
ES1317190-037	29-JUL-2013 15:00	S39				✓
ES1317190-038	29-JUL-2013 15:00	S40		✓	✓	

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES		
- A4 - AU Tax Invoice (INV)	Email	accounts@smectesting.com.au
ALL REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	enquiries@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	enquiries@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	enquiries@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enquiries@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	enquiries@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	enquiries@smectesting.com.au
DAVID YONGE		
- *AU Certificate of Analysis - NATA (COA)	Email	dyonge@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dyonge@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dyonge@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	dyonge@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	dyonge@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	dyonge@smectesting.com.au

CHAIN OF CUSTODY RECORD

SMEC Testing Services Pty Ltd
PO Box 6989 (postal)
14/1 Cowpasture Place (office), Wetherill Park NSW 2164
Telephone: (02) 9756 2166 Fax: (02) 9756 1137
E-Mail: dyonge@smectesting.com.au Contact: David Yonge

Job No: 19257/3243C Order No: 10297

Laboratory: ALS Laboratory Group - Sydney Environmental Division
277-289 Woodpark Road, SMITHFIELD NSW 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Jacob Waugh

Laboratory number	Sample number	jar/ bottle	bag	Date sampled	Composite number	Sample type	Comments	ANALYSIS PAH	S7	S4
1	S1	1		29/07/2013		soil		X		
2	S2	1		29/07/2013		soil				
3	S3	1		29/07/2013		soil				X
4	S4	1		29/07/2013		soil				X
5	S4A	1		29/07/2013		soil		X		
6	S5	1		29/07/2013		soil		X		
7	S6	1		29/07/2013		soil				
8	S7	1		29/07/2013		soil		X		
9	S8	1		29/07/2013		soil				
10	S9	1		29/07/2013		soil		X		
11	S10	1		29/07/2013		soil		X		
-	S11	1		29/07/2013		soil	Please forward to ALS Brisbane	X		
12	S12	1		29/07/2013		soil		X		
13	S13	1		29/07/2013		soil				
14	S14	1		29/07/2013		soil		X		
15	S15	1		29/07/2013		soil				
16	S16	1		29/07/2013		soil		X		
17	S17	1		29/07/2013		soil				
18	S18	1		29/07/2013		soil		X		
19	S19	1		29/07/2013		soil				
20	S20	1		29/07/2013		soil		X		
21	S21	1		29/07/2013		soil				X
22	S22	1		29/07/2013		soil		X		
23	S23	1		29/07/2013		soil				
-	S24	1		29/07/2013		soil	Please forward to ALS Brisbane			
24	S25	1		29/07/2013		soil		X		

Environmental Division
Sydney
Work Order
ES1317190

Telephone : +61-2-8784 8555

Dan 1/8 1300

CHAIN OF CUSTODY RECORD

SMEC Testing Services Pty Ltd
PO Box 6989 (postal)
14/1 Cowpasture Place (office), Wetherill Park NSW 2164
Telephone: (02) 9756 2166 Fax: (02) 9756 1137
E-Mail: dyonge@smectesting.com.au Contact: David Yonge

Job No: 19257/3243C Order No: 10297

Laboratory: ALS Laboratory Group - Sydney Environmental Division
277-289 Woodpark Road, SMITHFIELD NSW 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Jacob Waugh

Laboratory number	Sample number	jar/ bottle	bag	Date sampled	Composite number	Sample type	Comments	ANALYSIS PAH	S7	S4
25	S26	1		29/07/2013		soil		X		
26	S27	1		29/07/2013		soil				
27	S28	1		29/07/2013		soil		X		
28	S29	1		29/07/2013		soil		X		
29	S30	1		29/07/2013		soil		X		
30	S31	1		29/07/2013		soil				
—	S32	1		29/07/2013		soil	Please forward to ALS Brisbane			
31	S33	1		29/07/2013		soil				
32	S34	1		29/07/2013		soil		X		
33	S35	1		29/07/2013		soil				
34	S36	1		29/07/2013		soil		X		
35	S37	1		29/07/2013		soil				
36	S38	1		29/07/2013		soil				X
37	S39	1		29/07/2013		soil				X
38	S40	1		29/07/2013		soil		X		
TOTAL		40						21		5

Released by SMEC Testing Services
David Yonge
Signed:
Date: 1/08/2013
Time: 12:30 PM

Received by:
Signed: David
Date: 1/8
Time: 1300

CoC Number: P19257 - COC1

Your quotation: SMEC 2012 (EN/025/12)

Preliminary results by:	Final results by:
Thurs 8 August 2013	Thurs 8 August 2013

Comments:

Standard Detection Limits Apply, Standard Turnaround Required on Results

Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **ES1319673**		
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	Page	: 1 of 2
Order number	: 10373		
C-O-C number	: P19257-COC2	Quote number	: ES2013SMETES0267 (EN/025/13)
Site	: ----		
Sampler	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 05-SEP-2013	Issue Date	: 05-SEP-2013 19:22
Client Requested Due Date	: 16-SEP-2013	Scheduled Reporting Date	: **12-SEP-2013**

Delivery Details

Mode of Delivery	: Client Drop off	Temperature	: 13.2'C
No. of coolers/boxes	: 1 HARD	No. of samples received	: 9
Security Seal	: N/A	No. of samples analysed	: 9

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
- **Samples received in appropriately pretreated and preserved containers.**
- **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.**
- **Sample 101B forward to ALS Brisbane as per COC**
- 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 exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary 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 - S-04 TRH/BTEXN
ES1319673-001	04-SEP-2013 15:00	V1	✓
ES1319673-002	04-SEP-2013 15:00	V2	✓
ES1319673-003	04-SEP-2013 15:00	V3	✓
ES1319673-004	04-SEP-2013 15:00	V4	✓
ES1319673-005	04-SEP-2013 15:00	V5	✓
ES1319673-006	04-SEP-2013 15:00	V6	✓
ES1319673-007	04-SEP-2013 15:00	V7	✓
ES1319673-008	04-SEP-2013 15:00	V8	✓
ES1319673-009	04-SEP-2013 15:00	100A	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	accounts@smectesting.com.au

ALL REPORTS

- *AU Certificate of Analysis - NATA (COA)	Email	enquiries@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	enquiries@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	enquiries@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enquiries@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	enquiries@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	enquiries@smectesting.com.au
- EDI Format - ESDAT (ESDAT)	Email	enquiries@smectesting.com.au

DAVID YONGE

- *AU Certificate of Analysis - NATA (COA)	Email	dyonge@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dyonge@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dyonge@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	dyonge@smectesting.com.au
- A4 - AU Tax Invoice (INV)	Email	dyonge@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	dyonge@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	dyonge@smectesting.com.au
- EDI Format - ESDAT (ESDAT)	Email	dyonge@smectesting.com.au

Environmental Division
Sydney
Work Order
ES1319673

CHAIN OF CUSTODY RECORD

SMEC Testing Services Pty Ltd Job No: 19257/3243C Order No: 10373
PO Box 6989 (postal)
14/1 Cowpasture Place (office), Wetherill Park NSW 2164
Telephone: (02) 9756 2166 Fax: (02) 9756 1137
E-Mail: dyonge@smectesting.com.au Contact: David Yonge

Telephone : +61-2-8784 8555

Laboratory: ALS Laboratory Group - Sydney Environmental Division
277-289 Woodpark Road, SMITHFIELD NSW 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Jacob Waugh

Subcon / Forward Lab / Split WO
Lab / Analysis: AS Perkslaine
Organised By / Date: 10/B 4/9/13
Relinquished By / Date:
Connote / Courier:
WO No: ES1319673
Attach By PO / Internal Sheet:

Laboratory number	Sample number	jar/ bottle	bag	Date sampled	Composite number	Sample type	Comments	$	ANALYSIS
1	V1	1		4/097/2013		soil		X	
2	V2	1		4/097/2013		soil		X	
3	V3	1		4/097/2013		soil		X	
4	V4	1		4/097/2013		soil		X	
5	V5	1		4/097/2013		soil		X	
6	V6	1		4/097/2013		soil		X	
7	V7	1		4/097/2013		soil		X	
8	V8	1		4/097/2013		soil		X	
9	100A	1		4/097/2013		soil		X	
—	101B	1		4/097/2013		soil	**Please forward to ALS Brisbane**	X	
TOTAL		10						10	

Released by SMEC Testing Services David Yonge Signed:	Date: 5/09/2013	Time: 3:30PM	CoC Number: P19257 - COC2
			Your quotation: SMEC 2012 (EN/025/12)
Received by: SOPSkop Lab Signed: AS	Date: 5/9/13	Time: 15:45 13-2C	Preliminary results by: Mon 16 Sept 2013 / Final results by: Mon 16 Sept 2013

Comments:

Standard Detection Limits Apply, Standard Turnaround Required on Results

Please forward sample 101B to ALS Brisbane for Analysis

Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **ES1321000**		
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	Page	: 1 of 2
Order number	: 10479		
C-O-C number	: P19257-COC3	Quote number	: ES2013SMETES0267 (EN/025/13)
Site	: ----		
Sampler	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 24-SEP-2013	Issue Date	: 24-SEP-2013 15:47
Client Requested Due Date	: 27-SEP-2013	Scheduled Reporting Date	: **27-SEP-2013**

Delivery Details

Mode of Delivery	: Client Drop off	Temperature	: -1.6'C
No. of coolers/boxes	: 1 HARD	No. of samples received	: 14
Security Seal	: N/A	No. of samples analysed	: 9

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
- **Samples received in appropriately pretreated and preserved containers.**
- **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.**
- 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 exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary 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	(On Hold) SOIL No analysis requested	SOIL - S-04 TRH/BTEXN
ES1321000-001	23-SEP-2013 15:00	V9		✓
ES1321000-002	23-SEP-2013 15:00	V10		✓
ES1321000-003	23-SEP-2013 15:00	V11		✓
ES1321000-004	23-SEP-2013 15:00	V12		✓
ES1321000-005	23-SEP-2013 15:00	V13		✓
ES1321000-006	23-SEP-2013 15:00	V14		✓
ES1321000-007	23-SEP-2013 15:00	V15		✓
ES1321000-008	23-SEP-2013 15:00	V16		✓
ES1321000-009	23-SEP-2013 15:00	102C		✓
ES1321000-010	23-SEP-2013 15:00	A1	✓	
ES1321000-011	23-SEP-2013 15:00	A2	✓	
ES1321000-012	23-SEP-2013 15:00	A3	✓	
ES1321000-013	23-SEP-2013 15:00	A4	✓	
ES1321000-014	23-SEP-2013 15:00	A5	✓	

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	accounts@smectesting.com.au

ALL REPORTS

- *AU Certificate of Analysis - NATA (COA)	Email	enquiries@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	enquiries@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	enquiries@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enquiries@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	enquiries@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	enquiries@smectesting.com.au
- EDI Format - ESDAT (ESDAT)	Email	enquiries@smectesting.com.au

DAVID YONGE

- *AU Certificate of Analysis - NATA (COA)	Email	dyonge@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dyonge@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dyonge@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	dyonge@smectesting.com.au
- A4 - AU Tax Invoice (INV)	Email	dyonge@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	dyonge@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	dyonge@smectesting.com.au
- EDI Format - ESDAT (ESDAT)	Email	dyonge@smectesting.com.au

CHAIN OF CUSTODY RECORD

SMEC Testing Services Pty Ltd
PO Box 6989 (postal)
14/1 Cowpasture Place (office), Wetherill Park NSW 2164
Telephone: (02) 9756 2166 Fax: (02) 9756 1137
E-Mail: dyonge@smectesting.com.au Contact: David Yonge

Job No: 19257/3243C Order No: 10479

Laboratory: ALS Laboratory Group - Sydney Environmental Division
277-289 Woodpark Road, SMITHFIELD NSW 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Jacob Waugh

