Appendix C - Report on Detailed Site Investigation, Lot 3 Fred Pass Road, Humpty Doo, NT. Dec 2015 (DP Ref: 78156.01.R.001.Rev2)

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Detailed Environmental Site Investigation

Lot 3 Freds Pass Road
Humpty Doo, NT

Prepared for
Tolinchlo Pty Ltd

Project 78156.01
December 2015

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	78156.01	Document No.	78156.01.R.001.Rev2
Document title	Report on Detailed Environmental Site Investigation		
Site address	Lot 3 Freds Pass Road, Humpty Doo, NT		
Report prepared for	Tolinchlo Pty Ltd		
File name	78156.01 Humpty Doo ESI Report		

Document status and review

Revision	Prepared by	Reviewed by	Date issued
Rev0	Jessica Paulsen	Paul Moritz	12 August 2015
Rev1	Dana Wilson	Paul Moritz	30 October 2015
Rev2	Dana Wilson	Paul Moritz	8 December 2015

Distribution of copies

Revision	Electronic	Paper	Issued to
Rev0	1	0	Tolinchlo Pty Ltd – Mr Peter Poniris & Mr Tony Whear GHD Pty Ltd – Mr John Throssell
Rev1	1	0	Tolinchlo Pty Ltd – Mr Peter Poniris & Mr Tony Whear GHD Pty Ltd – Mr John Throssell
Rev2	1	0	Tolinchlo Pty Ltd – Mr Peter Poniris & Mr Tony Whear GHD Pty Ltd – Mr John Throssell

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		8 December 2015
Reviewer		8 December 2015

NCS INTERNATIONAL CERTIFIED QUALITY MANAGEMENT SYSTEM

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
Unit 2, 14 Caryota Court
Coconut Grove NT 0810
PO Box 36858
Winnellie NT 0821
Phone (08) 8948 6800
Fax (08) 8948 6899

Table of Contents

Report on Detailed Environmental Site Investigation
Lot 3 Freds Pass Road, Humpty Doo, NT

1. Introduction

This report presents the results of detailed environmental site investigation (DSI) which was carried out at Lot 3 Freds Pass Road, Humpty Doo, NT (hereon in referred to as 'the site'). The investigation was commissioned by Mr Peter Poniris of Tolinchlo Pty Ltd (Tolinchlo), owner of the site.

It is understood that the site will be divided into two zones for future residential subdivision, these being a single dwelling (SD) zone and a multiple dwelling (MD) zone. It is understood that the SD zone will be developed first followed by the MD zone, although, both zones were investigated at the same time.

This DSI will be used in an environmental audit, as required by the Northern Territory Development Consent Authority (DCA). The assessment process is subject to a site audit by a 'Qualified Person' under the NSW or Victorian contaminated land auditor systems. Mr John Throssell of GHD Pty Ltd ("GHD") has been appointed as the Site Auditor for the project.

The objectives of the DSI were to:

- Identify sources of contamination and determine the contaminants of concern;
- Identify areas of contamination;
- Identify human and ecological receptors;
- Identify affected media;
- Provide quantitative data on contamination; and
- Provide recommendations when contaminant levels were above adopted assessment guidelines.

The DSI comprised the following:

- A review of the Douglas Partners Pty Ltd (DP) preliminary site investigation (PSI) report conducted for the site (Ref 3);
- Excavation of a total of 32 test pits within the site to depths of 0.5 m to 1.0 m;
- Excavation of one additional test pit at a depth of 0.7 m and collection of two surface samples north-east of the site (*i.e.* off-site). The samples were collected as 'Background Samples' to confirm the absence of widespread contamination of the local area;
- Logging of the soil profile and collection of soil samples for testing and identification purposes;
- Laboratory testing of selected soil samples for identified potential contaminants of concern; and
- Preparation of this report presenting the findings of the investigation.

It should be noted that this DSI includes an assessment of soil comprising the analysis of a number of selected samples collected from 32 locations and limited background sampling. Given the size of the investigation area, soil conditions were investigated at a statistically significant number of locations, less than the number stipulated in AS 4482. This investigation does not include an assessment of groundwater.

2. Site Location and Description

The site is identified as Lot 3, Freds Pass Road, Humpty Doo, NT and is located on the south-eastern corner of the intersection of Freds Pass Road and Beaumont Road. The site is irregular in shape with maximum plan dimensions of approximately 404 m by 278 m, totalling an area of approximately 81,100 m^2 (8.11 ha) as shown on Drawing 1 in Appendix A.

The site is located within the Litchfield Local Government Area. Reference to the Northern Territory Planning Scheme (NTPS), indicates that the site is zoned 'Residential' purposes, with the northern portion zoned 'Multiple Dwelling Residential' and the southern portion zoned 'Single Dwelling Residential' as shown in Figure 1.

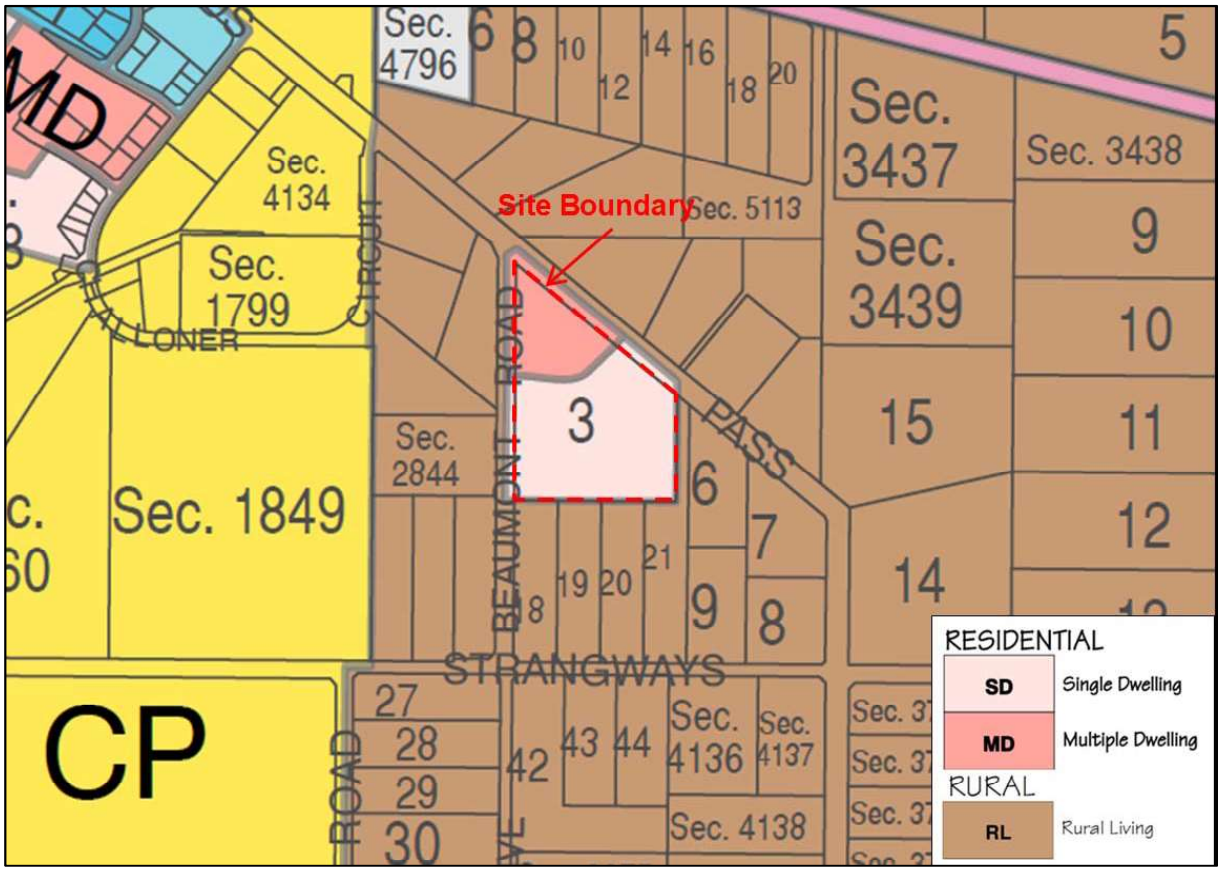


Figure 1: Current Landuse Zoning (Image adapted from Northern Territory Planning Scheme Plan titled 'Darwin and Surrounds')

The NTPS lists the primary purpose of the zonings as follows:

- Single Dwelling Residential: *to provide for single dwellings on individual lots*;
- Multiple Dwelling Residential: *to provide for a range of housing options to a maximum height of two storeys above ground level.*

Site history information indicated that the site was previously zoned 'RL Rural Living' as discussed further in Section 4.

A concrete slab, which had two shipping containers and one demountable shed on it, a double garage and an above ground water storage tank, occupied the north-western corner of the site.

The condition of the site at the time of the DSI was generally as per observations made by DP in February 2015 during the PSI walkover.

Adjacent sites are zoned "RL Rural Living" as shown in Figure 1, above. The NTPS lists the primary purpose of the zoning is to provide for low-density rural living and a range of rural land uses including agriculture and horticulture. Adjacent sites typically comprised rural residential allotments to the south, south-east and south-west. Several commercial premises are also located on nearby sites including Humpty Doo Pre-School (south) and Salvation Army store (north-east).

3. Scope of Work

The scope of work comprised the following.

- A review of the DP preliminary site investigation (PSI) report conducted for the site (Ref 3);
- Underground services were located based on 'Dial-Before-You-Dig' information and professional underground services locator using ground penetrating radar;
- Intrusive soil sampling as follows:
    - SD zone: 21 test pits (TP01 to TP21) were excavated to depths of between 0.5 m and 1.0 m using a 8 tonne excavator fitted with a 600 mm wide flat bucket;
    - MD zone: 12 test pits (TP22 to TP28, TP30 to TP34) were excavated to depths of between 0.5 m and 0.8 m using a 8 tonne excavator fitted with a 600 mm wide flat bucket;
    - Background Sampling: one test pit (TP29) was excavated to a depth of 0.7 m using an 8 tonne excavator fitted with a 600 mm wide flat bucket and two surface samples (S1 and S2) were collected using hand tools. Background samples were collected to assess the potential for widespread contamination of the local area.
- The test pits and background surface sampling locations were logged and sampled by a geotechnical engineer from DP. Samples were collected from the test pits based on field observations and any signs of potential contamination;
- Laboratory testing of 57 selected soil samples for the identified potential contaminants of concern. Laboratory testing comprised inter and intra-laboratory testing for Quality Assurance / Quality Control (QA/QC purposes);

- Preparation of this report including identification of potential sources of contamination, identification of contaminants of concern, fieldwork methodology, results of the investigation, a discussion of analytical results against site assessment criteria, and an assessment of the need for further field-based environmental investigations.

The test pit locations are shown on Drawings 2, 3 and 4 in Appendix A.

4. Review of Preliminary Site Investigation

DP prepared the *Report on Preliminary Site Investigation Revision 1, Lot 3 Freds Pass Road, Humpty Doo, NT* dated April 2015 (Ref 3). The scope of work comprised a review of historical information followed by a site walkover to observe any signs of potential contamination.

The report found that the following occurred at the approximate dates below:

- Prior to 1970 – site was likely unallocated crown land and occupied by virgin bushland;
- 1970 – site ownership was first transferred, followed by 1979, 1981, 1998 and 2012;
- 1979 – site was occupied by one shed and one house;
- 1994 – the construction of a cool room / shed approved;
- Prior to 1995 – The site had been occupied by an operational mango orchard. It is unclear when this site use commenced, although it may have been in 1970 when the site was first transferred. Pesticides and insecticides are thought to have been used;
- 1995 – site occupied by house, garage, shed and other rural structures;
- 1996 to 1998 – Tolinchlo (current owners) begun operating the mango orchard;
- 1999 – stopped using pesticides and insecticides;
- 2011 – an application to rezone of the site from zone 'RL Rural Living' to a proposed mix of residential and rural land use was "deferred" pending the outcome of rural village planning studies (*i.e.* review of zonings within policy documents at the time of application);
- 2012 – mango orchard ceased operation;
- 2012 to 2014 – trees were removed and the site surface was stripped;
- 2012 to 2015 – all structures removed from site apart from garage, concrete slab from cool room and above ground water storage tank;
- 2014 – rezoning to residential land use and the proposed development were approved.

At the time of the site walkover, the site sloped down slightly toward the south and no surface staining or soil discolouration was noted. The site surface had been stripped of topsoil and some parts were covered by patches of short grass. A few large trees were present. It is understood that the depth of stripping was in the order of 50 mm to 100 mm and was undertaken in preparation for future earthworks filling.

The north-western corner of the site was occupied by: a concrete slab which had two shipping containers and one demountable shed; a double garage with concrete floor; an above ground water storage tank; and, several items of earthmoving machinery.

The client indicated that two septic tanks were located at the site. One was removed along with the soil surrounding it sometime in 1999. DP was not informed whether a validation assessment was completed. The remaining septic tank is located close to the location of the former residential dwelling, which has since been demolished. The client plans to leave the septic on site at least until the MD zone of the site is developed. The approximate locations of the septic tanks within MD Zone are shown on Drawing 4 in Appendix A.

The primary contaminating activities identified at the site associated with the former mango, banana and tomato orchard (and described by the owner) are summarised as follows:

- At the time of mango tree planting in about 1970s, pesticides/fungicides were placed at the base of the excavation for each tree (*i.e.* about 0.1 m to 0.25 m) to prevent termite damage to trees/support poles. Treatment in this manner is understood to have occurred once only at the time of initial planting. Orchard activities was initially commenced in the northern part of the site;
- Prior to transport of fruit from site, chemical treatment / fruit dipping was undertaken in the site shed (slab on ground) in the north-western part of the site (MD Zone). Fruit was dipped in dilute solutions of dimethoate (organophosphate pesticide, OPP) and Sportak fungicide (imidazole fungicide). The treatment was undertaken using an approximately 8% chemical solution, as per the procedure required by food and health standards. The waste treatment solutions and chemical ("spent drip") was dispersed at the surface in a localised area the north-western part of the site, south of the concrete slab area as indicated by the client. Treatment was undertaken approximately weekly over the six week harvest period. Treatment or disposal of wastes has not been undertaken at the site for approximately 10 years (*i.e.* prior to surface soil stripping). The areas in which fruit dipping and chemical disposal were undertaken are shown on Drawings 3, 4 and 5. The chemical disposal area corresponds with sampling location TP28.

It is noted that while a tractor was used for orchard activities, machinery servicing and refuelling were undertaken off-site (*i.e.* there were no fuels or lubricants stored on-site). The potential for surface hydrocarbon impact at the site is, therefore, considered to be negligible and has not been identified as a potentially contaminating site activity. As outlined following, hydrocarbons have been considered as a potential contaminant associated with herbicide and pesticides storage and preparation.

The identified contaminants of concern comprised: pesticides, herbicides and insecticides associated with orchard farming activities; petroleum hydrocarbons which were the likely solvent for herbicide and pesticide concentrates; and asbestos due to the demolition of a former on-site dwelling. It is noted that the PSI indicated that the asbestos materials were removed from the dwelling by a licensed contractor prior to demolition.