Laboratory number	Sample number	jar/ bottle	bag	Date sampled	Composite number	Sample type	Comments	ANALYSIS S4	Asbestos
1	V9	1		23/09/2013		soil		X	
2	V10	1		23/09/2013		soil		X	
3	V11	1		23/09/2013		soil		X	
4	V12	1		23/09/2013		soil		X	
5	V13	1		23/09/2013		soil		X	
6	V14	1		23/09/2013		soil		X	
7	V15	1		23/09/2013		soil		X	
8	V16	1		23/09/2013		soil		X	
9	102C	1		23/09/2013		soil		X	
—	103D	1		23/09/2013		soil	Please forward to ALS Brisbane	X	
10	A1		1	23/09/2013		materials			
11	A2		1	23/09/2013		materials			
12	A3		1	23/09/2013		materials			
13	A4		1	23/09/2013		materials			
14	A5		1	23/09/2013		materials			
TOTAL		10						10	

Environmental Division
Sydney
Work Order
ES1321000

Telephone : +61-2-8784 8555

Released by SMEC Testing Services
David Yonge
Signed:

Date: 24/09/2013

Time: 10:45AM

CoC Number: P19257 - COC3

Your quotation: SMEC 2012 (EN/025/12)

Received by:
Signed:

Date: 24/9

Time: 1045

Preliminary results by: Fri 27 Sept 2013

Final results by: Fri 27 Sept 2013

Comments:

Standard Detection Limits Apply, 3 Day Turnaround Required on Results

Please forward sample 103D to ALS Brisbane for Analysis

Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **ES1321593**		
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	Page	: 1 of 2
Order number	: 10481		
C-O-C number	: P19257-COC4	Quote number	: ES2013SMETES0267 (EN/025/13)
Site	: ----		
Sampler	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 02-OCT-2013	Issue Date	: 02-OCT-2013 16:33
Client Requested Due Date	: 04-OCT-2013	Scheduled Reporting Date	: **04-OCT-2013**

Delivery Details

Mode of Delivery	: Carrier	Temperature	: 6.9'C
No. of coolers/boxes	: 1 HARD	No. of samples received	: 9
Security Seal	: Intact.	No. of samples analysed	: 9

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
- **Samples received in appropriately pretreated and preserved containers.**
- **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.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- 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 exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary 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 - S-04 TRH/BTEXN
ES1321593-001	02-OCT-2013 15:00	V117	✓
ES1321593-002	02-OCT-2013 15:00	V118	✓
ES1321593-003	02-OCT-2013 15:00	V119	✓
ES1321593-004	02-OCT-2013 15:00	V120	✓
ES1321593-005	02-OCT-2013 15:00	V121	✓
ES1321593-006	02-OCT-2013 15:00	V122	✓
ES1321593-007	02-OCT-2013 15:00	V123	✓
ES1321593-008	02-OCT-2013 15:00	V124	✓
ES1321593-009	02-OCT-2013 15:00	V125	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES		
- A4 - AU Tax Invoice (INV)	Email	accounts@smectesting.com.au
ALL REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	enquiries@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	enquiries@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	enquiries@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enquiries@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	enquiries@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	enquiries@smectesting.com.au
- EDI Format - ESDAT (ESDAT)	Email	enquiries@smectesting.com.au
DAVID YONGE		
- *AU Certificate of Analysis - NATA (COA)	Email	dyonge@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dyonge@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dyonge@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	dyonge@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	dyonge@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	dyonge@smectesting.com.au
- EDI Format - ESDAT (ESDAT)	Email	dyonge@smectesting.com.au

TAT

CHAIN OF CUSTODY RECORD

SMEC Testing Services Pty Ltd Job No: 19257/3243C Order No: 10481

PO Box 6989 (postal)
14/1 Cowpasture Place (office), Wetherill Park NSW 2164

Telephone: (02) 9756 2166 Fax: (02) 9756 1137
E-Mail: dyonge@smectesting.com.au Contact: David Yonge

Laboratory: ALS Laboratory Group - Sydney Environmental Division
277-289 Woodpark Road, SMITHFIELD NSW 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Jacob Waugh

Laboratory number	Sample number	jar/ bottle	bag	Date sampled	Composite number	Sample type	Comments	ANALYSIS: S4
1	V117	1		2/10/2013		soil		X
2	V118	1		2/10/2013		soil		X
3	V119	1		2/10/2013		soil		X
4	V120	1		2/10/2013		soil		X
5	V121	1		2/10/2013		soil		X
6	V122	1		2/10/2013		soil		X
7	V123	1		2/10/2013		soil		X
8	V124	1		2/10/2013		soil		X
9	V125	1		2/10/2013		soil		X
TOTAL		9						9

Environmental Division
Sydney
Work Order
ES1321593

Telephone : +61-2-8784 8555

Released by SMEC Testing Services
David Yonge
Signed: DYE

Date: 2/10/2013 Time: 2:30PM

CoC Number: P19257 - COC4

Your quotation: SMEC 2012 (EN/025/12)

Received by:
Signed:

Date: 02/10/13 Time: 14:40

Preliminary results by: Fri 4 Oct 2013

Final results by: Fri 4 Oct 2013

Comments:

Standard Detection Limits Apply

48 Hr Turnaround Required on Results

Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **ES1321841**		
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	Page	: 1 of 2
Order number	: 10484		
C-O-C number	: P19257-COC5	Quote number	: ES2013SMETES0267 (EN/025/13)
Site	: ----		
Sampler	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 04-OCT-2013	Issue Date	: 04-OCT-2013 19:53
Client Requested Due Date	: 09-OCT-2013	Scheduled Reporting Date	: **09-OCT-2013**

Delivery Details

Mode of Delivery	: Client Drop off	Temperature	: 10.6'C
No. of coolers/boxes	: 2 HARD	No. of samples received	: 6
Security Seal	: Not intact.	No. of samples analysed	: 6

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
- **Samples received in appropriately pretreated and preserved containers.**
- **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.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- 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 exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary 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 - S-04 TPH/BTEX
ES1321841-001	04-OCT-2013 15:00	V26	✓
ES1321841-002	04-OCT-2013 15:00	V27	✓
ES1321841-003	04-OCT-2013 15:00	V28	✓
ES1321841-004	04-OCT-2013 15:00	V29	✓
ES1321841-005	04-OCT-2013 15:00	V30	✓
ES1321841-006	04-OCT-2013 15:00	V31	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	accounts@smectesting.com.au

ALL REPORTS

- *AU Certificate of Analysis - NATA (COA)	Email	enquiries@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	enquiries@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	enquiries@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enquiries@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	enquiries@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	enquiries@smectesting.com.au
- EDI Format - ESDAT (ESDAT)	Email	enquiries@smectesting.com.au

DAVID YONGE

- *AU Certificate of Analysis - NATA (COA)	Email	dyonge@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dyonge@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dyonge@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	dyonge@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	dyonge@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	dyonge@smectesting.com.au
- EDI Format - ESDAT (ESDAT)	Email	dyonge@smectesting.com.au

CHAIN OF CUSTODY RECORD

SMEC Testing Services Pty Ltd
PO Box 6989 (postal)
14/1 Cowpasture Place (office), Wetherill Park NSW 2164
Telephone: (02) 9756 2166 Fax: (02) 9756 1137
E-Mail: dyonge@smectesting.com.au Contact: David Yonge

Job No: 19257/3243C Order No: 10484

Laboratory: ALS Laboratory Group - Sydney Environmental Division
277-289 Woodpark Road, SMITHFIELD NSW 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Jacob Waugh

Laboratory number	Sample number	jar/ bottle	bag	Date sampled	Composite number	Sample type	Comments	ANALYSIS: S4
1	V26	1		4/10/2013		soil		X
2	V27	1		4/10/2013		soil		X
3	V28	1		4/10/2013		soil		X
4	V29	1		4/10/2013		soil		X
5	V30	1		4/10/2013		soil		X
6	V31	1		4/10/2013		soil		X
TOTAL		6						6

Environmental Division Sydney
Work Order
ES1321841

Telephone : +61-2-8784 8555

Released by SMEC Testing Services
David Yonge
Signed:

Date: 4/10/2013 Time: 5:00pm

Received by:
Signed:

Date: 04/10/13 Time: 1745 10.6C

CoC Number: P19257 - COC5

Your quotation: SMEC 2012 (EN/025/12)

Preliminary results by:	Final results by:
Wed 9 Oct 2013	Wed 9 Oct 2013

Comments:

Standard Detection Limits Apply

VERY URGENT - 24 HR TURNAROUND REQUIRED ON RESULTS

Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **EB1318541**		
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	Page	: 1 of 2
Order number	: 10297		
C-O-C number	: P19257-COC1	Quote number	: ES2013SMETES0267 (EN/025/13)
Site	: ----		
Sampler	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 02-AUG-2013	Issue Date	: 02-AUG-2013 15:58
Client Requested Due Date	: 08-AUG-2013	Scheduled Reporting Date	: **08-AUG-2013**

Delivery Details

Mode of Delivery	: Carrier	Temperature	: 0.9°C - Ice present
No. of coolers/boxes	: 1 MEDIUM	No. of samples received	: 3
Security Seal	: Intact.	No. of samples analysed	: 1

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
- **Samples received in appropriately pretreated and preserved containers.**
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Matt Goodwin.
- Analytical work for this work order will be conducted at ALS Brisbane.
- 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 exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary 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	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EP075 SIM PAH only SIM - PAH only
EB1318541-001	29-JUL-2013 15:00	S11		✓	✓
EB1318541-002	29-JUL-2013 15:00	S24	✓		
EB1318541-003	29-JUL-2013 15:00	S32	✓		

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES		
- A4 - AU Tax Invoice (INV)	Email	accounts@smectesting.com.au
ALL REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	enquiries@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	enquiries@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	enquiries@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enquiries@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	enquiries@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	enquiries@smectesting.com.au
- EDI Format - XTab (XTAB)	Email	enquiries@smectesting.com.au
DAVID YONGE		
- *AU Certificate of Analysis - NATA (COA)	Email	dyonge@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dyonge@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dyonge@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	dyonge@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	dyonge@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	dyonge@smectesting.com.au
- EDI Format - XTab (XTAB)	Email	dyonge@smectesting.com.au

BTS

CHAIN OF CUSTODY RECORD

SMEC Testing Services Pty Ltd Job No: 19257/3243C Order No: 10297

PO Box 6989 (postal)
14/1 Cowpasture Place (office), Wetherill Park NSW 2164

Telephone: (02) 9756 2166 Fax: (02) 9756 1137
E-Mail: dyonge@smectesting.com.au Contact: David Yonge

Laboratory: ALS Laboratory Group - Sydney Environmental Division
277-289 Woodpark Road, SMITHFIELD NSW 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Jacob Waugh

Laboratory number	Sample number	jar/ bottle	bag	Date sampled	Composite number	Sample type	Comments	ANALYSIS: PAH	S7	S4
1	S1	1		29/07/2013		soil		X		
2	S2	1		29/07/2013		soil				
3	S3	1		29/07/2013		soil				X
4	S4	1		29/07/2013		soil				X
5	S4A	1		29/07/2013		soil		X		
6	S5	1		29/07/2013		soil		X		
7	S6	1		29/07/2013		soil				
8	S7	1		29/07/2013		soil		X		
9	S8	1		29/07/2013		soil				
10	S9	1		29/07/2013		soil		X		
11	S10	1		29/07/2013		soil		X		
1 -	S11	1		29/07/2013		soil	Please forward to ALS Brisbane	X		
12	S12	1		29/07/2013		soil		X		
13	S13	1		29/07/2013		soil				
14	S14	1		29/07/2013		soil		X		
15	S15	1		29/07/2013		soil				
16	S16	1		29/07/2013		soil		X		
17	S17	1		29/07/2013		soil				
18	S18	1		29/07/2013		soil		X		
19	S19	1		29/07/2013		soil				
20	S20	1		29/07/2013		soil		X		
21	S21	1		29/07/2013		soil				X
22	S22	1		29/07/2013		soil		X		
23	S23	1		29/07/2013		soil				
2 -	S24	1		29/07/2013		soil	Please forward to ALS Brisbane			
24	S25	1		29/07/2013		soil		X		

Subcon / Forward Lab / Split WO
Lab / Analysis: Brisbane
Organised By / Date: SH - S24 - S32
Relinquished By / Date:
Connote / Courier:
WO No:
Attach By PO / Internal Sheet

Environmental Division
Brisbane
Work Order
EB1318541

Telephone : +61-7-3243 7222

SCANNED 2/8

Received 02/8/13 09:10 Date 1/8 1300

CHAIN OF CUSTODY RECORD

SMEC Testing Services Pty Ltd
PO Box 6989 (postal)
14/1 Cowpasture Place (office), Wetherill Park NSW 2164
Telephone: (02) 9756 2166 Fax: (02) 9756 1137
E-Mail: dyonge@smectesting.com.au Contact: David Yonge

Job No: 19257/3243C Order No: 10297

Laboratory: ALS Laboratory Group - Sydney Environmental Division
277-289 Woodpark Road, SMITHFIELD NSW 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Jacob Waugh

Laboratory number	Sample number	jar/ bottle	bag	Date sampled	Composite number	Sample type	Comments	ANALYSIS PAH	S7	S4
25	S26	1		29/07/2013		soil		X		
26	S27	1		29/07/2013		soil				
27	S28	1		29/07/2013		soil		X		
28	S29	1		29/07/2013		soil		X		
29	S30	1		29/07/2013		soil		X		
30	S31	1		29/07/2013		soil				
3 —	S32	1		29/07/2013		soil	Please forward to ALS Brisbane			
31	S33	1		29/07/2013		soil				
32	S34	1		29/07/2013		soil		X		
33	S35	1		29/07/2013		soil				
34	S36	1		29/07/2013		soil		X		
35	S37	1		29/07/2013		soil				
36	S38	1		29/07/2013		soil			X	
37	S39	1		29/07/2013		soil			X	
38	S40	1		29/07/2013		soil		X		
TOTAL		40						21		5

Released by SMEC Testing Services
David Yonge
Signed: [signature] Date: 1/08/2013 Time: 12:30 PM

Received by:
Signed: David [signature] Date: 1/8 Time: 1300

CoC Number: P19257 - COC1

Your quotation: SMEC 2012 (EN/025/12) BQ

Preliminary results by: Thurs 8 August 2013

Final results by: Thurs 8 August 2013

Comments:

Standard Detection Limits Apply, Standard Turnaround Required on Results

Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **EB1321915**		
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	Page	: 1 of 2
Order number	: 10373		
C-O-C number	: P19257 - COC2	Quote number	: ES2013SMETES0267 (EN/025/13)
Site	: ----		
Sampler	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 10-SEP-2013	Issue Date	: 10-SEP-2013 14:10
Client Requested Due Date	: 16-SEP-2013	Scheduled Reporting Date	: **16-SEP-2013**

Delivery Details

Mode of Delivery	: Carrier	Temperature	: 2.7, 2.1, 2.6°C - Ice present
No. of coolers/boxes	: 3 MEDIUM	No. of samples received	: 1
Security Seal	: Intact.	No. of samples analysed	: 1

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
- **Samples received in appropriately pretreated and preserved containers.**
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' etc. suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Matt Goodwin.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958),
- 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 exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary 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 - S-04 TRH/BTEXN
EB1321915-001	04-SEP-2013 15:00	101B	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES		
- A4 - AU Tax Invoice (INV)	Email	accounts@smectesting.com.au
ALL REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	enquiries@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	enquiries@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	enquiries@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enquiries@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	enquiries@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	enquiries@smectesting.com.au
DAVID YONGE		
- *AU Certificate of Analysis - NATA (COA)	Email	dyonge@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dyonge@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dyonge@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	dyonge@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	dyonge@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	dyonge@smectesting.com.au

Environmental Division
Brisbane

Work Order

EB1321915

Page 1 of 1

CHAIN OF CUSTODY RECORD

SMEC Testing Services Pty Ltd Job No: 19257/3243C Order No: 10373

PO Box 6989 (postal)
14/1 Cowpasture Place (office), Wetherill Park NSW 2164

Telephone: (02) 9756 2166 Fax: (02) 9756 1137
E-Mail: dyonge@smectesting.com.au Contact: David Yonge

Telephone : +61-7-3243 7222

Laboratory: ALS Laboratory Group - Sydney Environmental Division
277-289 Woodpark Road, SMITHFIELD NSW 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Jacob Waugh

Forward Lab / Split WO
Lab / Analysis: ALS Brisbane
Organised By / Date: 101B 4/9/13
Relinquished By / Date:
Connote / Courier:
WO No: ES1319673
Attach By PC / Internal Sheet

Laboratory number	Sample number	jar/ bottle	bag	Date sampled	Composite number	Sample type	Comments	S4
1	V1	1		4/097/2013		soil		X
2	V2	1		4/097/2013		soil		X
3	V3	1		4/097/2013		soil		X
4	V4	1		4/097/2013		soil		X
5	V5	1		4/097/2013		soil		X
6	V6	1		4/097/2013		soil		X
7	V7	1		4/097/2013		soil		X
8	V8	1		4/097/2013		soil		X
9	100A	1		4/097/2013		soil		X
10	101B	1		4/097/2013		soil	Please forward to ALS Brisbane	X
TOTAL		10						10

Released by SMEC Testing Services
David Yonge
Signed:

Date: 5/09/2013 Time: 3:30PM

Received by: SCOTT KAPLAN
Signed:

Date: 5/9/13 Time: 1545 13-2C

CoC Number: P19257 - COC2

Your quotation: SMEC 2012 (EN/025/12)

Preliminary results by.	Final results by:
Mon 16 Sept 2013	Mon 16 Sept 2013

Comments:

Standard Detection Limits Apply, Standard Turnaround Required on Results

Please forward sample 101B to ALS Brisbane for Analysis

Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **EB1323381**		
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	Page	: 1 of 2
Order number	: 10479		
C-O-C number	: P19257/COC3	Quote number	: ES2013SMETES0267 (EN/025/13)
Site	: ----		
Sampler	: David Yonge	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 25-SEP-2013	Issue Date	: 25-SEP-2013 23:09
Client Requested Due Date	: 27-SEP-2013	Scheduled Reporting Date	: **27-SEP-2013**

Delivery Details

Mode of Delivery	: Carrier	Temperature	: 3.0°C, 3.3°C - Ice present
No. of coolers/boxes	: 1 MEDIUM, 1 SMALL	No. of samples received	: 1
Security Seal	: Intact.	No. of samples analysed	: 1

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
- **Samples received in appropriately pretreated and preserved containers.**
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' etc. suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Matt Goodwin.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958),
- 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 exist.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary 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 - S-04 TRH/BTEXN
EB1323381-001	23-SEP-2013 15:00	103D	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES		
- A4 - AU Tax Invoice (INV)	Email	accounts@smectesting.com.au
ALL REPORTS		
- *AU Certificate of Analysis - NATA (COA)	Email	enquiries@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	enquiries@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	enquiries@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enquiries@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	enquiries@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	enquiries@smectesting.com.au
DAVID YONGE		
- *AU Certificate of Analysis - NATA (COA)	Email	dyonge@smectesting.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	dyonge@smectesting.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	dyonge@smectesting.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN	Email	dyonge@smectesting.com.au
- Chain of Custody (CoC) (COC)	Email	dyonge@smectesting.com.au
- EDI Format - ENMRG (ENMRG)	Email	dyonge@smectesting.com.au
- EDI Format - XTab (XTAB)	Email	dyonge@smectesting.com.au

CHAIN OF CUSTODY RECORD

Subcon / Forward Lab / Split WO
Lab / Analysis: Brisbane
Page 1 of 1
Organised By / Date:
Relinquished By / Date:
Connote / Courier:
WO No:
Attach By PO / Internal Sheet

SMEC Testing Services Pty Ltd Job No: 19257/3243C Order No: 10479
PO Box 6989 (postal)
14/1 Cowpasture Place (office), Wetherill Park NSW 2164
Telephone: (02) 9756 2166 Fax: (02) 9756 1137
E-Mail: dyonge@smectesting.com.au Contact: David Yonge

Laboratory: ALS Laboratory Group - Sydney Environmental Division
277-289 Woodpark Road, SMITHFIELD NSW 2164
Telephone: (02) 8784 8555 Fax: (02) 8784 8500 Contact: Jacob Waugh

Environmental Division Brisbane
Work Order
EB1323381
Telephone : +61-7-3243 7222

Laboratory number	Sample number	jar/ bottle	bag	Date sampled	Composite number	Sample type	Comments	S4	Asbestos
1	V9	1		23/09/2013		soil		X	
2	V10	1		23/09/2013		soil		X	
3	V11	1		23/09/2013		soil		X	
4	V12	1		23/09/2013		soil		X	
5	V13	1		23/09/2013		soil		X	
6	V14	1		23/09/2013		soil		X	
7	V15	1		23/09/2013		soil		X	
8	V16	1		23/09/2013		soil		X	
9	102C	1		23/09/2013		soil		X	
(1)	103D	1		23/09/2013		soil	Please forward to ALS Brisbane	X	
10	A1		1	23/09/2013		materials			
11	A2		1	23/09/2013		materials			
12	A3		1	23/09/2013		materials			
13	A4		1	23/09/2013		materials			
14	A5		1	23/09/2013		materials			
TOTAL		10						10	

URGENT

TAT

Released by SMEC Testing Services David Yonge Signed:	Date: 24/09/2013	Time: 10:45am	CoC Number: P19257 - COC3 Your quotation: SMEC 2012 (EN/025/12)
Received by: Signed: David	Date: 24/9	Time: 1045	Preliminary results by: Fri 27 Sept 2013 Final results by: Fri 27 Sept 2013

Comments:

Standard Detection Limits Apply, 3 Day Turnaround Required on Results

Please forward sample 103D to ALS Brisbane for Analysis

Rec: OTDS @ 25/09/13 08:40

APPENDIX C

ANALYTICAL LABORATORY REPORTS

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1317190**	Page	: 1 of 11
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 10297		
C-O-C number	: P19257 - COC1	Date Samples Received	: 01-AUG-2013
Sampler	: ----	Issue Date	: 08-AUG-2013
Site	: ----		
		No. of samples received	: 38
Quote number	: EN/025/13	No. of samples analysed	: 25

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Pabi Subba	Senior Organic Chemist	Sydney Organics

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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S1	S3	S4	S4A	S5
				Client sampling date / time	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00
Compound	CAS Number	LOR	Unit		ES1317190-001	ES1317190-003	ES1317190-004	ES1317190-005	ES1317190-006
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		14.7	14.1	13.8	20.4	13.7
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	----	----	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	----	----	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		----	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		----	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		----	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	----	10	mg/kg		----	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	----	10	mg/kg		----	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		----	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		----	<100	<100	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S1	S3	S4	S4A	S5
				Client sampling date / time	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00
Compound	CAS Number	LOR	Unit		ES1317190-001	ES1317190-003	ES1317190-004	ES1317190-005	ES1317190-006
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 - Continued									
>C34 - C40 Fraction	----	100	mg/kg		----	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	<50	<50	----	----
EP080: BTEX									
Benzene	71-43-2	0.2	mg/kg		----	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		----	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	<0.5	<0.5	----	----
EP080: BTEXN									
^ Sum of BTEX	----	0.2	mg/kg		----	<0.2	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg		----	<1	<1	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		**119**	----	----	**106**	**121**
2-Chlorophenol-D4	93951-73-6	0.1	%		**102**	----	----	**110**	**104**
2.4.6-Tribromophenol	118-79-6	0.1	%		**98.2**	----	----	**110**	**102**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		**104**	----	----	**110**	**104**
Anthracene-d10	1719-06-8	0.1	%		**95.9**	----	----	**101**	**96.5**
4-Terphenyl-d14	1718-51-0	0.1	%		**95.0**	----	----	**101**	**93.7**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		----	**101**	**94.9**	----	----
Toluene-D8	2037-26-5	0.1	%		----	**108**	**94.5**	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		----	**108**	**97.7**	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S7	S9	S10	S12	S14
			Client sampling date / time	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00
Compound	CAS Number	LOR	Unit	ES1317190-008	ES1317190-010	ES1317190-011	ES1317190-012	ES1317190-014
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	10.3	16.1	15.6	15.8	14.4
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	1.0
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	0.9
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	1.2
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	3.1
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	93.2	88.2	87.4	95.1	88.4
2-Chlorophenol-D4	93951-73-6	0.1	%	93.6	89.1	88.5	94.8	87.8
2.4.6-Tribromophenol	118-79-6	0.1	%	117	108	110	117	115
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	99.8	95.7	95.4	102	94.6
Anthracene-d10	1719-06-8	0.1	%	97.6	92.5	92.1	98.4	93.3
4-Terphenyl-d14	1718-51-0	0.1	%	85.4	81.8	81.4	87.0	80.5