The potential contaminants, their sources and the areas of potential impact are summarised in Section 7.

As outlined in Section 2, adjacent sites are zoned Rural Living and comprised rural residential allotments to the south, south-east and south-west. Several commercial premises are also located on nearby sites including Humpty Doo Pre-School (south) and Salvation Army store (north-east). The current and past zonings of adjacent sites for rural purposes represent a low potential for contamination arising from adjacent sites.

The preliminary conceptual site model (CSM) identified the possible pathways between the above sources (S1) and receptors (R1 to R5) which has been replicated in Section 8 of this DSI report.

The PSI report concluded that intrusive soil sampling was required to confirm the contamination status of the site. That report also noted that the topsoil at the site had been scraped into stockpiles, and the site owner advised that the stockpiled soil had been removed from site.

5. Proposed Development

At this stage, the development plans have not been finalised but are likely to comprise the following as shown on Drawing 2 in Appendix A.

- The SD Zone covers an area of approximately 61,100 m^2 (6.11 ha). It is understood the proposed development will comprise subdivision into about 57 lots with an average area of 695 m^2 with access roads and a retention basin with an area of 6057 m^2. Across most of the zone, the surface level will be raised by 0.5 m to 1.5 m by the placement of imported filling. However, in the area of the retention basin, the surface level will be reduced by excavation up to 1.0 m in depth. It should be noted that the exact location of the retention basin has not been determined yet;
- The MD Zone covers an area of approximately 20,000 m^2 (2 ha). It is understood the proposed development will comprise subdivision into about 47 lots with individual site areas ranging from 300 m^2 to 2,000 m^2 with an access road. Across most of the zone, the surface level will be raised by up to 1.5 m by the placement of imported filling.

Conceptual lot layouts and cut and fill are shown on Drawings B00153-CE001 and B00153-CE002 (BMD Consulting) in Appendix A.

6. Regional Geology and Proximity to Surface Water

Reference to the *Noonamah* 1:100 000 Geological Series map (Sheet 5172) indicates the site is underlain by Quaternary age soil deposits of nodular and pisolitic laterite gravel and ferricrete. These soil materials overlie early Proterozoic age siltstone, shale and argillite belonging to the Wildman Siltstone Unit.

Based on investigations completed by DP in the surrounding area, lateritic soils are generally encountered at depths of between 0.5 m and 1 m and become cemented at a depth of approximately 2 m. DP has rarely encountered the underlying rock formation, but siltstone is generally encountered at depths greater than 5 m.

The site and surrounding area sloped down slightly toward the south. Edwins Creek is located approximately 1 km east of the site and Horns Creek is located approximately 2.5 km south-west of the site. The creeks drain into the Howard and Elizabeth Rivers, respectively, as shown on Drawing 6 in Appendix A.

According to the Northern Territory Government Natural Resource Maps (2004), groundwater quality in the vicinity of the site is suitable for most purposes and bore yields could be expected to be 0.5 L/s to 15 L/s.

The site is located within the southern extent of the Howard East Aquifer, as shown on Drawing 6 in Appendix A. Water allocation is managed under Howard East Water Allocation Planning. It is understood that there are typically three aquifers in the Darwin region as follows (CSIRO, Ref 2):

- *Uppermost aquifer developed in the lateritised profile of the Cretaceous sediments*; overlying
- *Intervening aquifer developed in the sandstone unit*; overlying
- *An aquifer developed in the weathered top of the Lower Proterozoic Koolpinyah Dolomite*.

The Lower Proterozoic Koolpinyah Dolomite is also referred to as the “Coomalie Dolomite”.

A Northern Territory Government (2004) modelling report on the McMinns and Howard East aquifers (Ref 8) indicates that the uppermost aquifer (*laterised profile*) profile extends to about 30 m in depth with the highest permeability zone to a maximum of about 12 m depth. The ‘typical end of dry season’ water level has been mapped below the level of the laterised profile as shown in Figure 2 below.

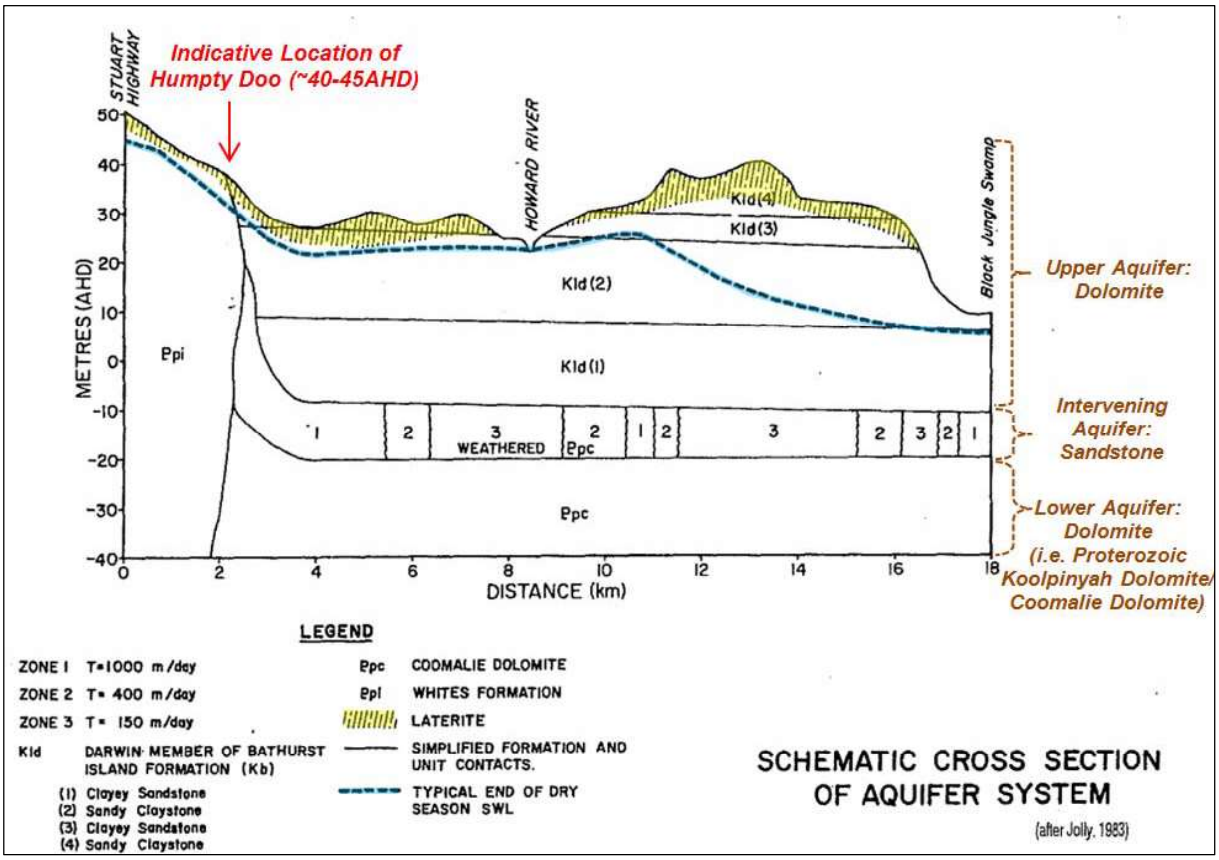


Figure 2: Indicative Hydrogeological Cross-Section (Adapted From Figure 3 of Ref 8)

The PSI report (Ref 3) found that three registered groundwater bores are or were located on the site, installed to depths of between 61 m and 85 m below ground level (m BGL). Based on the depths of drilling, the bores are understood to be screened in the intervening sandstone aquifer or Lower Proterozoic Koolpinyah Dolomite (Coomalie Dolomite) at base RLs of about -16 AHD to -40 AHD. The client has confirmed one of the bores (RN007082) remains on site and is currently operational. A submersible pump is currently installed in the bore.

Registered groundwater bores on surrounding lots were identified at 16 locations. All bores were licensed for 'water supply' purposes with most wells similarly screened at depths greater than about 50 m depth. A summary of the bore information from the Australian Bureau of Metrology *Australian Groundwater Bore Explorer* is included in Table D1.

It is understood the lower aquifer (Proterozoic Koolpinyah Dolomite / Coomalie Dolomite) is used for irrigated horticulture, industrial purposes, rural domestic water supply and to augment the reticulated urban water supply.

It is noted that the subsurface investigation for this DSI did not identify free groundwater within the 1 m maximum depth of excavation (refer Section 10).

7. Potential for Contamination

Based on the findings of the PSI Report (Ref 3), the potential for contamination at the site was considered to be low to moderate. The site may, potentially, be contaminated with pesticides, insecticides and petroleum hydrocarbons from the historical use of the site as a mango orchard. Asbestos materials or impact to surface/near-surface soils may also be present due to the removal/demolition of the former site dwelling known to have contained asbestos materials. The risk, however, is considered to be low and localised to the demolition area (MD Zone).

The surface vegetation, including some topsoil was stripped in preparation for the earthworks (filling) prior to subdivision of the site in about 2009 prior to DP undertaking the PSI. It is understood that the depth of stripping was in the order of about 50 mm to 100 mm. Notwithstanding the removal and off-site disposal of vegetation and topsoil, there remains the potential for surface and near-surface contamination due to former pesticide and herbicide use at the site.

Given the removal of one septic tank and surrounding soil was undertaken in about 2009 and the general absence of a shallow groundwater table, the risk of residual impact from the septic system is considered to be negligible. It is understood that the existing septic tank located in the north-western part of the is proposed for removal and validation during the proposed MD Zone development stage, assessment of potential nutrient contamination (*e.g.* nitrate) in this area was not considered warranted.

The three on site groundwater bores were installed between 1970 and 1979, and their locations are shown on Drawings 2 and 3. These bores are installed to depths of between 55 m and 85 m BGL. Records indicate that the groundwater was encountered at depths greater than about 50 m during drilling. Standing water levels (*i.e.* groundwater pressure head) were recorded between 3 m and 14.6 m BGL and may be indicative of the pressurised semi-confined aquifer system at depth. While the depth of groundwater at the site has not been assessed under the current scope of this DSI, the risk of potential contamination to groundwater at the site arising from site activities is considered to be low.

8. Conceptual Site Model

8.1 Overview

The following conceptual site model (CSM) was devised as part of the DP (2015) PSI (DP, Ref 3). The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future (*i.e.* it enables an assessment of the potential source – pathway – receptor linkages).

8.2 Potential Contamination Sources

Based on the findings of the PSI Report (DP Project 78156.00), the identified potential sources of contamination are summarised in Table 1.

Table 1: Potential Contamination Sources and Contaminants of Concern

Potential Source	Description of Potential Contaminating Activity	Contaminants of Concern	Summary of Potential Impacted Area
Historical operation of the site as mango, banana orchard and tomato market garden	Storage, use and disposal of pesticides, herbicides, fungicides during the operation of the orchard. Likely to be limited to shallow depth	OPP, OCP, TRH (likely solvent for OCP/OPP)	Storage – MD Zone (former shed on concrete slab) Use – SD and MD Zones (*i.e.* entire site area)
Former site dwelling containing asbestos materials	Removal/demolition of site dwelling	Asbestos	MD Zone (north-western portion near former residence)
Storage and use of post-harvest treatment chemicals on fruit	Use of dilute solutions of dimethoate and Sportak fungicide (*i.e.* OPPs)	OPP	MD Zone (north-western part of the site, near former site shed (slab on ground)
Disposal of post-harvest chemicals ("spent drip")	Disposal of dilute solutions of dimethoate and Sportak fungicide (*i.e.* OPPs)	OPP	MD Zone south of the concrete slab area / former site shed slab

Notes to Table 1:

Pesticides, herbicides and insecticides (*i.e. organophosphate* pesticides (OCP); organochlorine pesticides (OCP) including phenoxy herbicides)

TPH – Total Petroleum Hydrocarbons

The potential contamination source (S) on the site is therefore:

- S1 – impacted soil.

8.3 Potential Receptors

The following potential receptors have been identified:

- R1 – site users (current and future residents);
- R2 – adjacent site users;
- R3 – construction / maintenance workers;
- R4 – groundwater and surface water;
- R4a – users of groundwater;
- R5 – ecological – plants, gardens, and insects and other fauna on future subdivided allotments.

8.4 Potential Pathways

Potential pathways for contamination include the following:

- P1 – direct contact with contaminated soil (ingestion and dermal) – possibly complete pathway after development;
- P2 – inhalation of contaminated dust, asbestos and / or vapours) – possibly complete pathway during development;
- P3 – leaching of contaminants and vertical migration into groundwater – unlikely complete pathway, identified contaminants have low solubility;
- P4 – surface water and contaminated sediment runoff – currently considered an incomplete pathway, however, may be a possible complete pathway during and after development (post filling of site). For groundwater, given the insoluble nature and surficial application of the contaminants, OCP impact to groundwater at depths of 12 m bgl is considered unlikely. Further DP infers that the processes of dilution, adsorption and advection would prevent any contaminants that reached groundwater at 12 m bgl, from reaching Howard River located approximately 6 km from the site.
- P4a – users of groundwater – as for P4, DP infers that the processes of dilution, adsorption and advection would prevent any contaminants from reaching groundwater at 12 m bgl;
- P5 – lateral migration of groundwater into surrounding watercourses groundwater – unlikely complete pathway for contaminant transport, identified contaminants have low solubility;
- P6 – direct contact of contaminated soil with ecological receptors– possibly complete pathway during and after development;
- P7 – extraction of contaminated groundwater– unlikely complete pathway, identified contaminants have low solubility, registered extraction bores at great depth.

As discussed above, groundwater below the site is understood to be at significant depth below the site and impact to groundwater from the site is unlikely (*i.e.* incomplete pathway). While there are no on-site water courses at present to provide a complete pathway, it is noted that the proposed development comprises an on-site retention basin.

9. Sampling Rationale

9.1 Overview

This investigation was conducted in general accordance with the following legislation, standards and guidelines:

- *National Environmental Protection (Assessment of Site Contamination) Measure* 1999 (as amended 2013), Ref 6;
- Australian Standards AS 4482.1-2005 "*Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil. Part 1: Non-volatile and semi-volatile compounds*" (Ref 8);
- Northern Territory Government, *Waste Management and Pollution Control Act*, 2007; and

- Northern Territory Environment Protection Authority, Guidelines for Consultants Reporting on Environmental Issues, January 2013 (Ref 7).

Based upon the Australian Standard AS 4482.1-2005, soil sampling of a potentially contaminated site should be conducted on both a systematic grid-based system to test for unknown sources of contamination and a targeted sampling pattern to test for known potential sources of contamination. The Standard also provides guidance on the minimum number of grid based sample locations required to detect a hotspot of a certain diameter, depending on the size of the property.

Table E1 advises a minimum of 11 grid sample locations are required per hectare for an area greater than 5.0 ha. This is provided to allow detection of contamination hot-spots of a certain size. However, given the history of pesticide use, contamination 'hot spots' are not likely, with any contamination more likely to be evenly distributed across the site, although some sampling locations targeted the used pesticide disposal area. The number of systematic sampling locations was chosen to be statistically significant, albeit less than stipulated in Table E1 of AS4482.