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID	S16	S18	S20	S21	S22
				Client sampling date / time	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00
					ES1317190-016	ES1317190-018	ES1317190-020	ES1317190-021	ES1317190-022
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		**17.9**	**15.6**	**10.4**	**25.6**	**4.5**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	<0.5
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	----	**0.6**
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	----	<10	----
C10 - C14 Fraction	----	50	mg/kg		----	----	----	<50	----
C15 - C28 Fraction	----	100	mg/kg		----	----	----	<100	----
C29 - C36 Fraction	----	100	mg/kg		----	----	----	<100	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		----	----	----	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	----	10	mg/kg		----	----	----	<10	----
^ **C6 - C10 Fraction minus BTEX (F1)**	----	10	mg/kg		----	----	----	<10	----
>C10 - C16 Fraction	----	50	mg/kg		----	----	----	<50	----
>C16 - C34 Fraction	----	100	mg/kg		----	----	----	<100	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S16	S18	S20	S21	S22
				Client sampling date / time	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00
Compound	CAS Number	LOR	Unit		ES1317190-016	ES1317190-018	ES1317190-020	ES1317190-021	ES1317190-022
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 - Continued									
>C34 - C40 Fraction	----	100	mg/kg		----	----	----	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	----	<50	----
EP080: BTEX									
Benzene	71-43-2	0.2	mg/kg		----	----	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg		----	----	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	----	<0.5	----
EP080: BTEXN									
^ Sum of BTEX	----	0.2	mg/kg		----	----	----	<0.2	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	----	----	<0.5	----
Naphthalene	91-20-3	1	mg/kg		----	----	----	<1	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		93.4	97.3	88.3	----	92.7
2-Chlorophenol-D4	93951-73-6	0.1	%		92.6	96.7	89.3	----	92.7
2.4.6-Tribromophenol	118-79-6	0.1	%		123	120	106	----	111
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		98.6	104	95.6	----	99.4
Anthracene-d10	1719-06-8	0.1	%		96.1	100	92.7	----	96.3
4-Terphenyl-d14	1718-51-0	0.1	%		84.5	88.2	82.1	----	85.3
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		----	----	----	97.8	----
Toluene-D8	2037-26-5	0.1	%		----	----	----	105	----
4-Bromofluorobenzene	460-00-4	0.1	%		----	----	----	109	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S25	S26	S28	S29	S30
				Client sampling date / time	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00
Compound	CAS Number	LOR	Unit		ES1317190-024	ES1317190-025	ES1317190-027	ES1317190-028	ES1317190-029
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		10.4	12.4	14.0	11.6	14.7
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		0.6	<0.5	<0.5	<0.5	0.9
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		1.0	<0.5	<0.5	<0.5	2.0
Pyrene	129-00-0	0.5	mg/kg		1.1	<0.5	<0.5	<0.5	2.1
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	0.9
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	0.8
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	1.0
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	0.8
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		2.7	<0.5	<0.5	<0.5	8.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	1.0
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	1.3
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.6
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		93.4	90.9	89.1	90.4	92.5
2-Chlorophenol-D4	93951-73-6	0.1	%		93.0	90.7	89.1	90.6	91.8
2.4.6-Tribromophenol	118-79-6	0.1	%		114	112	109	110	114
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		100	97.2	97.2	97.2	98.8
Anthracene-d10	1719-06-8	0.1	%		97.6	94.6	94.8	94.2	96.0
4-Terphenyl-d14	1718-51-0	0.1	%		85.8	83.4	83.8	83.1	83.8

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S34	S36	S38	S39	S40
				Client sampling date / time	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00
Compound	CAS Number	LOR	Unit		ES1317190-032	ES1317190-034	ES1317190-036	ES1317190-037	ES1317190-038
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		17.8	14.4	30.6	13.9	9.8
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	0.7	----	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	0.7	----	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	----	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	----	----	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	----	----	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		----	----	2200	<50	----
C15 - C28 Fraction	----	100	mg/kg		----	----	29500	2790	----
C29 - C36 Fraction	----	100	mg/kg		----	----	2010	490	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	33700	3280	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	----	10	mg/kg		----	----	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	----	10	mg/kg		----	----	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg		----	----	8580	130	----
>C16 - C34 Fraction	----	100	mg/kg		----	----	24800	2990	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S34	S36	S38	S39	S40
				Client sampling date / time	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00	29-JUL-2013 15:00
Compound	CAS Number	LOR	Unit		ES1317190-032	ES1317190-034	ES1317190-036	ES1317190-037	ES1317190-038
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 - Continued									
>C34 - C40 Fraction	----	100	mg/kg		----	----	1520	360	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	34900	3480	----
EP080: BTEX									
Benzene	71-43-2	0.2	mg/kg		----	----	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg		----	----	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	<0.5	<0.5	----
EP080: BTEXN									
^ Sum of BTEX	----	0.2	mg/kg		----	----	<0.2	<0.2	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	----	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg		----	----	<1	<1	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		91.6	91.6	----	----	118
2-Chlorophenol-D4	93951-73-6	0.1	%		91.1	89.2	----	----	103
2.4.6-Tribromophenol	118-79-6	0.1	%		113	71.2	----	----	98.9
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		97.9	98.7	----	----	102
Anthracene-d10	1719-06-8	0.1	%		95.8	95.6	----	----	93.9
4-Terphenyl-d14	1718-51-0	0.1	%		84.6	84.0	----	----	90.7
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		----	----	103	100	----
Toluene-D8	2037-26-5	0.1	%		----	----	102	106	----
4-Bromofluorobenzene	460-00-4	0.1	%		----	----	99.1	98.8	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	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	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **ES1317190**	Page	: 1 of 10
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257 - COC1	Date Samples Received	: 01-AUG-2013
Sampler	: ----	Issue Date	: 08-AUG-2013
Order number	: 10297		
		No. of samples received	: 38
Quote number	: EN/025/13	No. of samples analysed	: 25

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Pabi Subba	Senior Organic Chemist	Sydney Organics

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.

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: 2996373)									
ES1317190-004	S4	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	13.8	14.1	2.1	0% - 50%
ES1317190-021	S21	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	25.6	22.3	13.4	0% - 20%
EA055: Moisture Content (QC Lot: 2996374)									
ES1317190-036	S38	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	30.6	29.1	5.0	0% - 20%
ES1317191-010	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	16.6	15.8	4.8	0% - 50%
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2995348)									
ES1317194-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES1317194-009	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	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 (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2995348) - continued									
ES1317194-009	Anonymous	EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2995384)									
ES1317190-008	S7	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES1317190-024	S25	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	0.6	0.6	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.0	1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.1	1.1	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	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 (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2995384) - continued									
ES1317190-024	S25	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	2.7	2.7	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2994674)									
ES1317190-003	S3	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1317191-006	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2995349)									
ES1317194-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES1317194-009	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 2994674)									
ES1317190-003	S3	EP080: C6 - C10 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1317191-006	Anonymous	EP080: C6 - C10 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 2995349)									
ES1317194-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES1317194-009	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 2994674)									
ES1317190-003	S3	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES1317191-006	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	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 (%)*
EP080: BTEXN (QC Lot: 2994674) - continued									
ES1317191-006	Anonymous	EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	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 Sample (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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2995348)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	4 mg/kg	110	80	124
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	4 mg/kg	110	77	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	4 mg/kg	109	79	123
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	4 mg/kg	110	77	123
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	4 mg/kg	102	79	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	4 mg/kg	101	79	123
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	4 mg/kg	99.2	79	123
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	4 mg/kg	100	79	125
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	4 mg/kg	111	73	121
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	4 mg/kg	111	81	123
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	4 mg/kg	109	70	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	4 mg/kg	104	77	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	4 mg/kg	107	76	122
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	4 mg/kg	103	71	113
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	4 mg/kg	103	71.7	113
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	4 mg/kg	102	72.4	114
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2995384)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	4 mg/kg	98.5	80	124
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	4 mg/kg	96.9	77	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	4 mg/kg	95.8	79	123
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	4 mg/kg	98.2	77	123
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	4 mg/kg	99.5	79	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	4 mg/kg	99.3	79	123
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	4 mg/kg	97.8	79	123
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	4 mg/kg	101	79	125
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	4 mg/kg	90.1	73	121
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	4 mg/kg	94.0	81	123
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	4 mg/kg	89.2	70	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	4 mg/kg	96.6	77	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	4 mg/kg	92.1	76	122
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	4 mg/kg	87.2	71	113
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	4 mg/kg	87.8	71.7	113
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	4 mg/kg	84.2	72.4	114
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2994674)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2994674) - continued								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	106	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2995349)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	102	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	119	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	110	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 2994674)								
EP080: C6 - C10 Fraction	----	10	mg/kg	<10	31 mg/kg	107	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 2995349)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	104	70	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	128	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
		50	mg/kg	----	150 mg/kg	116	63	131
EP080: BTEXN (QCLot: 2994674)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	104	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	105	62	128
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	98.6	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	106	60	120
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	105	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	95.4	62	138

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 ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2995348)							
ES1317194-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	106	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	110	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2995384)							
ES1317190-008	S7	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	100	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	114	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2994674)							
ES1317190-003	S3	EP080: C6 - C9 Fraction	----	32.5 mg/kg	108	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2995349)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2995349) - continued							
ES1317194-001	Anonymous	EP071: C10 - C14 Fraction	----	640 mg/kg	97.0	73	137
		EP071: C15 - C28 Fraction	----	3140 mg/kg	117	53	131
		EP071: C29 - C36 Fraction	----	2860 mg/kg	91.9	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 2994674)							
ES1317190-003	S3	EP080: C6 - C10 Fraction	----	37.5 mg/kg	106	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 2995349)							
ES1317194-001	Anonymous	EP071: >C10 - C16 Fraction	----	850 mg/kg	122	73	137
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	110	53	131
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	61.3	52	132
EP080: BTEXN (QCLot: 2994674)							
ES1317190-003	S3	EP080: Benzene	71-43-2	2.5 mg/kg	92.7	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	86.1	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	92.0	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	89.9	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	94.3	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	90.5	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report							
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2994674)										
ES1317190-003	S3	EP080: C6 - C9 Fraction	----	32.5 mg/kg	108	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 2994674)										
ES1317190-003	S3	EP080: C6 - C10 Fraction	----	37.5 mg/kg	106	----	70	130	----	----
EP080: BTEXN (QCLot: 2994674)										
ES1317190-003	S3	EP080: Benzene	71-43-2	2.5 mg/kg	92.7	----	70	130	----	----
		EP080: Toluene	108-88-3	2.5 mg/kg	86.1	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	92.0	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	89.9	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	94.3	----	70	130	----	----
		EP080: Naphthalene	91-20-3	2.5 mg/kg	90.5	----	70	130	----	----

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2995348)										
ES1317194-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	106	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	110	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2995349)										
ES1317194-001	Anonymous	EP071: C10 - C14 Fraction	----	640 mg/kg	97.0	----	73	137	----	----
		EP071: C15 - C28 Fraction	----	3140 mg/kg	117	----	53	131	----	----
		EP071: C29 - C36 Fraction	----	2860 mg/kg	91.9	----	52	132	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 2995349)										
ES1317194-001	Anonymous	EP071: >C10 - C16 Fraction	----	850 mg/kg	122	----	73	137	----	----
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	110	----	53	131	----	----
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	61.3	----	52	132	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2995384)										
ES1317190-008	S7	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	100	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	114	----	70	130	----	----

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1317190**	Page	: 1 of 6
Client	: SMEC TESTING SERVICES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257 - COC1	Date Samples Received	: 01-AUG-2013
Sampler	: ----	Issue Date	: 08-AUG-2013
Order number	: 10297		
		No. of samples received	: 38
Quote number	: EN/025/13	No. of samples analysed	: 25