The soil samples were collected from test pits to allow the *in situ* sub-surface conditions to be observed for both environmental and geotechnical purposes. It is anticipated that some information obtained during this DSI will be used to form part of the geotechnical investigation of the site which is likely to be undertaken at a later stage under separate cover.

The sampling rationale for each zone is outlined below. Overall, soil samples were collected at regular depth intervals or at signs of potential contamination. The samples from each test location considered to have the most potential to be contaminated were selected for laboratory analysis. The assessment of the potential for contamination was based on the sample location within the profile (e.g. near surface), the sample source (e.g. filling or natural soil) and signs of environmental concern (e.g. odours and staining).

Test pits were excavated to depths of between 0.5 m and 1.0 m; this depth is considered reasonable as the proposed development includes placing up to 1.5 m of imported filling, which would effectively form a ''cap'' between the future site users and any potentially contaminated soil.

9.2 SD Zone

The SD zone has historically been used for the growing of fruit trees and vegetables. No structures are known to have occupied the zone. One registered and operational groundwater bore is located within this zone (RN007082), as shown in Drawing 2 in Appendix A. One other groundwater bore (RN009500) was previously registered at in this zone, however, is it is understood the bore is not operational and bore records indicate the well has been "abandoned" (refer Table D1 in Appendix D).

Given the generalised use of the site for orchard activities, test locations were set out on an approximately grid-based arrangement. A reduced sampling density was undertaken comprising a total of 21 test pits for the 61,100 m^2 (6.11 ha) site area, representing about 30% of the minimum number of sample locations outlined in Table E1 of AS-4482 (Ref 8). The reduced sampling density was considered suitable for the assessment of contaminant concentrations due to site activities.

It is noted that AS-4482 does not provide guidance for the recommended number of test locations for sites greater than 5 ha.

The test pit locations are shown on Drawing 2 in Appendix A.

9.3 MD Zone

In the past, this zone was also occupied by an elevated residential dwelling and a cool room / shed which was used to store insecticides, pesticides and herbicides. Waste diluted chemicals ("spent drip") comprising dimethoate (*i.e.* OPP) and Sportak fungicide following treatment/dipping of fruit were previously dispersed at the surface within a localised area MD Zone (*i.e.* prior to surface soil stripping). A septic tank system is also known to have been removed along with the soil surrounding it. One registered groundwater bore (RN026874) was previously located within this zone, as shown in Drawing 3, however, is no longer operational.

Given the above, DP adopted a combination of grid-based and targeted sampling to investigate this zone. The site area is approximately 20,000 m^2 (2 ha). Allowance was made for 30% of the recommended number of sample locations, that being nine test pits on an approximately grid-based arrangement. In addition, another three targeted test pits were included. The targeted locations were positioned in the vicinity of the existing and previous structures plus the area where spent drip solution was dispersed. In total 12 test pits were excavated to depths of between 0.5 m and 0.8 m at the locations shown on Drawings 3 and 5 in Appendix A. It is noted that two of the grid-based locations (TP24 and TP25) also correspond to areas identified for targeted sampling and have therefore been considered as both grid-based and targeted locations.

Targeted test pit locations were as follows:

- TP24 (grid-based), TP26 and TP27 – former dwelling;
- TP25 (grid-based) – former septic tank system;
- TP28 – former dimethoate (*i.e.* OPP) and Sportak fungicide disposal location and area of existing septic system.

9.4 Background Sampling

The background sampling was undertaken within the road reserve south-east of the site in the undisturbed bush near the bend in Freds Pass Road. The purpose of the sampling was to confirm the absence of widespread contamination of the local area.

The sampling comprised the excavation of one test pit to a depth of 0.7 m (TP29) and collection of samples from 0.1 m and 0.7 m depth and collection of two surface samples (S1 and S2). The sampling locations are shown on Drawing 4 in Appendix A.

10. Field Work Results

10.1 Underground Services

The 'Dial-Before-You-Dig' search indicated the following services within and adjacent to the site:

- Overhead power within the road easement adjacent to the northern site boundary (Freds Pass). It is understood an overhead power line previously connected to the former site dwelling;
- Underground telecommunications within the road easement adjacent to the western site boundary (Beaumont Road). A redundant line was identified in the north-western part of the site assumed to have been a prior connection to the former site dwelling.

Publically-owned underground water, sewer or telecommunications were not mapped within the site.

A professional underground services locator was engaged for clearance of active underground services at proposed test pit locations. Screening of underground services in the vicinity of the current and former septic tanks was undertaken by ground penetrating radar. The service locating did not detect active services within the site.

It is noted that a 50 mm diameter PVC pipe was encountered at a depth of 0.25 m at TP24, located in close proximity to the existing septic system.

10.2 Subsurface Conditions

10.2.1 Overview

Detailed test pit logs are presented in Appendix B, together with Notes on Sampling Methods, Soil Descriptions and Symbols & Abbreviations. Notes About this Report are included in Appendix A.

The weather at the time of conducting the field work was fine and sunny.

10.2.2 SD Zone

The test pits located in the SD zone (TP01 to TP21, ref Drawing 3, App A) were excavated to depths of between 0.5 m and 1.0 m. The subsurface conditions encountered in the test pits were relatively uniform natural soils and comprised loose to very dense sand with some gravel, gravelly silty sand and gravelly sand to the base of the test pits at depths of between 0.5 m and 1.0 m. The only exception was very dense sandy gravel and dense clayey gravel with weakly cemented zones which was encountered at depths of between 0.05 m and 0.6 m in TP05 and TP19, respectively.

Soils in the central and southern parts of SD Zone were generally dominated by sands and silty sands, with increasing proportions of gravel in the northern part of the zone.

No free groundwater was encountered in any of the test pits. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will, therefore, vary with time.

No signs of contamination (*e.g.* staining, odorous soil) were noted during the test pitting. No filling was identified at the test pit locations.

10.2.3 MD Zone

The test pits located in the MD zone (TP22 to TP28 and TP30 to TP34, ref Drawing 4, App A) were excavated to depths of between 0.5 m and 0.8 m. The subsurface conditions encountered in the test pits were relatively uniform natural soils and comprised medium dense to weakly cemented sandy gravel, clayey sandy gravel and silty sandy gravel to depths of between 0.25 m and 0.6 m, overlying gravelly sand and gravelly silty sand to the base of the test pits at depths of between 0.5 m and 0.8 m.

Soils in MD Zone generally comprised coarser grained soils (*i.e.* gravels and sands) compared to SD Zone. The soils in MD were slightly more variable between test pits, however, are generally considered typical of natural soil variability.

No free groundwater was encountered in any of the test pits. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

No signs of contamination (*e.g.* staining, odorous soil) were noted during the test pitting. No filling was identified at the test pit locations.

10.2.4 Background Sampling

TP29 was excavated to a depth of 0.7 m (ref Drawing 4, App A). The two surface samples (S1 and S2) comprised gravelly sand and sandy gravel, respectively, and the subsurface conditions comprised medium dense to very dense sandy gravel to the base of the test pit. The soil conditions are generally considered representative of the strata encountered within the SD and MD Zones.

No free groundwater was encountered and no signs of contamination were noted in TP29.

10.3 Contaminant Observations

There were no obvious indicators of gross contamination to soils observed at the locations and depths investigated (*i.e.* no odours or staining). There were no observations of asbestos or potentially asbestos containing materials.

11. Laboratory Testing

Laboratory testing for the assessment of contaminant concentrations in soil was undertaken by Australian Laboratory Services' (ALS) located in Sydney and Newcastle, NSW (NATA-accredited laboratories).

A total of 59 selected soil samples were analysed for a range of the following identified potential contaminants:

- Soil pH;
- Total recoverable hydrocarbons (TRH);
- Organochlorine and organophosphate pesticides (OCP &OPP);
- Phenoxy acid herbicides.

Of the above, 33 soil samples were tested from SD Zone, 20 from MD Zone and soil were tested from the off-site location for indicative background analyses (including replicate testing).

QA/QC testing comprised testing of seven replicate soil samples ("D1" to "D5", "D7" to "D8") comprising:

- Five blind intra-laboratory samples analysed for TRH;
- Two blind inter-laboratory samples analysed for TRH.

The inter-laboratory replicate samples were analysed at Envirolab Services (ELS) laboratory located in Sydney, NSW (NATA-accredited laboratory).

Twelve **soil** samples from ten test pits in MD Zone were also analysed for the presence of asbestos due to the presence of the former site building. The sample locations primarily comprised test pits in closest proximity to the former dwelling, however, were also distributed within the extent of MD Zone. As outlined in Section 10.3, there were no observations of potential asbestos-containing materials at the surface of the site or at the location and depths investigated (*i.e.* no fibro fragments observed etc).

The results of the soil analysis are summarised in Table C1 in Appendix C along with the laboratory test reports. The assessment of intra-lab and inter-lab replicates is included in Appendix C.

12. Assessment Criteria

12.1 Land Use Setting

Given the proposed development, the site use will be residential with gardens and accessible soil.

The analytical results from the laboratory testing have been assessed (as a Tier 1 assessment) against the investigation and screening levels in Schedule B1 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (amended 2013) (Ref 6). The Schedule provides investigation and screening levels for commonly encountered contaminants which are applicable to generic land uses and include consideration of, where relevant, the soil type and the depth of contamination.

12.2 Health Investigation / Screening Levels

The Health Investigation Levels (HILs) and Health Screening Levels (HSLs) are scientifically-based, generic assessment criteria designed to be used in the first stage (Tier 1) of an assessment of potential risks to human health from chronic exposure to contaminants. HILs are applicable to assessing health risks arising from direct contact to a range of contaminants. HSLs are used to assess selected petroleum compounds and fractions to assess the risk to human health via inhalation and direct contact with affected soils and groundwater. HSLs have been developed for a range of petroleum hydrocarbons, and for different land uses, media, pathways, soil types and depths to contamination.

The investigation and screening levels are not intended to be used as clean up levels. They establish concentrations above which further appropriate investigation (e.g. Tier 2 investigation or health risk assessment) should be undertaken. They are intentionally conservative and are based on a reasonable worst-case scenario for four generic land use scenarios.

The generic HSLs are considered to be appropriate for the assessment of petroleum hydrocarbon contamination at the site. Given the proposed land use the adopted HSLs and HILs have been adopted based on residential land use criteria, and the following considerations:

Potential pathways considered were:

- Soil vapour intrusion; and
- Direct human contact with soil.

Soil type considered:

- Sand, which is considered appropriate to the ground conditions (soils with mixed proportions of sand, silt and gravel).

Depth to Contamination:

- 0 to <0.1 m for soil HSLs as being an initial conservative screen.

Applicable land use:

- **HIL A** – residential with accessible gardens and soils opportunities for soil access and intake of <10% home grown produce;
- **HSL A** – low to medium density residential (including aged care).

For HSL A & HSL B and intrusive maintenance worker for direct contact and vapour intrusion / inhalation (CRC CARE technical reports) have been adopted - Intrusive maintenance worker.

Only those contaminants common to both Table 1A(1) and the list of potential contaminants applied to samples from the site have been included.

The adopted HILs and HSLs based on the above are presented in Table 2.

Table 2: Health Investigation Levels (HILs)

Contaminants		Health Investigation and Screening Levels			
		All exposures		Vapour Intrusion	
		Residential Land Use (HIL A) (mg/kg)	Intrusive Maintenance Worker (mg/kg)	Residential Land Use (HSL A) (mg/kg)	Intrusive Maintenance Worker (mg/kg)
OCP/ OPP	Aldrin + dieldrin	6	45 (1)	NC	NC
	Chlordane	50	NC	NC	NC
	DDT+DDE+DDD	240	NC	NC	NC
	Endosulfan	270	NC	NC	NC
	Endrin	10	NC	NC	NC
	Heptachlor	6	NC	NC	NC
	HCB	10	NC	NC	NC
	Methoxychlor	300	NC	NC	NC
	Chlorpyrifos	160	NC	NC	NC
Phenoxy Herbicides	2,4,5-T	600	NC	NC	NC
	2,4-D	900	NC	NC	NC
	MCPA	600	NC	NC	NC
	MCPB	600	NC	NC	NC
	Mecoprop	600	NC	NC	NC
	Picloram	4500	NC	NC	NC

Notes to Table 2:
NL – Non limiting
NC – No applicable criteria
(1) Based on Heath Investigation Levels for Commercial/Industrial Land Use (HIL D)

All chemical concentrations, the mean or the 95% UCL must be within the HIL / HSL or the results must meet the following criteria:

- The standard deviation of the data set should be less than 50% of the HIL / HSL; and
- No single value should exceed 250% of the HIL / HSL.

12.3 Ecological Investigation Levels / Ecological Screening Levels

Ecological Investigation Levels (EILs) have been developed and discussed in NEPC (2013) for selected metals and organic compounds and are applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physiochemical properties and land use scenarios and generally apply to the top 2 m of soil, which essentially corresponds to the root zone and habitation zone of many species.

It is noted that ecological values are only published by NEPM for limited OCPs (DDT). No criteria are published for OPP or specifically phenoxy herbicides. Consideration has therefore been given to values published by the Dutch Soil Remediation Circular 2009 guidelines (Ref 5) for the adoption of ecological criteria. It is noted that soil intervention values are not published for OPP.

The adopted ecological investigation values for soil are presented in Table 3.

Table 3: Adopted Ecological Investigation Levels

Analyte		Adopted Ecological Investigation Level (mg/kg*)
OCP	Chlordane	4
	DDT	1.7 (3) / 180 (2)
	DDE	2.3
	DDD	34
	DDT/DDE/DDD (1)	NC
	Aldrin	0.32
	Dieldrin	NC
	Endrin	NC
	Heptachlor	4
	Heptachlor Epoxide (1)	4
OPP		NC
Phenoxy Herbicides	2,4,5-T	NC
	2,4-D	NC
	MCPA	4
	MCPB	NC
	Mecoprop	NC
	Picloram	NC

Notes to Table 3:
* mg/kg dry matter
Investigations levels apply to the top 2 m of the soil profile
(1) Aggregate parameters
(2) NEPM investigation level based on “aged” contamination (>2 years) and residential and public open space land use
(3) Dutch Soil Remediation Circular 2009
NC – No applicable criteria

Ecological Screening Levels (ESLs) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. ESLs apply to the top 2 m of the soil profile, which essentially corresponds to the root zone and habitation zone of many species.

ESLs have been derived in NEPC (2013) for the same four petroleum fractions as the HSLs (F1 to F4) as well as BTEX. The adopted ESLs, from Table 1B(6), Schedule B1 of NEPC (2013) are shown in Table 4. The following site specific data and assumptions have been used to determine the ESLs:

- The ESLs will apply to the top 2 m of the soil profile;

- The ESLs for urban residential and public open space apply; and
- The majority of soils encountered at the site comprised sands or granular soils. In the absence of field or laboratory measurements a “fine” soil texture has been adopted (conservative).