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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: **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
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
S1, S3, S4, S4A, S5, S7, S9, S10, S12, S14, S16, S18, S20, S21, S22, S25, S26, S28, S29, S30, S34, S36, S38, S39, S40	**29-JUL-2013**	**----**	----	----	**02-AUG-2013**	12-AUG-2013	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
S3, S4, S21, S38, S39	**29-JUL-2013**	**05-AUG-2013**	12-AUG-2013	✓	**05-AUG-2013**	14-SEP-2013	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
S7, S9, S10, S12, S14, S16, S18, S20, S22, S25, S26, S28, S29, S30, S34, S36	**29-JUL-2013**	**02-AUG-2013**	12-AUG-2013	✓	**05-AUG-2013**	11-SEP-2013	✓
Soil Glass Jar - Unpreserved (EP075(SIM))							
S1, S4A, S5, S40	**29-JUL-2013**	**05-AUG-2013**	12-AUG-2013	✓	**06-AUG-2013**	14-SEP-2013	✓

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
EP080: BTEX							
Soil Glass Jar - Unpreserved (EP080)							
S3, S4, S21, S38, S39	**29-JUL-2013**	**02-AUG-2013**	12-AUG-2013	✓	**02-AUG-2013**	12-AUG-2013	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
S3, S4, S21, S38, S39	**29-JUL-2013**	**02-AUG-2013**	12-AUG-2013	✓	**02-AUG-2013**	12-AUG-2013	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013							
Soil Glass Jar - Unpreserved (EP080)							
S3, S4, S21, S38, S39	**29-JUL-2013**	**02-AUG-2013**	12-AUG-2013	✓	**02-AUG-2013**	12-AUG-2013	✓

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(where) 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		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	40	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	4	32	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	32	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	32	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	2	32	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	**5.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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
Moisture Content	EA055-103	SOIL	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).
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) 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)
TPH Volatiles/BTEX	EP080	SOIL	(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. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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 (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1319673**	Page	: 1 of 5
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 10373		
C-O-C number	: P19257-COC2	Date Samples Received	: 05-SEP-2013
Sampler	: ----	Issue Date	: 12-SEP-2013
Site	: ----		
		No. of samples received	: 9
Quote number	: EN/025/13	No. of samples analysed	: 9

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Evie.Sidarta	Inorganic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Pabi Subba	Senior Organic Chemist	Sydney Organics

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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	V1	V2	V3	V4	V5
				Client sampling date / time	04-SEP-2013 15:00	04-SEP-2013 15:00	04-SEP-2013 15:00	04-SEP-2013 15:00	04-SEP-2013 15:00
Compound	CAS Number	LOR	Unit		ES1319673-001	ES1319673-002	ES1319673-003	ES1319673-004	ES1319673-005
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		11.5	11.2	11.8	7.8	7.6
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	340	290	150
C15 - C28 Fraction	----	100	mg/kg		2410	2010	9890	12900	11300
C29 - C36 Fraction	----	100	mg/kg		1370	220	810	2200	1280
^ C10 - C36 Fraction (sum)	----	50	mg/kg		3780	2230	11000	15400	12700
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg		110	230	1560	1220	910
>C16 - C34 Fraction	----	100	mg/kg		3240	1960	9180	13400	11300
>C34 - C40 Fraction	----	100	mg/kg		1060	130	450	1460	820
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		4410	2320	11200	16100	13000
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		110	230	1560	1220	910
EP080: BTEXN									
Benzene	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
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<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
^ Total Xylenes	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
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		101	101	95.4	120	130
Toluene-D8	2037-26-5	0.1	%		116	118	113	128	132
4-Bromofluorobenzene	460-00-4	0.1	%		102	103	97.3	114	124

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	V6	V7	V8	100A	----
				Client sampling date / time	04-SEP-2013 15:00	04-SEP-2013 15:00	04-SEP-2013 15:00	04-SEP-2013 15:00	----
Compound	CAS Number	LOR	Unit		ES1319673-006	ES1319673-007	ES1319673-008	ES1319673-009	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		24.5	22.6	34.9	12.2	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	60	<50	----
C15 - C28 Fraction	----	100	mg/kg		2840	4380	7440	1790	----
C29 - C36 Fraction	----	100	mg/kg		1380	1020	820	1070	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		4220	5400	8320	2860	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	----
>C10 - C16 Fraction	>C10_C16	50	mg/kg		120	210	580	110	----
>C16 - C34 Fraction	----	100	mg/kg		3750	4890	7420	2410	----
>C34 - C40 Fraction	----	100	mg/kg		920	710	530	880	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		4790	5810	8530	3400	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		120	210	580	110	----
EP080: BTEXN									
Benzene	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	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
^ Total Xylenes	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	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		111	100	93.6	99.1	----
Toluene-D8	2037-26-5	0.1	%		114	102	105	108	----
4-Bromofluorobenzene	460-00-4	0.1	%		111	97.0	92.5	96.2	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **ES1319673**	Page	: 1 of 7
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257-COC2	Date Samples Received	: 05-SEP-2013
Sampler	: ----	Issue Date	: 12-SEP-2013
Order number	: 10373		
		No. of samples received	: 9
Quote number	: EN/025/13	No. of samples analysed	: 9

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Evie.Sidarta	Inorganic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Pabi Subba	Senior Organic Chemist	Sydney Organics

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.

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: 3048256)									
ES1319656-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	4.6	4.5	2.6	No Limit
ES1319673-009	100A	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	12.2	12.6	3.1	0% - 50%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3047977)									
ES1319673-001	V1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1319674-003	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3048020)									
ES1319673-001	V1	EP071: C15 - C28 Fraction	----	100	mg/kg	2410	2230	8.0	0% - 20%
		EP071: C29 - C36 Fraction	----	100	mg/kg	1370	1210	12.9	0% - 50%
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES1319674-003	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	720	730	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	550	580	5.6	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3047977)									
ES1319673-001	V1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES1319674-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3048020)									
ES1319673-001	V1	EP071: >C16 - C34 Fraction	----	100	mg/kg	3240	3020	6.8	0% - 20%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	1060	840	23.4	0% - 50%
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	110	90	20.3	No Limit
ES1319674-003	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	1080	1100	2.5	0% - 50%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	380	390	2.8	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 3047977)									
ES1319673-001	V1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES1319674-003	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	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 (%)*
EP080: BTEXN (QC Lot: 3047977) - continued									
ES1319674-003	Anonymous	EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	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 Sample (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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3047977)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	98.8	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3048020)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	98.9	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	108	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	111	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3047977)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	99.9	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3048020)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	106	70	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	108	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
		50	mg/kg	----	150 mg/kg	121	63	131
EP080: BTEXN (QCLot: 3047977)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	98.8	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	98.0	62	128
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	96.0	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	95.4	60	120
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	96.1	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	79.0	62	138

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**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3047977)							
ES1319673-001	V1	EP080: C6 - C9 Fraction	----	32.5 mg/kg	109	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3048020)							
ES1319674-003	Anonymous	EP071: C10 - C14 Fraction	----	640 mg/kg	85.8	73	137
		EP071: C15 - C28 Fraction	----	3140 mg/kg	88.3	53	131
		EP071: C29 - C36 Fraction	----	2860 mg/kg	78.6	52	132

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3047977)							
ES1319673-001	V1	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	98.1	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3048020)							
ES1319674-003	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	109	73	137
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	82.0	53	131
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	65.2	52	132
EP080: BTEXN (QCLot: 3047977)							
ES1319673-001	V1	EP080: Benzene	71-43-2	2.5 mg/kg	95.3	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	101	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	100	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	98.5	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	95.9	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	75.3	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3047977)										
ES1319673-001	V1	EP080: C6 - C9 Fraction	----	32.5 mg/kg	109	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3047977)										
ES1319673-001	V1	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	98.1	----	70	130	----	----
EP080: BTEXN (QCLot: 3047977)										
ES1319673-001	V1	EP080: Benzene	71-43-2	2.5 mg/kg	95.3	----	70	130	----	----
		EP080: Toluene	108-88-3	2.5 mg/kg	101	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	100	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	98.5	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	95.9	----	70	130	----	----
		EP080: Naphthalene	91-20-3	2.5 mg/kg	75.3	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3048020)										
ES1319674-003	Anonymous	EP071: C10 - C14 Fraction	----	640 mg/kg	85.8	----	73	137	----	----
		EP071: C15 - C28 Fraction	----	3140 mg/kg	88.3	----	53	131	----	----
		EP071: C29 - C36 Fraction	----	2860 mg/kg	78.6	----	52	132	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3048020)										

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3048020) - continued										
ES1319674-003	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	109	----	73	137	----	----
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	82.0	----	53	131	----	----
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	65.2	----	52	132	----	----

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1319673**	Page	: 1 of 5
Client	: SMEC TESTING SERVICES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257-COC2	Date Samples Received	: 05-SEP-2013
Sampler	: ----	Issue Date	: 12-SEP-2013
Order number	: 10373		
		No. of samples received	: 9
Quote number	: EN/025/13	No. of samples analysed	: 9

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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: **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
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
V1, V2, V3, V4, V5, V6, V7, V8, 100A	**04-SEP-2013**	**----**	----	----	**06-SEP-2013**	18-SEP-2013	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013							
Soil Glass Jar - Unpreserved (EP071)							
V1, V2, V3, V4, V5, V6, V7, V8, 100A	**04-SEP-2013**	**06-SEP-2013**	18-SEP-2013	✓	**06-SEP-2013**	16-OCT-2013	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
V1, V2, V3, V4, V5, V6, V7, V8, 100A	**04-SEP-2013**	**06-SEP-2013**	18-SEP-2013	✓	**06-SEP-2013**	18-SEP-2013	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013							
Soil Glass Jar - Unpreserved (EP080)							
V1, V2, V3, V4, V5, V6, V7, V8, 100A	**04-SEP-2013**	**06-SEP-2013**	18-SEP-2013	✓	**06-SEP-2013**	18-SEP-2013	✓

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(where) 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		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TPH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TPH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
TPH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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
Moisture Content	EA055-103	SOIL	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).
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
TPH Volatiles/BTEX	EP080	SOIL	(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. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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 (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1321000**	Page	: 1 of 5
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 10479		
C-O-C number	: P19257-COC3	Date Samples Received	: 24-SEP-2013
Sampler	: ----	Issue Date	: 27-SEP-2013
Site	: ----		
		No. of samples received	: 14
Quote number	: EN/025/13	No. of samples analysed	: 9

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics
Edwandy Fadjar	Organic Coordinator	Sydney Organics
Evie.Sidarta	Inorganic Chemist	Sydney Inorganics
Phalak Inthaksone	Laboratory Manager - Organics	Sydney Inorganics

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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID	V9	V10	V11	V12	V13
				Client sampling date / time	23-SEP-2013 15:00	23-SEP-2013 15:00	23-SEP-2013 15:00	23-SEP-2013 15:00	23-SEP-2013 15:00
					ES1321000-001	ES1321000-002	ES1321000-003	ES1321000-004	ES1321000-005
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		**13.8**	**12.3**	**13.1**	**17.1**	**16.5**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		**150**	**280**	**1600**	**210**	**130**
C15 - C28 Fraction	----	100	mg/kg		**3040**	**4070**	**11100**	**3740**	**2110**
C29 - C36 Fraction	----	100	mg/kg		**140**	**150**	**460**	**810**	**1120**
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		**3330**	**4500**	**13200**	**4760**	**3360**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg		**700**	**1210**	**4310**	**900**	**510**
>C16 - C34 Fraction	----	100	mg/kg		**2570**	**3260**	**8760**	**3590**	**2420**
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	**190**	**680**	**980**
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		**3270**	**4470**	**13300**	**5170**	**3910**
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		**700**	**1210**	**4310**	**900**	**510**
EP080: BTEXN									
Benzene	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
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<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
^ **Total Xylenes**	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
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**75.8**	**121**	**114**	**96.5**	**108**
Toluene-D8	2037-26-5	0.1	%		**103**	**106**	**111**	**99.1**	**97.7**
4-Bromofluorobenzene	460-00-4	0.1	%		**98.6**	**104**	**103**	**97.0**	**85.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	V14	V15	V16	102C	----
				Client sampling date / time	23-SEP-2013 15:00	23-SEP-2013 15:00	23-SEP-2013 15:00	23-SEP-2013 15:00	----
Compound	CAS Number	LOR	Unit		ES1321000-006	ES1321000-007	ES1321000-008	ES1321000-009	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		10.4	13.5	14.8	18.1	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		60	120	160	110	----
C15 - C28 Fraction	----	100	mg/kg		3670	4890	2700	1440	----
C29 - C36 Fraction	----	100	mg/kg		1720	2720	1100	530	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		5450	7730	3960	2080	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	----
>C10 - C16 Fraction	>C10_C16	50	mg/kg		350	540	650	370	----
>C16 - C34 Fraction	----	100	mg/kg		4540	6260	2910	1500	----
>C34 - C40 Fraction	----	100	mg/kg		1320	1940	1050	460	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		6210	8740	4610	2330	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		350	540	650	370	----
EP080: BTEXN									
Benzene	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	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	----
^ Total Xylenes	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	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		81.7	95.6	109	104	----
Toluene-D8	2037-26-5	0.1	%		112	96.4	114	103	----
4-Bromofluorobenzene	460-00-4	0.1	%		105	93.4	108	99.8	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **ES1321000**	Page	: 1 of 6
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257-COC3	Date Samples Received	: 24-SEP-2013
Sampler	: ----	Issue Date	: 27-SEP-2013
Order number	: 10479		
		No. of samples received	: 14
Quote number	: EN/025/13	No. of samples analysed	: 9

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics
Edwandy Fadjar	Organic Coordinator	Sydney Organics
Evie.Sidarta	Inorganic Chemist	Sydney Inorganics
Phalak Inthaksone	Laboratory Manager - Organics	Sydney Inorganics

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.