Table 4: Ecological Screening Levels

Analyte		Urban residential and public open space – fine soils (mg/kg)
TRH	C_6-C_{10} (less BTEX) [F1]	180*
	>C_{10}-C_{16} [F2]	120*
	>C_{16}-C_{34} [F3]	1,300
	>C_{34}-C_{40} [F4]	5,600

Notes to Table 4:
All ESLs are low reliability apart from those marked with * which are moderate reliability

12.4 Management Limits – Petroleum Hydrocarbons

In addition to appropriate consideration and application of HSLs, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards; and
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services.

Management limits to avoid or minimise these potential effects have been in NEPC (2013) as interim Tier 1 guidance. Management limits have been derived in NEPC (2013) for the same four petroleum fractions as the HSLs (F1 to F4). The adopted management limits, from Table 1B(7), Schedule B1 of NEPC (2013) are shown on the following Table 5. The following site specific data and assumptions have been used to determine the Management limits:

- Management limits will apply to any depth within the soil profile;
- Management limits for commercial / industrial land use apply; and
- The soils encountered at the site comprised various types including sand, silt and clay. A ‘’coarse’’ soil texture (being the most conservative soil type) has been adopted.

Table 5: Management Limits

Analyte		Management Limit (mg/kg)
TRH	F1	700
	F2	1,000
	F3	3,500
	F4	10,000

Note to Table 5:
Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

12.5 Asbestos in Soil

Asbestos identification was undertaken on selected samples using an initial quantitative screening analysis only.

13. Laboratory Test Results

13.1 Programme

The results of the laboratory testing are presented in Table C1 and the laboratory report sheets in Appendix C. The results for SD and MD Zone and background sampling are summarised in the following sections.

13.2 SD Zone

Laboratory test results indicate dieldrin and chlorpyrifos were the only contaminants present in samples at concentrations above laboratory limits of reporting (LOR). Dieldrin was detected above the LOR in ten of the 31 primary soil samples tested. Chlorpyrifos was detected in one sample (TP05/0.25 m) at a concentration of 41.0 mg/kg, however, this was less than the assessment criteria of 160 mg/kg.

Detection of dieldrin for samples in SD Zone are summarised in Table 6.

Table 6: OCP Detected Above LOR in SD Zone

Sample ID	Dieldrin Concentration (mg/kg)
TP01 / 0.1 m	**57.7**
TP07 / surface	**10.0**
TP10 / 0.1 m	**11.2**
TP11 / surface	0.67
TP17 / 0.1 m	**7.92**
TP18 / surface	**8.81**
TP19 / 0.1 m	2.18
TP20 / 0.1 m	**18.2**
TP21 / 0.1 m	**9.08**
TP21 / 0.3 m	0.5
Key	
Exceeds HIL-A	6
Exceeds 2.5 x HIL-A (Hot spot)	15

Dieldrin concentrations exceeded the health investigation level (6 mg/kg) in seven of the 30 samples analysed. In two of the samples, the dieldrin concentration was more than 250% of the assessment criterion and, consistent with guidance in Schedule B1 of the NEPM (NEPC 2013), these two samples are considered to represent contamination “hot spots”. The median concentration was 0.5 mg/kg (the laboratory limit of reporting). When the “hot spot” samples were included in the data set, the 95% upper confidence limit of the mean concentration (95% UCL) was 8.1 mg/kg, which exceeds the assessment criterion. When the “hot spot” samples were excluded from the data set, the 95% UCL was 6.5 mg/kg.

The results of testing were within the ecological investigation and screening levels for SD Zone, however, it is noted that no criteria are published for dieldrin.

Of the seven locations in which dieldrin was identified above the assessment criteria, two locations (TP07 and TP21) have been vertically delineated. Of the five remaining locations not delineated, two comprise hotspots which are proposed for over-excavation and off-site disposal and validation which will, in effect, delineate the vertical extent of OCP impact.

The distribution of contamination across SD Zone is generally considered to be representative of broad acre application. The description of hotspots has been assigned based on NEPC criteria for contamination exceeding 250% of the assessment criteria.

The pH results ranged between pH 5.5 and 6.1. Other projects completed by DP in the Humpty Doo area indicated soil pH typically ranged between pH 5 and 6.5.

Asbestos identification was not undertaken on any of the samples as the PSI indicated that no structures have been present within this zone.

13.3 MD Zone

Laboratory test results indicated OCPs were detected above laboratory limits of reporting (LOR) for twelve of 18 primary soils tested. Chlorpyrifos was detected in one sample (TP05 / 0.25 m) at a concentration of 41.0 mg/kg, however, this was less than the assessment criterion of 160 mg/kg.

Table 7 below presents the OCPs which were detected above the LOR.

Table 7: OCP Detected Above LOR in MD Zone

Sample ID	OCP Concentration (mg/kg)				
	Aldrin and dieldrin	Heptachlor	Heptachlor Epoxide	Heptachlor TEQ*	Chlordane (Cis and Trans)
TP25 / surface	5.12	1.05	<0.5	2.10	3.62
TP26 / surface	**29.72**	**12.5**	3.98	**28.98**	28.71
TP26 / 0.5 m	1.72	0.62	<0.5	1.24	1.13
TP27 / 0.1 m	**45.83**	**8.57**	3.72	**20.86**	26.48
TP27 / 0.5 m	0.78	5.06	0.64	**10.76**	1.88
TP28 / surface	**63.1**	<0.5	<0.5	<0.5	<0.5
TP28 / 0.3 m	0.96	<0.5	<0.5	<0.5	<0.5
TP30 / 0.1 m	**22.9**	<0.5	<0.5	<0.5	0.47
TP30 / 0.5 m	0.59	<0.5	<0.5	<0.5	<0.5
TP31 / 0.5 m	1.62	<0.5	<0.5	<0.5	<0.5
TP32 / 0.3 m	2.56	<0.5	<0.5	<0.5	<0.5
TP34 / 0.1 m	4.97	<0.5	<0.5	<0.5	<0.5
Key					
Exceeds HIL-A (6 mg/kg)	6	6	NC	6	50
Exceeds 2.5 x HIL-A (15 mg/kg, Hotspot)	15	15	NC	15	50

Notes to Table 7:

*Heptachlor TEQ is the sum of twice the heptachlor epoxide concentration and the heptachlor concentration

NC – No Criteria

Based on the above:

- Dieldrin concentrations exceeded the assessment criterion (6 mg/kg) in four of the 18 samples analysed. In all four of those samples, the dieldrin concentration was more than 250% of the assessment criterion and, they are considered to represent contamination "hot spots".
- With inclusion of the all results, the median concentration of dieldrin was 1.6 mg/kg and the 95% UCL was 18 mg/kg. However, some of the samples were from deeper locations in the soil profile, and not surface samples.

Heptachlor and heptachlor epoxide were detected in several samples. An assessment criterion for heptachlor of 6 mg/kg was established, based on Schedule B1 of the NEPM (NEPC 2013). However, USEPA information indicates that the toxicity of heptachlor epoxide is approximately twice that of heptachlor (USEPA 2015) and, so, its concentration should be included in any comparison with the assessment criterion. DP calculated a heptachlor Toxic Equivalent Quotient (TEQ) value, by adding twice the heptachlor epoxide concentration to the heptachlor concentration in each sample.

Based on this:

- Heptachlor TEQ concentrations exceeded the assessment criterion (6 mg/kg) in three of the 18 samples analysed.
- In two of these samples, concentrations were more than 250% of the assessment criterion;
- The median concentration was 0.5 mg/kg (the laboratory LOR) and the 95% UCL was 17 mg/kg, when all the samples were included in the data set.

Chlordane was detected at concentrations above the laboratory LOR, but no samples had concentrations greater than the assessment criteria.

The results of testing exceeded the adopted ecological investigation levels for three test pit locations in the north-western part of the site as summarised in Table 8.

Table 8: Summary of OCP Exceedances of Ecological Investigation Levels

Sample ID	OCP Concentration (mg/kg)			
	Aldrin	Chlordane	Heptachlor	Heptachlor Epoxide
TP25 / surface	**0.52**	3.62	1.05	<0.50
TP26 / surface	**2.92**	**28.71**	**12.5**	3.98
TP27 / 0.1 m	**1.83**	**26.48**	**8.57**	3.72
TP27 / 0.5 m	<0.5	1.88	**5.06**	0.64
Ecological Value	**0.32**	**4**	**4**	**4**
Exceeds 2.5x Ecological Value	**0.8**	**10**	**10**	**10**

Notes to Table 8:
Bold & Underlined Exceeds adopted assessment criterion/investigation level

Vertical delineation of the extent of OCP contamination has been identified for six of the above seven locations which exceeded the assessment criteria. It is noted that the extent of OCP impact has not been delineated for TP27, however, it is anticipated that this location will be subject to excavation and off-site disposal. Over-excavation and collection of validation samples at the base of the excavation would confirm appropriate removal and the inferred vertical delineation of OCPs.

The distribution of contamination across MD Zone is generally considered to be representative of broad acre application, with the exception of elevated concentrations near the waste disposal area. The description of hotspots has been assigned based on NEPC criteria for contamination exceeding 250% of the assessment criteria.

The pH results ranged between pH 4.9 and 5.2, which were generally lower than detected in other projects completed by DP in the Humpty Doo area (where soil pH typically ranged between pH 5 and 6.5).

Asbestos identification was undertaken on 12 soil samples. Amosite (brown) asbestos was identified in the soil sample “TP28 / surface” comprising “friable asbestos fibre bundles”. TP28 is located in the central portion of MD Zone in the “spent drip” disposal area and south of the former residential dwelling. It is considered that the source is likely to be the former dwelling (*i.e.* residual surface impact during asbestos removal/demolition). Asbestos was not identified in the eleven other soil sub-samples which were tested.

13.4 SD Zone (South)

Most of the OCP contaminant “hotspots” were identified for the northern part of the site, however, were identified in SD Zone as far south as TP01. The absence of contaminant exceedances 2.5 times the criteria for the southern part of SD Zone is considered statistically significant.

For the purposes of statistical analyses and delineation of primary areas of contamination, a line of data delineation “x-x” has been inferred immediately south of TP01 and extending across the site (east to west) as shown on Drawing 5 in Appendix A. Line “x-x” is positioned south of TP01 which is the southernmost extent of contaminant exceedances, and is therefore considered a conservative estimate of the southern extent of impact (*i.e.* of the ten test pit locations between SD-MD Zone boundary and x-x line, only two locations exceeded the assessment criteria by 250%).

Contaminant exceedances in SD Zone south of line “x-x” were limited to surface soils at TP10 and TP17 and were only slightly in excess of the criteria. Calculation of 95% UCL for the area is considered justified. Statistical analysis of dieldrin for the twelve test pits south of “x-x” indicated the 95% UCL_{mean} concentration was 4.5 mg/kg, less than the 6 mg/kg assessment criteria.

13.5 Background Samples

Laboratory test results indicate that all chemicals tested were below the laboratory LOR (*i.e.* absence of pesticides, hydrocarbons etc). pH was tested in one of the samples (TP29 / 0.3 m) and found to be pH 5.1. Asbestos identification was not undertaken on any of the samples.

14. Discussion and Recommendations

The results of the site history review as presented in the DP (2015) Preliminary Site Investigation report (Ref 3) indicated the site has been as mango, banana and tomato orchard, anecdotally dating back to the 1960s. The site was previously occupied by a dwelling and cool room / shed in the north-western corner which was used for site orchard activities (*i.e.* storage of goods, chemicals and treatment of harvests). Surface vegetation and some topsoil were stripped in preparation for the proposed earthworks and filling prior to subdivision of the land for the proposed residential development, with materials disposed off-site. At the time of DP's PSI in February 2015 and during this DSI, the site was generally vacant and remained stripped of vegetation.

The PSI identified a number of potential sources of contamination within the site. The potential for contamination arising from previous site activities was considered to be low to moderate. The primary contaminating activities identified at the site are considered to be associated with the former orchard activities, namely:

- The historic application of pesticides and herbicides used during planting of crops;
- Use of post-harvest pesticides and fungicides for treatment of fruit prior to commercial sale;
- Disposal of dilute pesticides and fungicides solutions in the north-western part of the site (MD Zone) following application to harvested fruit as shown on Drawing 5 in Appendix A. The use of these chemicals is understood to have been limited to the six week harvest periods and used at generally weekly frequency. Application and disposal of these chemicals was for a period of about ten years (*i.e.* not used the whole period of orchard operation).

The identified contaminants of concern therefore comprised: pesticides, herbicides and insecticides associated with orchard activities; petroleum hydrocarbons which were the likely solvents for herbicides and pesticides; and asbestos containing materials due to the demolition of a former on-site dwelling. The potential for asbestos impact at the site was generally considered to be low based on the licensed removal of asbestos containing materials prior to dwelling demolition (Ref 3).

The site history review and information from NT Government Natural Resource Maps indicated that shallow groundwater is not likely to be present at the site. Groundwater bore records for site wells and adjacent groundwater bores indicated that groundwater is likely to be present at depths greater than about 50 m. On this basis and with consideration to the low solubility (*i.e.* low mobility) OCP/OPP contaminants in question, the potential for contamination to groundwater based on site activities is considered to be low and therefore assessment of groundwater was not considered to be warranted for this DSI. It is further noted that the Environmental Auditor for this investigation has indicated "…that contamination of groundwater is unlikely" and therefore DP considers that for the purposes of site remediation and future redevelopment, groundwater investigation remains unwarranted.

The subsurface investigation for the DSI comprised excavation of test pits and laboratory testing of soils within the proposed SD and MD Zones, as well as 'background' sampling off-site to confirm the absence of widespread contamination of the local area. The subsurface investigation was generally undertaken on a grid-based arrangement. Additional targeted test pits for MD Zone were located in the vicinity of previous structure and dilute waste chemical application (*i.e.* north-western part of the site). In summary:

- 21 test pits (TP01 to TP21) were excavated for SD Zone (6.1 ha) on an approximately grid-based arrangement;

- 12 test pits (TP22 to TP28, TP30 to TP34) were excavated for MD Zone (2 ha) on an approximately grid-based arrangement, including five targeted test pits;
- One test pit (TP29) and two surface samples (S1 and S2) were excavated off-site for the assessment of background conditions.

The number of test pits locations represents about 30% of the recommended number for the assessment of site conditions as outlined in AS-4482, but a statistically significant number of sampling locations. The testing conducted is considered suitable for the assessment of site conditions.

The results of the subsurface investigation indicated the general absence of gross contamination to soils at the locations and depths tested (*i.e.* absence of visual or olfactory indicators of contamination). Laboratory testing indicated organochlorine pesticides (OCPs) were detected for ten of 31 primary soils tested in SD Zone and 12 of 18 primary soils tested in MD Zone, confirming the presence of pesticide impact to soils which are likely to be due to former chemical application. OPPs were not detected at concentrations above laboratory detection limits, with the exception of one sample (TP05/0.25 m) which indicated chlorpyrifos at a concentration of 41.0 mg/kg.