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: 3078648)									
ES1321000-001	V9	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	13.8	14.4	4.8	0% - 50%
ES1321155-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	2.5	2.6	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3075847)									
ES1321000-001	V9	EP071: C15 - C28 Fraction	----	100	mg/kg	3040	3080	1.1	0% - 20%
		EP071: C29 - C36 Fraction	----	100	mg/kg	140	150	9.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	150	140	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3076483)									
ES1320884-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1320915-004	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3075847)									
ES1321000-001	V9	EP071: >C16 - C34 Fraction	----	100	mg/kg	2570	2610	1.4	0% - 20%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	700	730	3.6	0% - 50%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3076483)									
ES1320884-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES1320915-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 3076483)									
ES1320884-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES1320915-004	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	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 Sample (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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3075847)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	95.9	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	100	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	97.7	64	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3076483)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	106	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3075847)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	98.0	70	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	99.8	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
		50	mg/kg	----	150 mg/kg	89.2	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3076483)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	107	68.4	128
EP080: BTEXN (QCLot: 3076483)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	99.2	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	97.9	62	128
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	94.1	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	95.5	60	120
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	96.7	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	80.6	62	138

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**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3075847)							
ES1321000-001	V9	EP071: C10 - C14 Fraction	----	640 mg/kg	82.6	73	137
		EP071: C15 - C28 Fraction	----	3140 mg/kg	89.8	53	131
		EP071: C29 - C36 Fraction	----	2860 mg/kg	72.9	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3076483)							
ES1320884-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	120	70	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3075847)							
ES1321000-001	V9	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	111	73	137
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	79.9	53	131
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	55.0	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3076483)							
ES1320884-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	120	70	130
EP080: BTEXN (QCLot: 3076483)							
ES1320884-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	87.2	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	90.9	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	93.1	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	97.0	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	96.0	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	89.1	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3075847)										
ES1321000-001	V9	EP071: C10 - C14 Fraction	----	640 mg/kg	82.6	----	73	137	----	----
		EP071: C15 - C28 Fraction	----	3140 mg/kg	89.8	----	53	131	----	----
		EP071: C29 - C36 Fraction	----	2860 mg/kg	72.9	----	52	132	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3075847)										
ES1321000-001	V9	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	111	----	73	137	----	----
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	79.9	----	53	131	----	----
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	55.0	----	52	132	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3076483)										
ES1320884-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	120	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3076483)										
ES1320884-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	120	----	70	130	----	----
EP080: BTEXN (QCLot: 3076483)										
ES1320884-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	87.2	----	70	130	----	----
		EP080: Toluene	108-88-3	2.5 mg/kg	90.9	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	93.1	----	70	130	----	----

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080: BTEXN (QCLot: 3076483) - continued										
ES1320884-001	Anonymous	EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	97.0	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	96.0	----	70	130	----	----
		EP080: Naphthalene	91-20-3	2.5 mg/kg	89.1	----	70	130	----	----

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1321000**	Page	: 1 of 5
Client	: SMEC TESTING SERVICES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257-COC3	Date Samples Received	: 24-SEP-2013
Sampler	: ----	Issue Date	: 27-SEP-2013
Order number	: 10479		
		No. of samples received	: 14
Quote number	: EN/025/13	No. of samples analysed	: 9

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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: **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
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
V9, V10, V11, V12, V13, V14, V15, V16, 102C	**23-SEP-2013**	**----**	----	----	**26-SEP-2013**	07-OCT-2013	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013							
Soil Glass Jar - Unpreserved (EP071)							
V9, V10, V11, V12, V13, V14, V15, V16, 102C	**23-SEP-2013**	**25-SEP-2013**	07-OCT-2013	✓	**25-SEP-2013**	04-NOV-2013	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
V9, V10, V11, V12, V13, V14, V15, V16, 102C	**23-SEP-2013**	**25-SEP-2013**	07-OCT-2013	✓	**25-SEP-2013**	07-OCT-2013	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
V9, V10, V11, V12, V13, V14, V15, V16, 102C	**23-SEP-2013**	**25-SEP-2013**	07-OCT-2013	✓	**25-SEP-2013**	07-OCT-2013	✓

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(where) 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		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	9	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TPH - Semivolatile Fraction	EP071	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TPH - Semivolatile Fraction	EP071	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
TPH - Semivolatile Fraction	EP071	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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
Moisture Content	EA055-103	SOIL	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).
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
TPH Volatiles/BTEX	EP080	SOIL	(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. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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 (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

CERTIFICATE OF ANALYSIS

Work Order	: **ES1321593**	Page	: 1 of 5
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 10481		
C-O-C number	: P19257-COC4	Date Samples Received	: 02-OCT-2013
Sampler	: ----	Issue Date	: 04-OCT-2013
Site	: ----		
		No. of samples received	: 9
Quote number	: EN/025/13	No. of samples analysed	: 9

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics

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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID	V117	V118	V119	V120	V121
				Client sampling date / time	02-OCT-2013 15:00	02-OCT-2013 15:00	02-OCT-2013 15:00	02-OCT-2013 15:00	02-OCT-2013 15:00
					ES1321593-001	ES1321593-002	ES1321593-003	ES1321593-004	ES1321593-005
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		**10.6**	**10.9**	**10.6**	**9.6**	**11.4**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	**390**	**140**	<50
C15 - C28 Fraction	----	100	mg/kg		**520**	**840**	**3140**	**1740**	**990**
C29 - C36 Fraction	----	100	mg/kg		<100	<100	**140**	<100	**280**
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		**520**	**840**	**3670**	**1880**	**1270**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg		**120**	**150**	**1140**	**500**	**170**
>C16 - C34 Fraction	----	100	mg/kg		**450**	**740**	**2490**	**1420**	**1040**
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	**240**
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		**570**	**890**	**3630**	**1920**	**1450**
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		**120**	**150**	**1140**	**500**	**170**
EP080: BTEXN									
Benzene	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
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<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
^ **Total Xylenes**	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
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**96.3**	**85.8**	**111**	**99.0**	**95.9**
Toluene-D8	2037-26-5	0.1	%		**108**	**91.1**	**110**	**106**	**105**
4-Bromofluorobenzene	460-00-4	0.1	%		**106**	**89.3**	**105**	**105**	**102**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	V122	V123	V124	V125	----
			Client sampling date / time	02-OCT-2013 15:00	02-OCT-2013 15:00	02-OCT-2013 15:00	02-OCT-2013 15:00	----
Compound	CAS Number	LOR	Unit	ES1321593-006	ES1321593-007	ES1321593-008	ES1321593-009	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	9.5	9.4	10.8	9.8	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	80	----
C15 - C28 Fraction	----	100	mg/kg	1210	560	960	1840	----
C29 - C36 Fraction	----	100	mg/kg	310	220	350	520	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	1520	780	1310	2440	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	----
>C10 - C16 Fraction	>C10_C16	50	mg/kg	190	50	80	360	----
>C16 - C34 Fraction	----	100	mg/kg	1240	670	1120	1910	----
>C34 - C40 Fraction	----	100	mg/kg	250	170	240	450	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	1680	890	1440	2720	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	190	50	80	360	----
EP080: BTEXN								
Benzene	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	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
^ Total Xylenes	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	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	75.5	104	98.4	97.2	----
Toluene-D8	2037-26-5	0.1	%	74.4	108	112	102	----
4-Bromofluorobenzene	460-00-4	0.1	%	74.7	109	111	99.5	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

QUALITY CONTROL REPORT

Work Order	: **ES1321593**	Page	: 1 of 6
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257-COC4	Date Samples Received	: 02-OCT-2013
Sampler	: ----	Issue Date	: 04-OCT-2013
Order number	: 10481		
		No. of samples received	: 9
Quote number	: EN/025/13	No. of samples analysed	: 9

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics

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.

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: 3089008)									
ES1321400-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	10.0	9.8	2.8	0% - 50%
ES1321593-004	V120	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	9.6	10.1	5.1	0% - 50%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3089010)									
ES1321593-001	V117	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1321593-008	V124	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3089016)									
ES1321593-001	V117	EP071: C15 - C28 Fraction	----	100	mg/kg	520	530	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3089010)									
ES1321593-001	V117	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES1321593-008	V124	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3089016)									
ES1321593-001	V117	EP071: >C16 - C34 Fraction	----	100	mg/kg	450	440	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	120	120	0.0	No Limit
EP080: BTEXN (QC Lot: 3089010)									
ES1321593-001	V117	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES1321593-008	V124	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	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 Sample (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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3089010)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	122	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3089016)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	106	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	107	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	96.6	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3089010)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	120	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3089016)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	102	70	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	106	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
		50	mg/kg	----	150 mg/kg	79.3	63	131
EP080: BTEXN (QCLot: 3089010)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	108	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	102	62	128
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	101	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	99.2	60	120
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	98.4	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	94.4	62	138

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**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3089010)							
ES1321593-001	V117	EP080: C6 - C9 Fraction	----	32.5 mg/kg	106	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3089016)							
ES1321593-001	V117	EP071: C10 - C14 Fraction	----	640 mg/kg	77.4	73	137
		EP071: C15 - C28 Fraction	----	3140 mg/kg	74.1	53	131
		EP071: C29 - C36 Fraction	----	2860 mg/kg	74.1	52	132

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3089010)							
ES1321593-001	V117	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	103	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3089016)							
ES1321593-001	V117	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	91.8	73	137
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	72.2	53	131
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	66.4	52	132
EP080: BTEXN (QCLot: 3089010)							
ES1321593-001	V117	EP080: Benzene	71-43-2	2.5 mg/kg	84.8	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	89.5	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	91.3	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	93.4	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	90.4	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	82.6	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3089010)										
ES1321593-001	V117	EP080: C6 - C9 Fraction	----	32.5 mg/kg	106	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3089010)										
ES1321593-001	V117	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	103	----	70	130	----	----
EP080: BTEXN (QCLot: 3089010)										
ES1321593-001	V117	EP080: Benzene	71-43-2	2.5 mg/kg	84.8	----	70	130	----	----
		EP080: Toluene	108-88-3	2.5 mg/kg	89.5	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	91.3	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	93.4	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	90.4	----	70	130	----	----
		EP080: Naphthalene	91-20-3	2.5 mg/kg	82.6	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3089016)										
ES1321593-001	V117	EP071: C10 - C14 Fraction	----	640 mg/kg	77.4	----	73	137	----	----
		EP071: C15 - C28 Fraction	----	3140 mg/kg	74.1	----	53	131	----	----
		EP071: C29 - C36 Fraction	----	2860 mg/kg	74.1	----	52	132	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3089016)										

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3089016) - continued										
ES1321593-001	V117	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	91.8	----	73	137	----	----
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	72.2	----	53	131	----	----
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	66.4	----	52	132	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1321593**	Page	: 1 of 5
Client	: SMEC TESTING SERVICES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257-COC4	Date Samples Received	: 02-OCT-2013
Sampler	: ----	Issue Date	: 04-OCT-2013
Order number	: 10481		
		No. of samples received	: 9
Quote number	: EN/025/13	No. of samples analysed	: 9