The comparison of contaminant concentrations in soil as a Tier 1 assessment indicated the following:

- Concentrations of OCPs, OPPs, TRH and phenoxy herbicides were less than the adopted ecological investigation criteria with the exception of exceedances of OCPs (aldrin, chlordane, heptachlor and heptachlor epoxide) at three test pit locations in the north-western part of the site (TP25, TP26 and TP27);
- Concentrations of OCP were generally within the human health investigation levels for residential land use (or less than laboratory detection limits), with the exception of:
    - SD Zone:
        - Five surface or near surface samples which contained elevated dieldrin concentrations (TP01/surface, TP07/surface; TP10/0.1 m; TP17/0.1 m; TP18/surface; TP20/0.1 m; TP21/surface;
        - Of these, two samples exceeded 250% of the criteria (TP01/0.1 m; TP20/0.1 m).
    - MD Zone:
        - Five soil samples which exceeded for aldrin and dieldrin and/or heptachlor (TP26/surface; TP27/0.1 m; TP27/0.5 m; TP28/surface; TP30/0.1 m);
        - Of these, four samples exceeded 250% of the criteria for aldrin and dieldrin (TP26/surface; TP27/0.1 m; TP28/surface; TP30/0.1 m), and two exceeded for 2x Heptachlor Epoxide and Heptachlor TEQ (TP26/surface; TP27/0.1 m; TP27/0.5 m).
- Statistical analyses of the concentration data for both the SD and MD Zones indicated 95% UCL concentrations remained above the site assessment criteria both with and without consideration of hot spots zone concentrations;
- Additional statistical analyses of the 95% UCLs for OCP concentrations for the southern part of SD Zone (refer Line “x-x” on Drawing 5 in Appendix A), indicated the 95% UCL was 4.5 mg/kg and less than the 6 mg/kg assessment criterion. As outlined in Section 13.4, Line “x-x” is positioned south of TP01 which is the southernmost extent of contaminant exceedances, and is therefore considered a conservative estimate of the southern extent of impact.

Elevated OCP concentrations were typically identified in surface and near-surface soils corresponding to historical chemical application techniques. OCP concentrations were generally higher for the MD Zone, in areas which have been subject to orchard activities for a greater period of time (*i.e.* initial planting in northern part of the site) as well as chemical disposal. The lowest concentrations of OCP were identified for the southern part of SD Zone with most of the samples less than laboratory detection limits. The distribution and contaminant concentrations for identified HIL exceedances, including "hot spots", are shown on Drawing 5 in Appendix A.

Where elevated OCPs were identified above the assessment criteria, vertical delineation was achieved for six out of seven of the samples in MD Zone (*i.e.* TP27 excluded). Vertical delineation was achieved for three of the eight the samples in SD Zone (*i.e.* TP01, TP10, TP17, TP18, TP20 excluded), however, as outlined above contaminant concentrations for SD Zone were lower than for MD Zone. As discussed below, further the vertical delineation is proposed to be assessed by: excavation of hotspots and validation testing; or additional targeted sampling.

While the distribution of contamination across the site were generally higher for the MD Zone (*i.e.* areas which have been subject to orchard activities for a greater period of time and chemical disposal), contamination across the site is considered to be representative of broad acre application. The description of hotspots has been assigned based on NEPC guidance for contamination exceeding 250% of the assessment criteria.

Asbestos fibres were identified in soil for sample TP28/surface, located in the north-western part of the site and in the vicinity of former site structures in MD Zone (south of former dwelling). Given that an asbestos clearance certificate exists for the removal of the site dwelling, the absence of field observations of potential asbestos (e.g. fibro) and the absence of asbestos in the other eleven soil samples tested in MD zone, gross asbestos impact at the site is unlikely. It is considered that the impact is likely to be localised and due to surficial impact from the demolition of the former site dwelling (*i.e.* material tracking etc during demolition). Surficial soil in the vicinity of TP28 and the former dwelling should be stripped for disposal to a suitably licensed off-site facility and validated to confirm appropriate removal.

While OCP contaminant concentrations were identified exceeding the health investigation levels for residential land use, it is considered that a combination of remediation options would be considered suitable to render the site suitable for the proposed development. Options that could be considered (subject to regulatory approval) to enable minimisation of exposure for future receptors (*i.e.* site users), include the following:

- Removal of identified hotspots;
- On-site management beneath filling, in particular the MD Zone which is proposed for medium-density development and where higher concentrations are allowable. Site restrictions would be subject to management by strata title corporation rules;
- On-site management via vertical soil mixing of the upper profile;
- A combination of off-site disposal and on-site management.

The preferred remediation strategies are further outlined in DP's (2015) letter report *'Detailed Environmental Site Investigation – Proposed Remediation Strategies'* dated 8 December 2015 (Doc 78156.01.C.001.Rev0, Ref 4).

It is noted that additional investigation may be required for MD Zone and the northern parts of SD Zone to confirm the suitability of remedial options, however, it is also considered that this could be undertaken in conjunction with site remediation works.

It is further noted that the existing site septic system is to be removed during the MD Zone development stage and will be subject to inspection and validation testing by an environmental consultant. It is considered that localised surface soils at TP28 could be stripped, removed and validated for asbestos impact in conjunction with septic system excavation to suitably remediate the localised asbestos impact.

Proposed remediation strategies should be endorsed by the Auditor and should be undertaken with reference to a site specific Remediation Action Plan (RAP).

15. References

1. CRC CARE Technical Report No. 10 '*Health screening levels for petroleum hydrocarbons in soil and groundwater*', September 2011.
2. CSIRO Sustainable Ecosystems (2008), '*Water resources of the Howard River region, northern Territory: A report on the social and cultural values and a stakeholder assessment of water resource scenarios*', E. Woodward, S. Jackson, A. Straton, Darwin NT.
3. Douglas Partners Pty Ltd (2015), '*Report on Preliminary Environmental Site Investigation, Revision 1, Lot 3 Feds Pass Road, Humpty Doo, NT*', DP Project 78156.00, Rev 1, 16 April 2015.
4. Douglas Partners Pty Ltd (2015), *'Detailed Environmental Site Investigation – Proposed Remediation Strategies, Proposed Residential Development, 3 Freds Pass Road, Humpty Doo, NT'*, DP Ref No. 78156.01.C.001.Rev0, 8 December 2015.
5. Dutch Soil Remediation Circular 2009.
6. National Environment Protection Council (2013), '*National Environment Protection (Assessment of Site Contamination) Measure (as amended 2013)*', 11 April 2013.
7. Northern Territory Environment Protection Authority (2013), *Guidelines for Consultants Reporting on Environmental Issues*, January 2013.
8. Northern Territory Government (2004), *'Modelling of the McMinns / Howard East Groundwater System'*, D. Yin Foo, Department of Infrastructure, Planning and Environment, Report 26/2004D.Standards Australia (2005), Australian Standard AS4882.1 '*Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds'*, November 2005.
9. USEPA (2015), *Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. (Regions 3, 6 and 9)*. United States Environmental Protection Agency, June 2015.

16. Limitations

Douglas Partners (DP) has prepared this report for Lot 3 Freds Pass Road, Humpty Doo, NT in accordance with DP's proposal dated 13 May 2015 and acceptance received from Tolinchlo Pty Ltd dated 25 May 2015. The work was carried out under DP'S Conditions of Engagement. This report is provided for the exclusive use of Tolinchlo Pty Ltd for this project only and for the purposes as described in the report. It should not be used for other projects or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

Notes About this Report
Drawing 1: Proposed Zones
Drawing 2: Location of Test Pits – SD Zone
Drawing 3: Location of Test Pits – MD Zone
Drawing 4: Site Features (MD Zone)
Drawing 5: Hotspot Locations and Earthworks Plan Overlay
BMD Consulting Drawing B00153-CE001: Earthworks Management Plan
BMD Consulting Drawing B00153-CE002: Earthworks Management Plan

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Scale as Shown

Sourced from Google Earth Pro & Drawing provided by client entitled *Concept Plan*

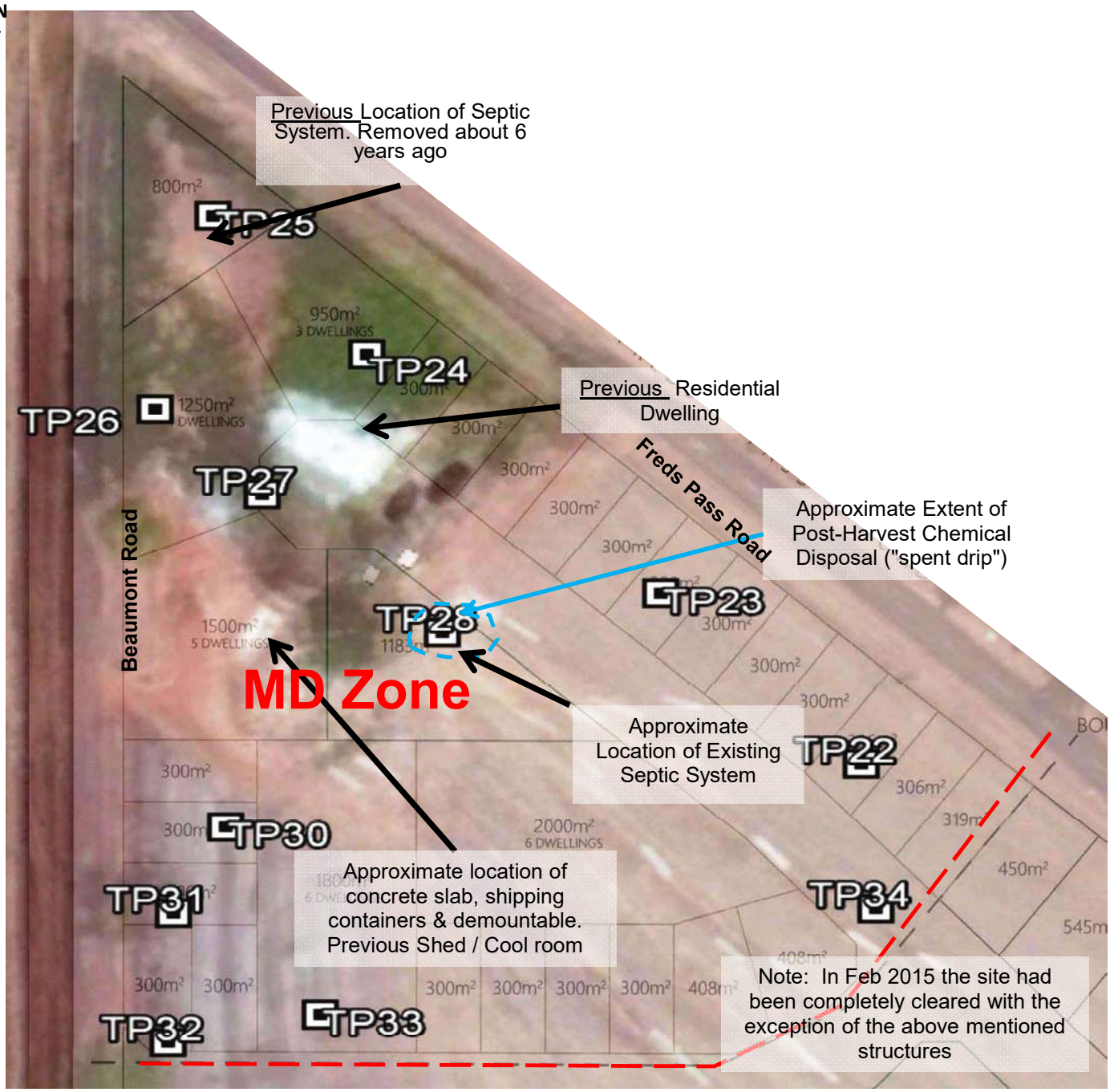
Douglas Partners Geotechnics / Environment / Groundwater	**Proposed Zones** **Proposed Residential Subdivision** **Lot 3 Freds Pass Road** **Humpty Doo, NT**	Proposal 78156.01 DRAWING: 1 REV: 1
	CLIENT: Tolinchlo Pty Ltd	DATE: 30-Nov-15

Approximate location of Test Pit

Approximate location of Registered Groundwater Bore

Sourced from Google Earth Pro & Drawing provided by client entitled *Concept Plan*

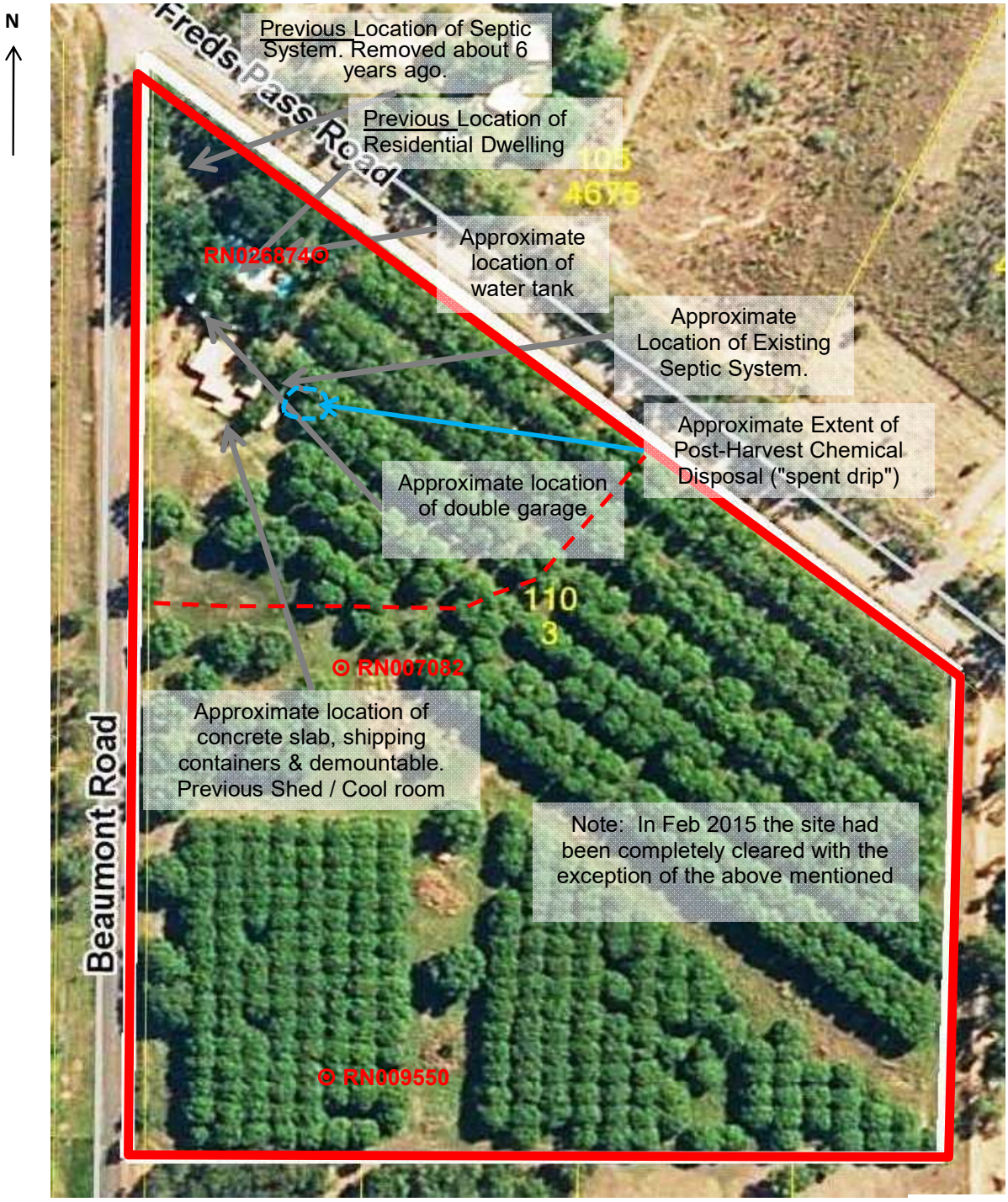
Douglas Partners Geotechnics / Environment / Groundwater	**Location of Test Pits - SD zone** **Proposed Residential Subdivision** **Lot 3 Freds Pass Road** **Humpty Doo, NT**	Proposal 78156.01 DRAWING: 2 REV: 1
	CLIENT: Tolinchlo Pty Ltd	DATE: 18-Jun-15



□ Approximate location of Test Pit

Sourced from Google Earth Pro & Drawing provided by client entitled *Concept Plan*

Douglas Partners Geotechnics / Environment / Groundwater	**Location of Test Pits - MD zone** **Proposed Residential Subdivision** **Lot 3 Freds Pass Road** **Humpty Doo, NT**	Project 78156.01 DRAWING: 3 REV: 1
	CLIENT: Tolinchlo Pty Ltd	DATE: 2-Dec-15

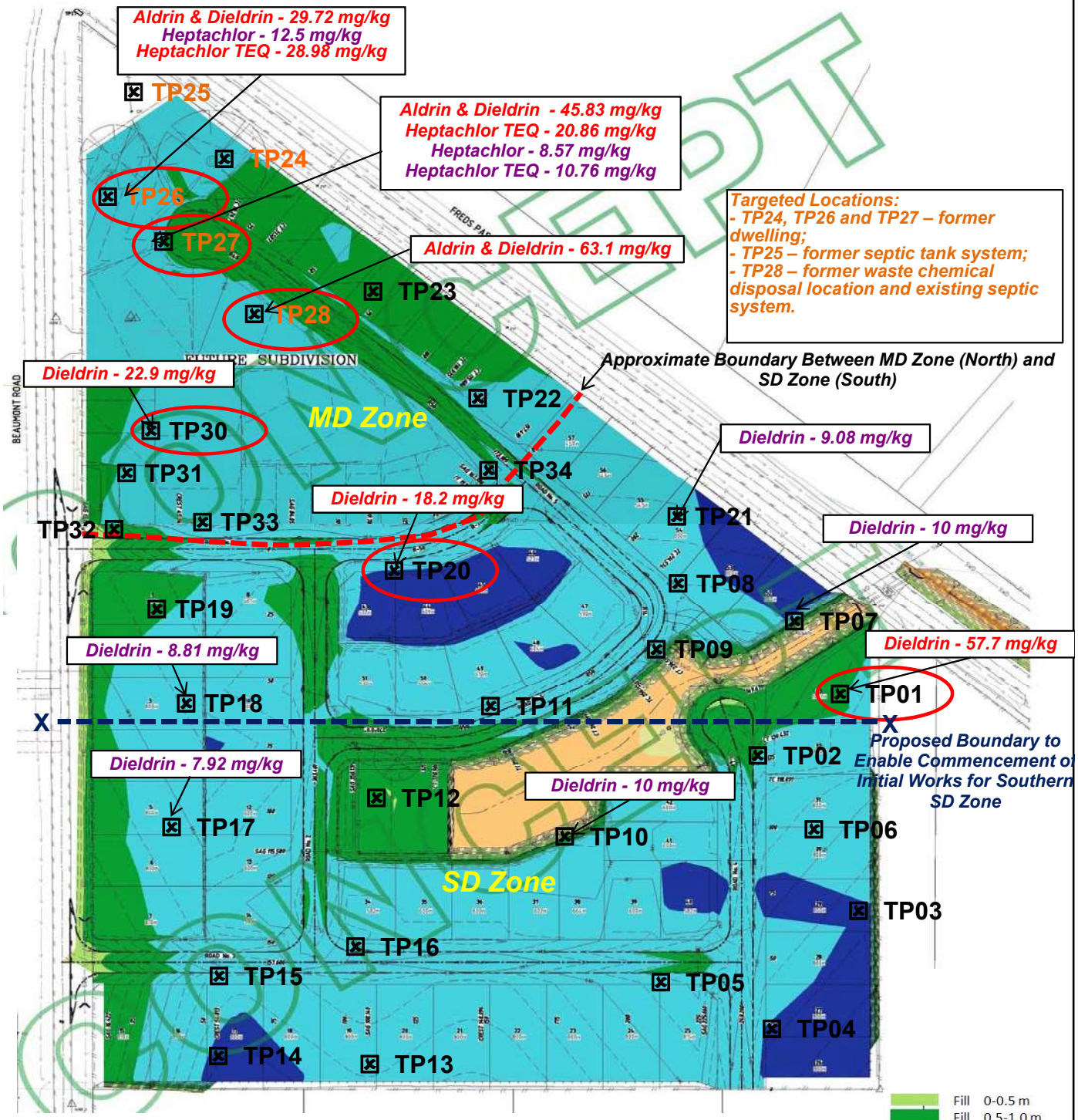


Drawing Not to Scale

⊙ - Approximate Location of Registered Groundwater Bore

Sourced from Council Records. Original photo not dated, although likely to be dated 2012

Douglas Partners Geotechnics / Environment / Groundwater	**Site Features** **Proposed Residential Development** **Lot 3 Freds Pass Road** **Humpty Doo, NT**	PROJECT: 78156.01 DRAWING: 4 REV: 2
	CLIENT: Tolinchlo Pty Ltd	DATE: 2-Dec-15



Approximate Test Pit Location (Targeted Locations in Orange)

Contamination Exceedances: Proposed Cut/Fill Depths:

Purple Exceeds Human Health Criteria

Red Exceeds 2.5 x Human Health Criteria (*i.e.* "Hotspot")

Drawing adapted from BMD Consulting Drawings B00153-CE001 and B00153-CE002

Douglas Partners
Geotechnics | Environment | Groundwater

Hotspot Locations and Earthworks Plan Overlay
Proposed Residential Subdivision
Lot 3 Freds Pass Road
Humpty Doo, NT