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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: **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
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
V117, V118, V119, V120, V121, V122, V123, V124, V125	**02-OCT-2013**	**----**	----	----	**03-OCT-2013**	16-OCT-2013	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
V117, V118, V119, V120, V121, V122, V123, V124, V125	**02-OCT-2013**	**03-OCT-2013**	16-OCT-2013	✓	**03-OCT-2013**	12-NOV-2013	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
V117, V118, V119, V120, V121, V122, V123, V124, V125	**02-OCT-2013**	**03-OCT-2013**	16-OCT-2013	✓	**03-OCT-2013**	16-OCT-2013	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
V117, V118, V119, V120, V121, V122, V123, V124, V125	**02-OCT-2013**	**03-OCT-2013**	16-OCT-2013	✓	**03-OCT-2013**	16-OCT-2013	✓

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(where) 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		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	9	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	12	**16.7**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TPH - Semivolatile Fraction	EP071	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TPH - Semivolatile Fraction	EP071	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
TPH - Semivolatile Fraction	EP071	1	9	**11.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	12	**8.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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
Moisture Content	EA055-103	SOIL	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).
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
TPH Volatiles/BTEX	EP080	SOIL	(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. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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 (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

CERTIFICATE OF ANALYSIS

Work Order	: **ES1321841**	Page	: 1 of 5
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 10484		
C-O-C number	: P19257-COC5	Date Samples Received	: 04-OCT-2013
Sampler	: ----	Issue Date	: 09-OCT-2013
Site	: ----		
		No. of samples received	: 6
Quote number	: EN/025/13	No. of samples analysed	: 6

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Phalak Inthaksone	Laboratory Manager - Organics	Sydney Inorganics
Phalak Inthaksone	Laboratory Manager - Organics	Sydney Organics

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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Client sample ID	V26	V27	V28	V29	V30
				Client sampling date / time	04-OCT-2013 15:00	04-OCT-2013 15:00	04-OCT-2013 15:00	04-OCT-2013 15:00	04-OCT-2013 15:00
					ES1321841-001	ES1321841-002	ES1321841-003	ES1321841-004	ES1321841-005
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		**12.4**	**12.1**	**11.3**	**13.6**	**13.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	**260**	**180**	**160**
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	<50	**260**	**180**	**160**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	**270**	**180**	**170**
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	**270**	**180**	**170**
EP080: BTEXN									
Benzene	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
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<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
^ **Total Xylenes**	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
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**89.5**	**94.0**	**98.9**	**109**	**107**
Toluene-D8	2037-26-5	0.1	%		**98.8**	**98.1**	**97.7**	**106**	**113**
4-Bromofluorobenzene	460-00-4	0.1	%		**106**	**104**	**96.6**	**105**	**109**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	V31	----	----	----	----
				Client sampling date / time	04-OCT-2013 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1321841-006	----	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		12.1	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		630	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		130	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		760	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	>C10_C16	50	mg/kg		110	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		630	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		840	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		94.8	----	----	----	----
Toluene-D8	2037-26-5	0.1	%		101	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		95.4	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0

QUALITY CONTROL REPORT

Work Order	: **ES1321841**	Page	: 1 of 6
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257-COC5	Date Samples Received	: 04-OCT-2013
Sampler	: ----	Issue Date	: 09-OCT-2013
Order number	: 10484		
		No. of samples received	: 6
Quote number	: EN/025/13	No. of samples analysed	: 6

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out ir compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Phalak Inthaksone	Laboratory Manager - Organics	Sydney Inorganics
Phalak Inthaksone	Laboratory Manager - Organics	Sydney Organics

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.

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: 3095839)									
ES1321840-016	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	5.8	6.2	6.1	No Limit
ES1321851-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	4.9	5.2	6.3	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3093219)									
ES1321841-001	V26	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3094927)									
ES1321840-002	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3093219)									
ES1321841-001	V26	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3094927)									
ES1321840-002	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 3093219)									
ES1321841-001	V26	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	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 Sample (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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3093219)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	107	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3094927)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	103	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	118	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	107	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3093219)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	106	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3094927)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	108	70	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	130	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
		50	mg/kg	----	150 mg/kg	101	63	131
EP080: BTEXN (QCLot: 3093219)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	102	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	98.0	62	128
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	95.9	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	92.0	60	120
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	95.3	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	88.7	62	138

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**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3093219)							
ES1321841-001	V26	EP080: C6 - C9 Fraction	----	32.5 mg/kg	109	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3094927)							
ES1321840-002	Anonymous	EP071: C10 - C14 Fraction	----	640 mg/kg	77.4	73	137
		EP071: C15 - C28 Fraction	----	3140 mg/kg	82.4	53	131
		EP071: C29 - C36 Fraction	----	2860 mg/kg	74.3	52	132

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3093219)							
ES1321841-001	V26	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	105	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3094927)							
ES1321840-002	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	98.6	73	137
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	77.1	53	131
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	56.1	52	132
EP080: BTEXN (QCLot: 3093219)							
ES1321841-001	V26	EP080: Benzene	71-43-2	2.5 mg/kg	92.2	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	89.3	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	89.2	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	88.3	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	86.8	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	84.6	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3093219)										
ES1321841-001	V26	EP080: C6 - C9 Fraction	----	32.5 mg/kg	109	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3093219)										
ES1321841-001	V26	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	105	----	70	130	----	----
EP080: BTEXN (QCLot: 3093219)										
ES1321841-001	V26	EP080: Benzene	71-43-2	2.5 mg/kg	92.2	----	70	130	----	----
		EP080: Toluene	108-88-3	2.5 mg/kg	89.3	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	89.2	----	70	130	----	----
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	88.3	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	86.8	----	70	130	----	----
		EP080: Naphthalene	91-20-3	2.5 mg/kg	84.6	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3094927)										
ES1321840-002	Anonymous	EP071: C10 - C14 Fraction	----	640 mg/kg	77.4	----	73	137	----	----
		EP071: C15 - C28 Fraction	----	3140 mg/kg	82.4	----	53	131	----	----
		EP071: C29 - C36 Fraction	----	2860 mg/kg	74.3	----	52	132	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3094927)										

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3094927) - continued										
ES1321840-002	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	98.6	----	73	137	----	----
		EP071: >C16 - C34 Fraction	----	4800 mg/kg	77.1	----	53	131	----	----
		EP071: >C34 - C40 Fraction	----	2400 mg/kg	56.1	----	52	132	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1321841**	Page	: 1 of 5
Client	: SMEC TESTING SERVICES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DAVID YONGE	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dyonge@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9756 1137	Facsimile	: +61-2-8784 8500
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257-COC5	Date Samples Received	: 04-OCT-2013
Sampler	: ----	Issue Date	: 09-OCT-2013
Order number	: 10484		
		No. of samples received	: 6
Quote number	: EN/025/13	No. of samples analysed	: 6

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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: **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
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
V26, V27, V28, V29, V30, V31	**04-OCT-2013**	**----**	----	----	**08-OCT-2013**	18-OCT-2013	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
V26, V27, V28, V29, V30, V31	**04-OCT-2013**	**08-OCT-2013**	18-OCT-2013	✓	**08-OCT-2013**	17-NOV-2013	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
V26, V27, V28, V29, V30, V31	**04-OCT-2013**	**04-OCT-2013**	18-OCT-2013	✓	**04-OCT-2013**	18-OCT-2013	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft							
Soil Glass Jar - Unpreserved (EP080)							
V26, V27, V28, V29, V30, V31	**04-OCT-2013**	**04-OCT-2013**	18-OCT-2013	✓	**04-OCT-2013**	18-OCT-2013	✓

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(where) 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		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	10	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	6	**16.7**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TPH - Semivolatile Fraction	EP071	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TPH - Semivolatile Fraction	EP071	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
TPH - Semivolatile Fraction	EP071	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	6	**16.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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
Moisture Content	EA055-103	SOIL	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).
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
TPH Volatiles/BTEX	EP080	SOIL	(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. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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 (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB1318541**	Page	: 1 of 4
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 10297		
C-O-C number	: P19257-COC1	Date Samples Received	: 02-AUG-2013
Sampler	: ----	Issue Date	: 08-AUG-2013
Site	: ----		
		No. of samples received	: 3
Quote number	: EN/025/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Matt Frost	Senior Organic Chemist	Brisbane Inorganics
Matt Frost	Senior Organic Chemist	Brisbane Organics

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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	S11	----	----	----	----
				Client sampling date / time	29-JUL-2013 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB1318541-001	----	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		11.3	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%		91.3	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%		100	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%		81.2	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		80.8	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%		95.4	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%		101	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	34.8	154.5
2-Chlorophenol-D4	93951-73-6	41.9	152.8
2.4.6-Tribromophenol	118-79-6	26.0	156.8
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	33.8	156.5
Anthracene-d10	1719-06-8	36.9	153.1
4-Terphenyl-d14	1718-51-0	41.8	172.2

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB1318541**	Page	: 1 of 6
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257-COC1	Date Samples Received	: 02-AUG-2013
Sampler	: ----	Issue Date	: 08-AUG-2013
Order number	: 10297		
		No. of samples received	: 3
Quote number	: EN/025/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Matt Frost	Senior Organic Chemist	Brisbane Inorganics
Matt Frost	Senior Organic Chemist	Brisbane Organics

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.

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: 2997634)									
EB1318620-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	19.3	19.3	0.0	0% - 50%
EB1318632-016	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	6.5	6.2	3.8	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2997608)									
EB1318632-017	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EB1318632-022	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	0.7	1.0	31.7	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	0.7	1.0	27.8	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.5	0.7	27.4	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	0.6	22.4	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	0.7	1.0	32.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.5	0.6	22.1	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	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 (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2997608) - continued									
EB1318632-022	Anonymous	EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	0.6	0.8	22.3	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 Sample (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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2997608)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	5.0 mg/kg	87.1	71	119
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	5.0 mg/kg	90.9	67	118
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	5.0 mg/kg	101	83	121
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	5.0 mg/kg	105	76	116
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	5.0 mg/kg	106	72	117
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	5.0 mg/kg	112	70	115
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	5.0 mg/kg	# 133	69	116
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	5.0 mg/kg	109	69	134
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	5.0 mg/kg	109	61	120
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	5.0 mg/kg	96.9	62	119
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	5.0 mg/kg	128	49	129
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	5.0 mg/kg	102	64	129
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	5.0 mg/kg	112	65	121
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	5.0 mg/kg	96.3	51	135
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	5.0 mg/kg	94.7	45	134
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	5.0 mg/kg	99.9	53	133

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**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2997608)							
EB1318541-001	S11	EP075(SIM): Acenaphthene	83-32-9	2.5 mg/kg	104	70	130
		EP075(SIM): Pyrene	129-00-0	2.5 mg/kg	124	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2997608)										
EB1318541-001	S11	EP075(SIM): Acenaphthene	83-32-9	2.5 mg/kg	104	----	70	130	----	----
		EP075(SIM): Pyrene	129-00-0	2.5 mg/kg	124	----	70	130	----	----

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB1318541**	Page	: 1 of 5
Client	: SMEC TESTING SERVICES PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257-COC1	Date Samples Received	: 02-AUG-2013
Sampler	: ----	Issue Date	: 08-AUG-2013
Order number	: 10297		
		No. of samples received	: 3
Quote number	: EN/025/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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: **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
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
S11	**29-JUL-2013**	**----**	----	----	**05-AUG-2013**	12-AUG-2013	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
S11	**29-JUL-2013**	**06-AUG-2013**	12-AUG-2013	✓	**07-AUG-2013**	15-SEP-2013	✓

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(where) 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		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	18	**11.1**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	2	14	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	14	**7.1**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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
Moisture Content	EA055-103	SOIL	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).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) 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)

Preparation Methods	Method	Matrix	Method Descriptions
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

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
Laboratory Control Spike (LCS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	3567730-002	----	**Fluoranthene**	206-44-0	133 %	69-116%	**Recovery greater than upper control limit**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB1321915**	Page	: 1 of 4
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 10373		
C-O-C number	: P19257 - COC2	Date Samples Received	: 10-SEP-2013
Sampler	: ----	Issue Date	: 16-SEP-2013
Site	: ----		
		No. of samples received	: 1
Quote number	: EN/025/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Matt Frost	Senior Organic Chemist	Brisbane Organics
Matt Frost	Senior Organic Chemist	Brisbane Organics
Stephen Hislop	Senior Inorganic Chemist	Brisbane Inorganics

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

- **EP071 (TPH/TRH): Particular sample shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	101B	----	----	----	----
				Client sampling date / time	04-SEP-2013 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1321915-001	----	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%	**9.6**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	**550**	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	**300**	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	**850**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----
>C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	**750**	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	**210**	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	**960**	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**88.1**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	**92.2**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	**95.9**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	52.7	133.7
Toluene-D8	2037-26-5	60.3	131.1
4-Bromofluorobenzene	460-00-4	59.2	126.6

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB1321915**	Page	: 1 of 6
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257 - COC2	Date Samples Received	: 10-SEP-2013
Sampler	: ----	Issue Date	: 16-SEP-2013
Order number	: 10373		
		No. of samples received	: 1
Quote number	: EN/025/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Matt Frost	Senior Organic Chemist	Brisbane Organics
Matt Frost	Senior Organic Chemist	Brisbane Organics
Stephen Hislop	Senior Inorganic Chemist	Brisbane Inorganics

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.