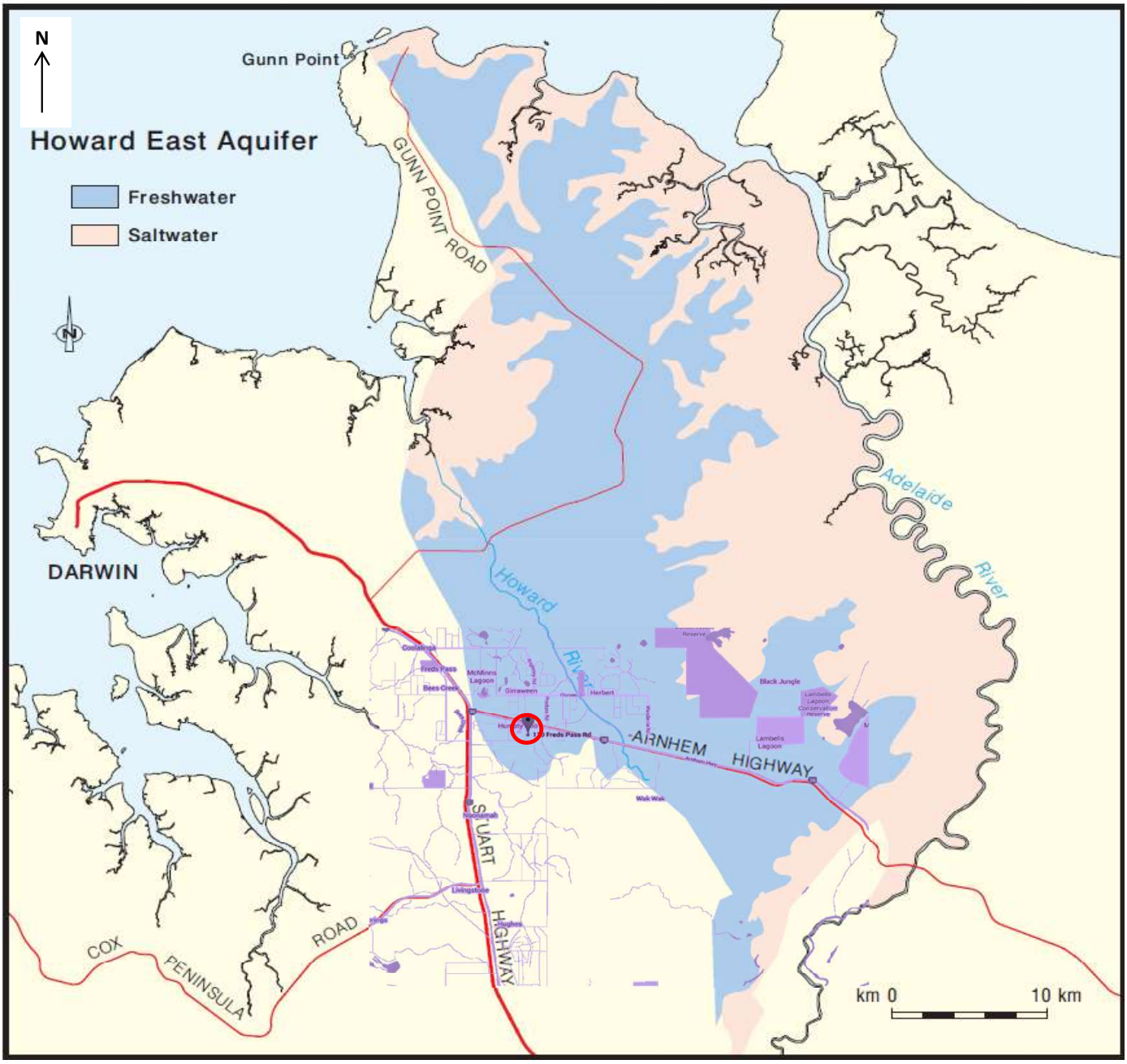
CLIENT: Tolinchlo Pty Ltd

Project 78156.01

DRAWING: 5

REV: 1

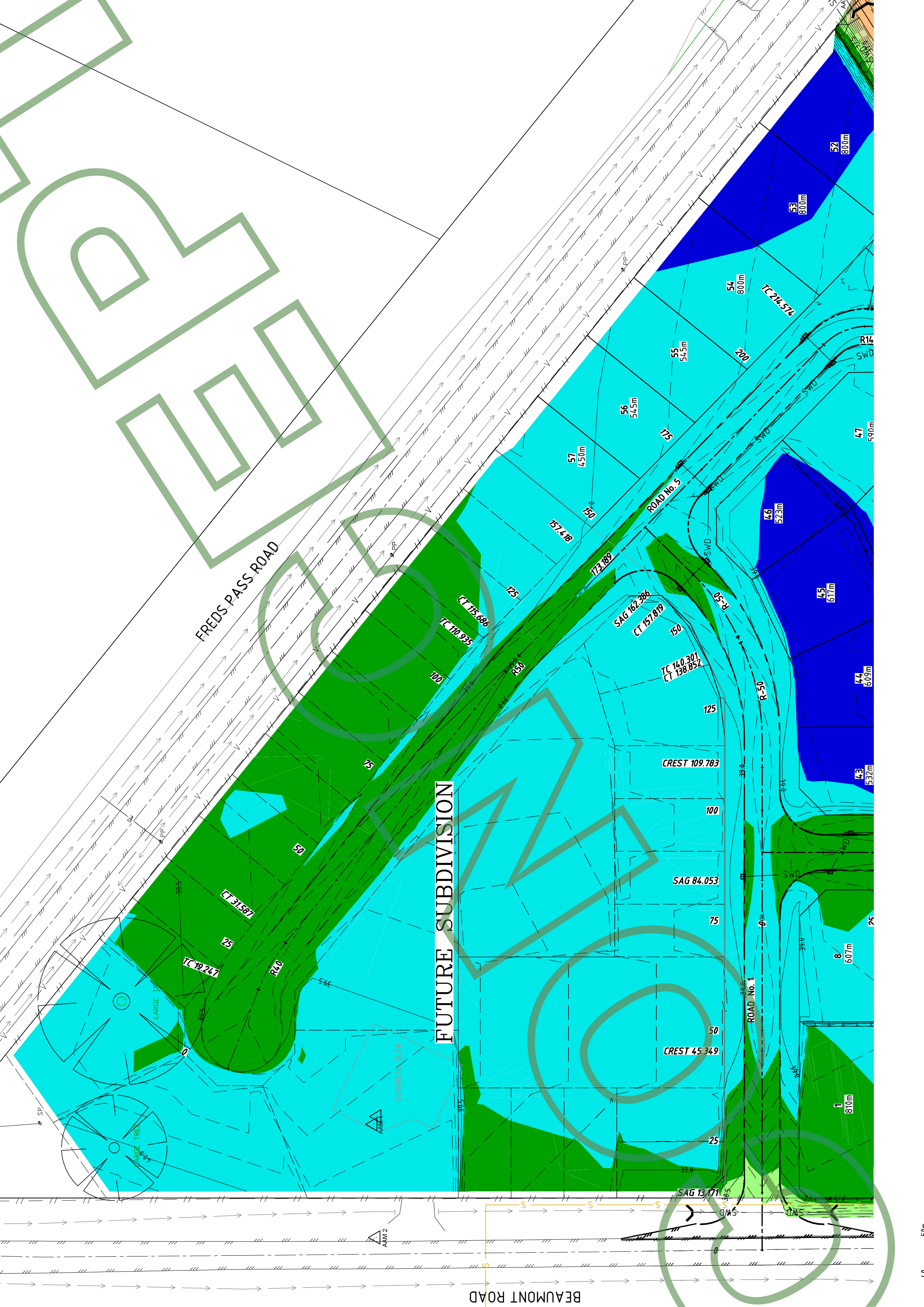
DATE: 2-Dec-15



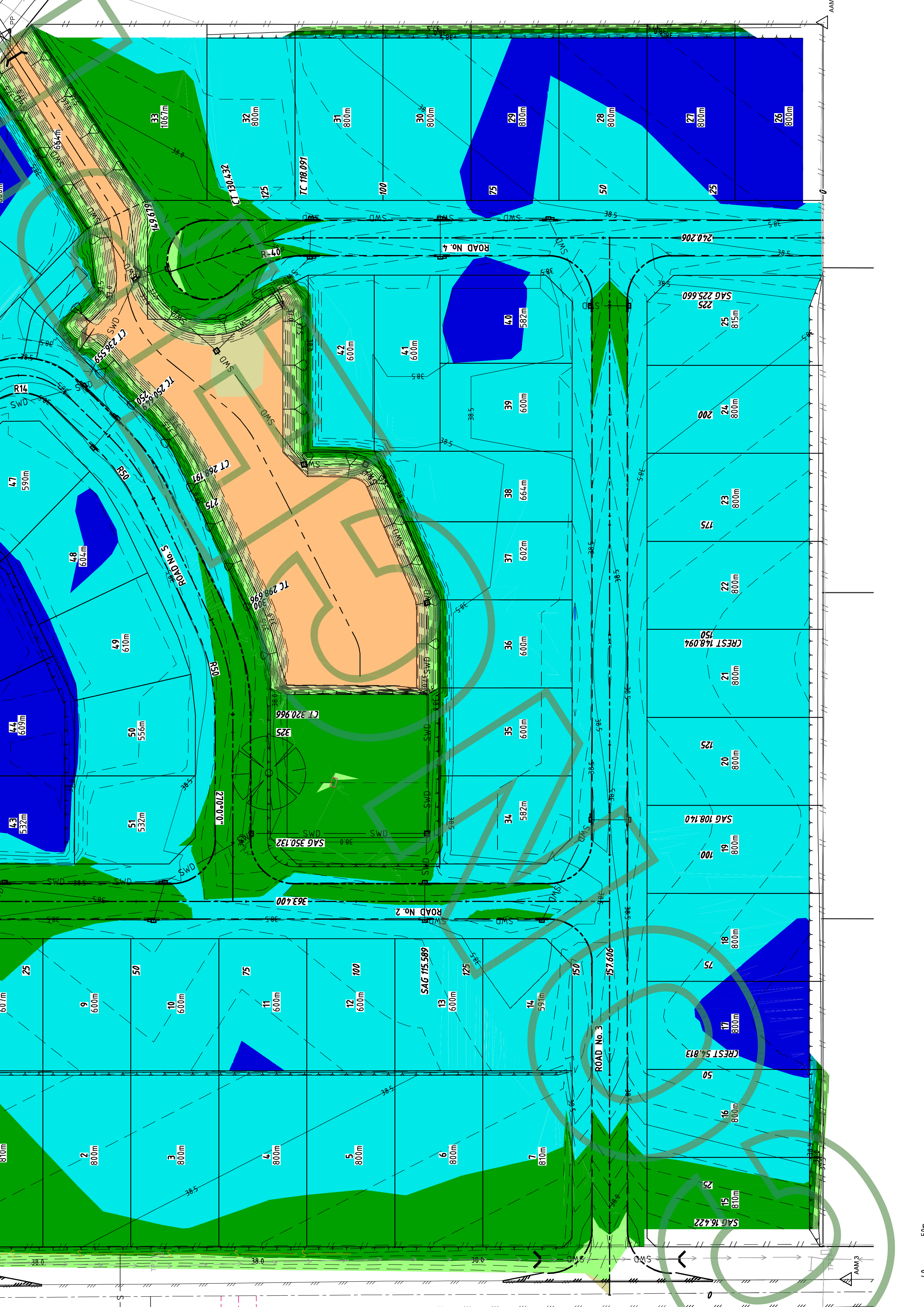
Approximate Location of Site within Howard East Aquifer

Drawing adapted from Northern Territory Depatrtment of Land Resource Management "Howard East Aquifer Map" (N.D.) and overlaid Google Maps image

Douglas Partners Geotechnics / Environment / Groundwater	**Hydrogeological Setting** **Proposed Residential Development** **Lot 3 Freds Pass Road** **Humpty Doo, NT**	PROJECT: 78156.01 DRAWING: 6 REV: 0
	CLIENT: Tolinchlo Pty Ltd	DATE: 30-Oct-15



FREDS PASS ROAD
FUTURE SUBDIVISION
ROAD No. 5
ROAD No. 1
BEAUMONT ROAD
52 800m
53 800m
54 800m
55 545m
56 545m
57 450m
47 590m
46 523m
45 617m
44 609m
43 532m
8 607m
1 810m
TC 214.574
200
175
150
157.418
125
173.189
CT 115.686
TC 110.935
100
75
50
CT 31.587
25
TC 19.247
R40
R50
R-50
SAG 162.386
CT 157.819
TC 140.301
CT 138.852
CREST 109.783
SAG 84.053
CREST 45.349
SAG 13.171
SWD
LARGE TREE
CONCRETE SLAB
AAM 2



ROAD No. 4
ROAD No. 2
ROAD No. 5
ROAD No. 3
33 1067m
32 800m
31 800m
30 800m
29 800m
28 800m
27 800m
26 800m
25 815m
24 800m
23 800m
22 800m
21 800m
20 800m
19 800m
18 800m
17 800m
16 800m
15 810m
42 600m
41 600m
40 582m
39 600m
38 664m
37 602m
36 600m
35 600m
34 582m
47 590m
48 604m
49 610m
50 556m
51 532m
44 609m
43 532m
9 600m
10 600m
11 600m
12 600m
13 600m
14 591m
2 800m
3 800m
4 800m
5 800m
6 800m
7 810m
TC 118.091
CT 130.432
149.679
CT 236.559
TC 250.679
CT 260.191
TC 288.696
CT 320.966
SAG 350.132
363.400
270.0.0"
240.206
SAG 225.660
CREST 148.094
SAG 108.140
CREST 54.813
SAG 16.422
SAG 115.589
157.606
R50
R14
R-40
SWD
38.5
38.0

Appendix B

Notes on Sampling Methods
Soil Descriptions
Symbols & Abbreviations
Test Pits Logs

Sampling Methods

Douglas Partners

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

Douglas Partners

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Symbols & Abbreviations

Douglas Partners

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core Drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General


Asphalt


Road base


Concrete

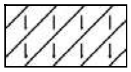

Filling

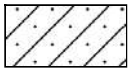
Soils


Topsoil

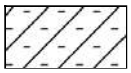

Peat


Clay

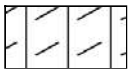

Silty clay

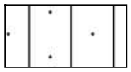

Sandy clay

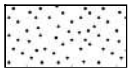

Gravelly clay

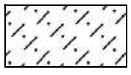

Shaly clay

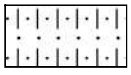

Silt


Clayey silt


Sandy silt

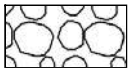

Sand

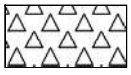

Clayey sand


Silty sand


Gravel

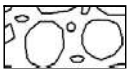

Sandy gravel


Cobbles, boulders

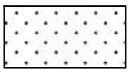

Talus

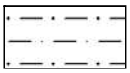
Sedimentary Rocks

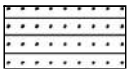

Boulder conglomerate

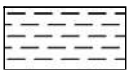

Conglomerate


Conglomeratic sandstone

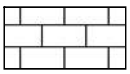

Sandstone


Siltstone

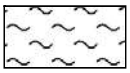

Laminite

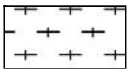

Mudstone, claystone, shale

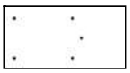

Coal


Limestone

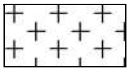
Metamorphic Rocks

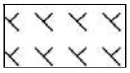

Slate, phyllite, schist

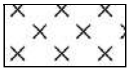

Gneiss

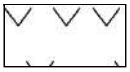

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 729038
NORTHING: 8608382

PIT No: TP01
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm) 5 10 15 20
		SILTY SAND: dense, brown, silty fine to medium grained sand with some gravel, fine to medium sub-rounded to sub-angular gravel, humid		E	0.1		D1		
				E	0.3				
		...becoming red brown and damp from 0.45 m		E	0.5				
	0.7	Pit discontinued at 0.7m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 729014
NORTHING: 8608360

PIT No: TP02
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm) 5 10 15 20
		SILTY SAND: dense, dark brown, slightly gravelly fine to medium grained sand, fine to medium sub-rounded to sub-angular gravel, humid		E	0.1				
				E	0.3		D2		
	0.5	SILTY SAND: loose to medium dense, red brown, silty fine to medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, damp		E	0.5				
	0.8	Pit discontinued at 0.8m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U$_x$	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 729043
NORTHING: 8608299

PIT No: TP03
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm) 5 10 15 20
	0.2	SILTY SAND: very dense, dark brown, slightly gravelly silty fine to medium grained sand, fine to medium rounded to sub-rounded gravel, humid		E	0.1				
	0.9	SILTY SAND: loose to medium dense, red brown, silty fine to medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, damp		E	0.3		D3		
	1			E	0.5				1
		Pit discontinued at 0.9m , target depth reached							
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 729018
NORTHING: 8608253

PIT No: TP04
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm) 5 10 15 20
		SILTY SAND: very dense, dark brown, slightly gravelly silty fine to coarse grained sand, fine to coarse sub-rounded to sub-angular gravel, humid		E	0.1				
	0.3	SILTY SAND: loose to medium dense, red brown, silty fine to medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, damp		E	0.3				
				E	0.5				
	0.9	Pit discontinued at 0.9m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728986
NORTHING: 8608272

PIT No: TP05
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm) 5 10 15 20
	0.05	SANDY GRAVEL: very dense, light brown, slightly clayey sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, humid		E	0.1				
		SILTY SAND: very dense, dark brown, silty fine to medium grained sand with some gravel, fine to medium sub-rounded to sub-angular gravel, humid to damp		E	0.3				
	0.35	SILTY SAND: loose to medium dense, red brown, silty fine to medium grained sand with some gravel, fine sub-rounded gravel, damp		E	0.5				
	0.7	Pit discontinued at 0.7m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 729031
NORTHING: 8608329

PIT No: TP06
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm) 5 10 15 20
		SILTY SAND: very dense, brown, slightly gravelly silty fine to medium grained sand, fine to medium sub-rounded to sub-angular gravel, humid		E	0.1				
	0.25	SILTY SAND: medium dense, red brown, silty fine to medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, damp		E	0.3				
				E	0.5				
	0.9	Pit discontinued at 0.9m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 729027
NORTHING: 8608411

PIT No: TP07
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SILTY SAND: very dense, brown, slightly gravelly silty fine to coarse grained sand, fine to medium sub-rounded to sub-angular gravel, humid		E	0.05		Surface sample		
	0.3	SILTY SAND: medium dense, red brown and orange brown, silty fine to medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, damp		E	0.3				
				E	0.5				
	0.7	Pit discontinued at 0.7m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728992
NORTHING: 8608425

PIT No: TP08
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SAND: very dense, dark brown, slightly gravelly slightly silty fine to coarse grained sand, fine to medium rounded to sub-rounded gravel, humid		E	0.1				
				E	0.3				
	0.35	GRAVELLY SILTY SAND: medium dense, red brown, gravelly silty fine to medium grained sand, fine to coarse rounded to sub-rounded gravel, damp		E	0.5				
	0.6	Pit discontinued at 0.6m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728986
NORTHING: 8608399

PIT No: TP09
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		GRAVELLY SAND: very dense, dark brown, slightly silty gravelly fine to coarse grained sand, fine to medium rounded to sub-rounded gravel, humid		E	0.1				
				E	0.3				
	0.4	SILTY SAND: medium dense, orange brown, slightly gravelly silty fine to medium grained sand, fine to medium rounded to sub-rounded gravel, damp		E	0.5				
	0.6	Pit discontinued at 0.6m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▽	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728958
NORTHING: 8608335

PIT No: TP10
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SILTY SAND: dense, dark brown, silty fine to coarse grained sand with some gravel, fine to medium rounded to sub-rounded gravel, humid		E	0.1				
				E	0.3				
	0.35	SILTY SAND: loose to medium dense, red brown, silty fine to medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, damp		E	0.5				
	0.75	Pit discontinued at 0.75m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PI (A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728939
NORTHING: 8608379

PIT No: TP11
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		GRAVELLY SILTY SAND: dense to very dense, brown, gravelly silty fine to coarse grained sand, fine to coarse rounded to sub-rounded gravel, humid		E	0.05		Surface sample		
				E	0.3				
		...becoming silty sandy gravel from 0.4 m		E	0.5				
	0.8	Pit discontinued at 0.8m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728903
NORTHING: 8608343

PIT No: TP12
PROJECT No: 78156.01
DATE: 11/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SAND: very dense, dark brown, slightly silty slightly gravelly fine to coarse grained sand, fine to medium rounded to sub-rounded gravel, humid		E	0.05		Surface sample		
				E	0.3				
	0.45	SILTY SAND: medium dense, yellow brown and orange brown, silty fine medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, damp		E	0.5				
	1.0	Pit discontinued at 1.0m , target depth reached							

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728901
NORTHING: 8608241

PIT No: TP13
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
	0.2	SILTY SAND: dense, brown, silty fine to coarse grained sand with some gravel, fine to medium rounded to sub-rounded gravel, humid		E	0.05		Surface sample		
	0.5	SILTY SAND: medium dense, orange brown, silty fine to medium grained sand with some gravel, fine to medium sub-rounded to sub-angular gravel, humid to damp		E	0.3				
	1	Pit discontinued at 0.5m , target depth reached		E	0.5				
	2								

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728858
NORTHING: 8608245

PIT No: TP14
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SILTY SAND: dense, brown, silty fine to coarse grained sand with some gravel, fine to medium rounded to sub-rounded gravel, humid		E	0.1				
	0.25	SILTY SAND: medium dense, orange brown, silty fine to medium grained sand with some gravel, fine to medium sub-rounded to rounded gravel, humid to damp		E	0.3				
				E	0.5				
	0.6	Pit discontinued at 0.6m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728858
NORTHING: 8608277

PIT No: TP15
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SAND: very dense, grey brown, slightly silty fine to coarse grained sand with some gravel, fine to medium rounded to sub-rounded gravel, humid		E	0.1				
	0.2	SILTY SAND: medium dense to dense, orange brown, silty fine to medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, humid to damp		E	0.3				
				E	0.45				
	0.5	Pit discontinued at 0.5m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▽	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728898
NORTHING: 8608287

PIT No: TP16
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SAND: very dense, grey brown, slightly silty fine to coarse grained sand with some gravel, fine to medium rounded to sub-rounded gravel, humid		E	0.1				
	0.2	SILTY SAND: loose to medium dense, orange brown, silty fine to medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, humid to damp		E	0.3				
	0.5	Pit discontinued at 0.5m , target depth reached		E	0.5				
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728841
NORTHING: 8608334

PIT No: TP17
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SILTY SAND: dense, grey brown, slightly gravelly silty fine to coarse grained sand, fine to medium sub-rounded to sub-angular gravel, humid		E	0.1				
	0.2	SILTY SAND: loose to medium dense, orange brown, silty fine to medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, damp		E	0.3				
				E	0.5				
	0.8	Pit discontinued at 0.8m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U$_x$	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728848
NORTHING: 8608379

PIT No: TP18
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
	0.15	SILTY SAND: very dense, grey brown, slightly gravelly slightly silty fine to coarse grained sand, fine to medium sub-rounded to rounded gravel, humid		E	0.05		Surface sample		
	0.6	SILTY SAND: dense, orange brown, silty fine to medium grained sand with some gravel, fine to medium rounded to sub-rounded gravel, humid to damp		E E	0.3 0.5				
	1	Pit discontinued at 0.6m , target depth reached							1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728840
NORTHING: 8608419

PIT No: TP19
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: very dense, brown, slightly clayey sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, humid		E	0.1				
	0.2	CLAYEY GRAVEL: dense with weakly cemented zones, orange brown, yellow brown and red brown, slightly sandy clayey fine to coarse rounded to sub-rounded gravel, humid		E	0.3				
				E	0.5				
	0.6	Pit discontinued at 0.6m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728899
NORTHING: 8608431