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: 3053710)									
EB1321847-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	16.2	16.2	0.0	0% - 50%
EB1321885-006	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	21.2	21.2	0.0	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3053694)									
EB1321729-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EB1321885-017	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3053698)									
EB1321729-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	620	380	47.5	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	410	280	39.9	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EB1321913-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	620	780	22.5	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	360	520	36.9	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3053694)									
EB1321729-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EB1321885-017	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3053698)									
EB1321729-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	910	570	45.7	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	210	150	29.6	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	60	<50	0.0	No Limit
EB1321913-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	900	1170	26.5	0% - 50%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	150	250	50.9	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 3053694)									
EB1321729-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EB1321885-017	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	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 (%)*
EP080: BTEXN (QC Lot: 3053694) - continued									
EB1321885-017	Anonymous	EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	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 Sample (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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3053694)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	16 mg/kg	88.2	66	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3053698)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	312 mg/kg	96.8	84	117
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	500 mg/kg	93.0	80	118
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3053694)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	18.5 mg/kg	87.1	66	126
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3053698)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	413 mg/kg	98.6	86	117
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	360 mg/kg	95.3	72	113
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080: BTEXN (QCLot: 3053694)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	84.8	73	108
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	79.0	73	111
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	90.0	67	110
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	88.3	66	112
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	84.2	68	110
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	92.4	72	115

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**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3053694)							
EB1321729-002	Anonymous	EP080: C6 - C9 Fraction	----	8 mg/kg	82.9	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3053698)							
EB1321729-002	Anonymous	EP071: C10 - C14 Fraction	----	312 mg/kg	102	70	130
		EP071: C15 - C28 Fraction	----	500 mg/kg	# 139	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3053694)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3053694) - continued							
EB1321729-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	8 mg/kg	91.4	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3053698)							
EB1321729-002	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	413 mg/kg	107	70	130
		EP071: >C16 - C34 Fraction	----	360 mg/kg	# 174	70	130
EP080: BTEXN (QCLot: 3053694)							
EB1321729-002	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	80.6	70	130
		EP080: Toluene	108-88-3	2 mg/kg	79.4	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3053694)										
EB1321729-002	Anonymous	EP080: C6 - C9 Fraction	----	8 mg/kg	82.9	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3053694)										
EB1321729-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	8 mg/kg	91.4	----	70	130	----	----
EP080: BTEXN (QCLot: 3053694)										
EB1321729-002	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	80.6	----	70	130	----	----
		EP080: Toluene	108-88-3	2 mg/kg	79.4	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3053698)										
EB1321729-002	Anonymous	EP071: C10 - C14 Fraction	----	312 mg/kg	102	----	70	130	----	----
		EP071: C15 - C28 Fraction	----	500 mg/kg	# 139	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3053698)										
EB1321729-002	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	413 mg/kg	107	----	70	130	----	----
		EP071: >C16 - C34 Fraction	----	360 mg/kg	# 174	----	70	130	----	----

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB1321915**	Page	: 1 of 5
Client	: SMEC TESTING SERVICES PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257 - COC2	Date Samples Received	: 10-SEP-2013
Sampler	: ----	Issue Date	: 16-SEP-2013
Order number	: 10373		
		No. of samples received	: 1
Quote number	: EN/025/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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: **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
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
101B	**04-SEP-2013**	**----**	----	----	**10-SEP-2013**	18-SEP-2013	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013							
Soil Glass Jar - Unpreserved (EP071)							
101B	**04-SEP-2013**	**12-SEP-2013**	18-SEP-2013	✓	**12-SEP-2013**	22-OCT-2013	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
101B	**04-SEP-2013**	**10-SEP-2013**	18-SEP-2013	✓	**11-SEP-2013**	18-SEP-2013	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013							
Soil Glass Jar - Unpreserved (EP080)							
101B	**04-SEP-2013**	**10-SEP-2013**	18-SEP-2013	✓	**11-SEP-2013**	18-SEP-2013	✓

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(where) 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		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	19	**10.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	13	**15.4**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TPH - Semivolatile Fraction	EP071	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TPH - Semivolatile Fraction	EP071	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
TPH - Semivolatile Fraction	EP071	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	13	**7.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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
Moisture Content	EA055-103	SOIL	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).
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
TPH Volatiles/BTEX	EP080	SOIL	(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. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	(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 (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

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	EB1321729-002	Anonymous	**C15 - C28 Fraction**	----	139 %	70-130%	**Recovery greater than upper data quality objective**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	EB1321729-002	Anonymous	**>C16 - C34 Fraction**	----	174 %	70-130%	**Recovery greater than upper data quality objective**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB1323381**	Page	: 1 of 4
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 10479		
C-O-C number	: P19257/COC3	Date Samples Received	: 25-SEP-2013
Sampler	: David Yonge	Issue Date	: 27-SEP-2013
Site	: ----		
		No. of samples received	: 1
Quote number	: EN/025/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Minh Wills	Organic Chemist	Brisbane Organics
Minh Wills	Organic Chemist	Brisbane Organics
Stephen Hislop	Senior Inorganic Chemist	Brisbane Inorganics

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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	103D	----	----	----	----
				Client sampling date / time	23-SEP-2013 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1323381-001	----	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%	**15.1**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	**100**	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	**1460**	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	**510**	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	**2070**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----
>C10 - C16 Fraction	>C10_C16	50	mg/kg	**380**	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	**1520**	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	**440**	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	**2340**	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	**380**	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**92.3**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	**82.2**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	**73.6**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	52.7	133.7
Toluene-D8	2037-26-5	60.3	131.1
4-Bromofluorobenzene	460-00-4	59.2	126.6

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB1323381**	Page	: 1 of 4
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257/COC3	Date Samples Received	: 25-SEP-2013
Sampler	: David Yonge	Issue Date	: 27-SEP-2013
Order number	: 10479		
		No. of samples received	: 1
Quote number	: EN/025/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Minh Wills	Organic Chemist	Brisbane Organics
Minh Wills	Organic Chemist	Brisbane Organics
Stephen Hislop	Senior Inorganic Chemist	Brisbane Inorganics

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.

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 (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3078816)									
EB1323381-001	103D	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3078823)									
EB1323381-001	103D	EP071: C15 - C28 Fraction	----	100	mg/kg	1460	1170	22.5	0% - 50%
		EP071: C29 - C36 Fraction	----	100	mg/kg	510	380	28.1	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	100	90	12.9	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3078816)									
EB1323381-001	103D	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QC Lot: 3078823)									
EB1323381-001	103D	EP071: >C16 - C34 Fraction	----	100	mg/kg	1520	1170	25.9	0% - 50%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	440	330	27.4	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	380	340	11.4	No Limit
EP080: BTEXN (QC Lot: 3078816)									
EB1323381-001	103D	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	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 Sample (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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3078816)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	16 mg/kg	102	66	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3078823)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	312 mg/kg	89.6	84	117
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	500 mg/kg	92.8	80	118
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3078816)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	18.5 mg/kg	100	66	126
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3078823)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	413 mg/kg	95.3	86	117
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	360 mg/kg	91.5	72	113
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
EP080: BTEXN (QCLot: 3078816)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	88.2	73	108
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	96.6	73	111
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	99.2	67	110
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	88.2	66	112
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	88.4	68	110
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	84.6	72	115

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) Results are required to be reported.**

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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.**

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB1323381**	Page	: 1 of 5
Client	: SMEC TESTING SERVICES PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: DAVID YONGE	Contact	: Customer Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: dyonge@smectesting.com.au	E-mail	: Brisbane.Enviro.Services@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61 7 3243 7222
Facsimile	: +61 02 9756 1137	Facsimile	: +61 7 3243 7218
Project	: 19257 3243C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: P19257/COC3	Date Samples Received	: 25-SEP-2013
Sampler	: David Yonge	Issue Date	: 27-SEP-2013
Order number	: 10479		
		No. of samples received	: 1
Quote number	: EN/025/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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: **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
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
103D	**23-SEP-2013**	**----**	----	----	**26-SEP-2013**	07-OCT-2013	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013							
Soil Glass Jar - Unpreserved (EP071)							
103D	**23-SEP-2013**	**26-SEP-2013**	07-OCT-2013	✓	**26-SEP-2013**	05-NOV-2013	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
103D	**23-SEP-2013**	**26-SEP-2013**	07-OCT-2013	✓	**26-SEP-2013**	07-OCT-2013	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013							
Soil Glass Jar - Unpreserved (EP080)							
103D	**23-SEP-2013**	**26-SEP-2013**	07-OCT-2013	✓	**26-SEP-2013**	07-OCT-2013	✓

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(where) 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		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
TPH - Semivolatile Fraction	EP071	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
TPH - Semivolatile Fraction	EP071	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
TPH - Semivolatile Fraction	EP071	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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
Moisture Content	EA055-103	SOIL	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).
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
TPH Volatiles/BTEX	EP080	SOIL	(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. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	(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 (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

APPENDIX D

RESULTS OF STATISTICAL ANALYSES

General UCL Statistics for Full Data Set - Carcinogenic PAHs

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

General Statistics

Number of Valid Observations		50 servations	19

Raw Statistics

Minimum	0.2
Maximum	8.5
Mean	1.469
Median	0.6
SD	2.144
Coefficient of Variation	1.459
Skewness	2.03

Log-transformed Statistics

Minimum of Log Data	-1.609
Maximum of Log Data	2.14
Mean of log Data	-0.324
SD of log Data	1.089

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.595
Shapiro Wilk Critical Value	0.947

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.837
Shapiro Wilk Critical Value	0.947

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	1.977

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL	2.061
95% Modified-t UCL	1.992

Assuming Lognormal Distribution

95% H-UCL	1.915
95% Chebyshev (MVUE) UCL	2.324
97.5% Chebyshev (MVUE) UCL	2.773
99% Chebyshev (MVUE) UCL	3.656

Gamma Distribution Test

k star (bias corrected)	0.797
Theta Star	1.843
MLE of Mean	1.469
MLE of Standard Deviation	1.646
nu star	79.69
Approximate Chi Square Value (.05)	60.12
Adjusted Level of Significance	0.0452
Adjusted Chi Square Value	59.62
Anderson-Darling Test Statistic	5.174
Anderson-Darling 5% Critical Value	0.789
Kolmogorov-Smirnov Test Statistic	0.347
Kolmogorov-Smirnov 5% Critical Value	0.13

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.947
95% Adjusted Gamma UCL	1.964

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	1.968
95% Jackknife UCL	1.977
95% Standard Bootstrap UCL	1.954
95% Bootstrap-t UCL	2.104
95% Hall's Bootstrap UCL	1.991
95% Percentile Bootstrap UCL	1.985
95% BCA Bootstrap UCL	2.05
95% Chebyshev(Mean, Sd) UCL	2.79
97.5% Chebyshev(Mean, Sd) UCL	3.362
99% Chebyshev(Mean, Sd) UCL	4.485

Potential UCL to Use

Use 97.5% Chebyshev (Mean, Sd) UCL 3.362