PIT No: TP20
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
	0.0	GRAVELLY SAND: very dense, dark brown, gravelly fine to coarse grained sand, fine to coarse rounded to sub-rounded gravel, damp		E	0.1				
				E	0.3				
	0.4	GRAVELLY SAND: medium dense, orange brown, slightly silty gravelly fine to medium grained sand, fine to medium rounded to sub-rounded gravel, damp		E	0.5				
	0.7	Pit discontinued at 0.7m , target depth reached							
	1								1
	2								2

5 10 15 20

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728975
NORTHING: 8608456

PIT No: TP21
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		GRAVELLY SAND: very dense, brown, gravelly fine to coarse grained sand, fine to medium sub-rounded to rounded gravel, humid		E	0.1				
				E	0.3				
	0.35	GRAVELLY SAND: medium dense, yellow brown, slightly silty gravelly fine to coarse grained sand, fine to medium rounded to sub-rounded gravel, humid		E	0.5				
	0.7	Pit discontinued at 0.7m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728935
NORTHING: 8608496

PIT No: TP22
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: dense, brown, sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, humid		E	0.1		D4		
	0.25	CLAYEY SANDY GRAVEL: weakly cemented, orange brown and red brown, clayey sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, damp		E	0.3				
	0.6	Pit discontinued at 0.6m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728905
NORTHING: 8608528

PIT No: TP23
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: dense, brown, sandy fine to medium sub-rounded to sub-angular gravel, fine to coarse grained sand, humid		E	0.1				
	0.2	GRAVELLY SILTY SAND: medium dense, orange brown, gravelly silty fine to medium grained sand, fine to medium rounded to sub-rounded gravel, damp		E	0.3		D5		
	0.5	Pit discontinued at 0.5m , target depth reached		E	0.5				
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728861
NORTHING: 8608573

PIT No: TP24
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		GRAVELLY SAND: dense, dark brown, gravelly fine to coarse grained sand, fine to medium rounded to sub-rounded gravel, some large roots, humid		E	0.1				
					0.25		50 mm diameter PVC pipe encountered 0.25 m below the surface		
				E	0.3				
	0.35	GRAVELLY SILTY SAND: medium dense, orange brown, gravelly silty fine to coarse grained sand, fine to coarse rounded to sub-rounded gravel, damp							
				E	0.5		D6		
	0.65	Pit discontinued at 0.65m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728838
NORTHING: 8608599

PIT No: TP25
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: dense, grey brown, sandy fine to medium sub-rounded to sub-angular gravel some silt, fine to coarse grained sand, humid		E	0.05		Surface sample		
	0.25	GRAVELLY SILTY SAND: dense with some cemented zones, orange brown, gravelly silty fine to coarse grained sand, fine to medium sub-rounded to sub-angular gravel, humid		E	0.3				
				E	0.5				
	0.65	Pit discontinued at 0.65m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728829
NORTHING: 8608563

PIT No: TP26
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: very dense, grey brown, sandy fine to medium sub-rounded to sub-angular gravel, fine to coarse grained sand, humid		E	0.05		Surface sample		
	0.35	GRAVELLY SILTY SAND: dense with some cemented zones, orange brown, gravelly silty fine to coarse grained sand, fine to medium sub-rounded to sub-angular gravel, humid		E	0.3				
	0.65	Pit discontinued at 0.65m , target depth reached		E	0.5				
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728845
NORTHING: 8608547

PIT No: TP27
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: dense, dark brown, slightly silty sandy fine to medium rounded to sub-rounded gravel, fine to coarse grained sand, humid to damp		E	0.1				
		...gravelly sand filling zones with cobbles to 150 mm		E	0.3				
	0.4	GRAVELLY SILTY SAND: medium dense, orange brown, gravelly silty fine to medium grained sand, fine to coarse rounded to sub-rounded gravel, damp		E	0.5				
	0.7	Pit discontinued at 0.7m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728872
NORTHING: 8608521

PIT No: TP28
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: very dense, dark brown and brown, slightly silty sandy fine to medium sub-angular to sub-rounded gravel, fine to coarse grained sand, humid		E	0.05		Surface sample		
				E	0.3				
	0.35	SANDY GRAVEL: medium dense with weakly cemented zones, slightly silty sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, damp		E	0.5				
	0.7	Pit discontinued at 0.7m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 729377
NORTHING: 8608214

PIT No: TP29
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: very dense, brown, sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, some roots, humid		E	0.1		D8		
				E	0.3		D7		
	0.4	SANDY GRAVEL: medium dense, yellow brown, slightly silty sandy fine to medium sub-rounded gravel, fine to coarse grained sand, some roots, damp		E	0.5				
	0.7	Pit discontinued at 0.7m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728839
NORTHING: 8608485

PIT No: TP30
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		GRAVELLY SAND: very dense, brown, gravelly fine to coarse grained sand, fine to medium sub-rounded to sub-angular gravel, humid		E	0.1				
				E	0.3				
	0.35	SANDY GRAVEL: very dense with some weakly cemented zones, orange brown and yellow brown, sandy fine to coarse rounded to sub-rounded gravel with some silt, fine to coarse grained sand, humid to damp		E	0.5				
	0.55	Pit discontinued at 0.55m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728831
NORTHING: 8608469

PIT No: TP31
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: very dense, grey brown, sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, some roots, humid		E	0.1				
				E	0.3				
	0.4	SILTY SANDY GRAVEL: dense, orange brown, silty sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, damp		E	0.5				
	0.6	Pit discontinued at 0.6m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728830
NORTHING: 8608445

PIT No: TP32
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: very dense, brown, sandy fine to coarse sub-rounded to sub-angular gravel, fine to coarse grained sand, humid		E	0.1				
	0.3	SILTY SANDY GRAVEL: very dense with weakly cemented zones, silty sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, damp		E	0.3				
				E	0.5				
	0.65	Pit discontinued at 0.65m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728853
NORTHING: 8608450

PIT No: TP33
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		SANDY GRAVEL: very dense, brown and grey brown, sandy fine to medium rounded to sub-rounded gravel, fine to coarse grained sand, some roots, humid		E	0.1				
				E	0.25				
	0.3	SILTY SANDY GRAVEL: medium dense to dense, orange brown, silty sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, humid to damp		E	0.5				
	0.65	Pit discontinued at 0.65m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▽	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Tolinchlo Pty Ltd
PROJECT: Environmental Site Investigation
LOCATION: Lot 3 Fred Pass Road, Humpty Doo, NT

SURFACE LEVEL: --
EASTING: 728937
NORTHING: 8608469

PIT No: TP34
PROJECT No: 78156.01
DATE: 12/6/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
	0.2	GRAVELLY SAND: dense, brown, gravelly fine to coarse grained sand, fine to medium sub-rounded to sub-angular gravel, damp		E	0.1				
		SILTY SANDY GRAVEL: medium dense to dense, orange brown and yellow brown, silty sandy fine to coarse rounded to sub-rounded gravel, fine to coarse grained sand, damp		E	0.3				
				E	0.5				
	0.8	Pit discontinued at 0.8m , target depth reached							
	1								1
	2								2

RIG: Kubota 8 tonne excavator with 600 mm wide flat bucket

LOGGED: B.S

SURVEY DATUM: WGS84 Zone 52

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels not available at time of Reporting

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

Appendix C

Table C1
Pro UCL Summaries
Laboratory Test Reports
QA/QC Data Quality Assessment

Douglas Partners
Geotechnics | Environment | Groundwater

Table C1: Results of Laboratory Tests (all results are in mg/kg unless otherwise stated)

Sample ID TP No. / Depth (m)	Sample Description	pH (pH units)	TRH C_6 - C_{10} (F1)	TRH C_{10} - C_{16} (F2)	TRH C_{16} - C_{34} (F3)	TRH C_{34} - C_{40} (F4)	OCP	OPP	Phenoxy Herbicides	Asbestos ID
SD Zone										
TP01 / 0.1	silty sand	6.0	<10	<50	<100	<100	**Dieldrin 57.7**	<10	<0.04	NT
D1*		NT	<10	<50	<100	<100	NT	NT	NT	NT
TP02 / 0.3	silty sand	NT	<10	<50	<100	<100	<0.5	<10	NT	NT
D2*		NT	<10	<50	<100	<100	NT	NT	NT	NT
TP02 / 0.5	silty sand	NT	<10	<50	<100	<100	<0.5	<10	<0.02	NT
TP03 / 0.3	silty sand	NT	<10	<50	<100	<100	<0.5	<10	<0.02	NT
D3**		NT	<25	<50	<100	<100	NT	NT	NT	NT
TP04 / 0.5	silty sand	NT	<10	<50	<100	<100	<0.5	<10	NT	NT
TP05 / 0.25	silty sand	NT	<10	<50	<100	<100	<0.5	Chlorpyrifos - 41.0	NT	NT
TP05 / 0.5	silty sand	NT	<10	<50	<100	<100	<0.5	<10	<0.02	NT
TP06 / 0.1	silty sand	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NT
TP07 / Surface	silty sand	NT	<10	<50	<100	<100	**Dieldrin - 10**	<10	NT	NT
TP07 / 0.5	silty sand	NT	<10	<50	<100	<100	<0.5	<10	<0.02	NT
TP08 / 0.3	sand	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NT
TP09 / 0.3	gravelly sand	NT	<10	<50	<100	<100	<0.5	<10	NT	NT
TP09 / 0.5	silty sand	NT	<10	<50	<100	<100	<0.5	<10	<0.02	NT
TP10 / 0.1	silty sand	5.5	<10	<50	<100	<100	**Dieldrin 11.2**	<10	<0.04	NT
TP11 / Surface	gravelly silty sand	NT	<10	<50	<100	<100	Dieldrin 0.67	<10	NT	NT
TP11 / 0.3	gravelly silty sand	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NT
TP12 / Surface	sand	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NT
TP12 / 0.5	silty sand	NT	<10	<50	<100	<100	<0.5	<10	NT	NT
TP13 / 0.3	silty sand	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NT
TP14 / 0.1	silty sand	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NT
TP14 / 0.3	silty sand	NT	<10	<50	<100	<100	<0.5	<10	NT	NT
TP15 / 0.45	silty sand	6.0	<10	<50	<100	<100	<0.5	<10	<0.02	NT
TP16 / 0.1	sand	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NT
TP16 / 0.45	silty sand	NT	<10	<50	<100	<100	<0.5	<10	NT	NT
TP17 / 0.1	silty sand	NT	<10	<50	<100	<100	**Dieldrin 7.92**	<10	<0.04	NT
TP18 / Surface	silty sand	NT	<10	<50	<100	<100	**Dieldrin 8.81**	<10	<0.04	NT
TP19 / 0.1	silty sand	NT	<10	<50	<100	<100	Dieldrin 2.18	<10	<0.04	NT
TP20 / 0.1	gravelly sand	6.1	<10	<50	<100	<100	**Dieldrin 18.2**	<10	<0.04	NT
TP21 / 0.1	gravelly sand	NT	<10	<50	<100	<100	**Dieldrin 9.08**	<10	<0.04	NT
TP21 / 0.3	gravelly sand	NT	<10	<50	<100	<100	Dieldrin 0.5	<10	NT	NT
Mean for samples up to 0.3m depth, excluding Hot Spots (>15mg/kg for Dieldrin)							Dieldrin - 2.7			
95% Upper Confidence Limit for samples up to 0.3m depth, excluding Hot Spots (>15mg/kg for Dieldrin)							Dieldrin - 6.4			
Assessment Criteria - Residential Land Use										
HIL / HSL	**All Exposures: Residential Land Use HIL A**		4400	3300	NC	NC	6 - 300 Aldrin & Dieldrin - 6 Heptachlor - 6 Chlordane - 50	160 - 320 Chlorpyrifos - 160	600-4500	NC
	All Exposures: Intrusive Worker Maintenance Worker		82000	62000	85000	120000	NC	NC	NC	NC
	Vapour Intrusion: Residential Land Use HIL A		45	110	NC	NC	NC	NC	NC	NC
	Vapour Intrusion: Intrusive Maintenance Worker		NL	NL	NC	NC	NC	NC	NC	NC
Ecological Screening Levels (fine soils)			180^	120^	1300	5600	NC	NC	NC	NC
Ecological Investigation Levels			NC	NC	NC	NC	0.32 to 34 Chlordane - 4 DDT - 1.7 DDE - 2.3 DDD - 34 Aldrin - 0.32 Heptachlor - 4 Heptachlor epoxide - 4	NC	MCPA - 4	NC
Management Limits			700	1000	3500	10000	NC	NC	NC	NC

See notes following

Douglas Partners
Geotechnics | Environment | Groundwater

Table C1: Results of Laboratory Tests (all results are in mg/kg unless otherwise stated)

Sample ID TP No. / Depth (m)	Sample Description	pH (pH units)	TRH				OCP	OPP	Phenoxy Herbicides	Asbestos ID
			C_6 - C_{10} (F1)	C_{10} - C_{16} (F2)	C_{16} - C_{34} (F3)	C_{34} - C_{40} (F4)				
MD Zone										
TP22 / 0.1	sandy gravel	4.9	<10	<50	<100	<100	<0.5	<10	<0.04	NAD
D4*		NT	<10	<50	<100	<100	NT	NT	NT	NT
TP23 / 0.3	gravelly silty sand	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NAD
D5*		NT	<10	<50	<100	<100	NT	NT	NT	NT
TP24 / 0.1	gravelly sand	NT	<10	<50	<100	<100	<0.5	<10	NT	NAD
TP24 / 0.3	gravelly sand	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NAD
TP25 / Surface	sandy gravel	NT	<10	<50	<100	<100	Total -14.9 Aldrin - 0.52 Aldrin & Dieldrin - 5.12 Heptachlor - 1.05 Chlordane - 3.62	<10	<0.04	NAD
TP25 / 0.3	gravelly silty sand	NT	<10	<50	<100	<100	<0.5	<10	NT	NAD
TP26 / Surface	sandy gravel	NT	<10	<50	<100	<100	Total - 74.9 Aldrin - 2.92 **Aldrin & Dieldrin - 29.72** **Heptachlor - 12.5** Heptachlor Epoxide - 3.98 Chlordane - 28.71	<10	NT	NAD
TP26 / 0.5	gravelly silty sand	5.2	<10	<50	<100	<100	Total - 3.47 Dieldrin - 1.72 Heptachlor - 0.62 Chlordane - 1.13	<10	<0.04	NT
TP27 / 0.1	sandy gravel	NT	<10	<50	<100	<100	Total - 84.6 Aldrin - 1.83 **Aldrin & Dieldrin - 45.83** **Heptachlor - 8.57** Heptachlor Epoxide - 3.72 Chlordane - 26.48	<10	<0.04	NAD
TP27 / 0.5	gravelly silty sand	NT	<10	<50	<100	<100	Total - 7.6 Dieldrin - 0.78 Heptachlor - 5.06 Heptachlor Epoxide - 0.64 Chlordane - 1.88	<10	NT	NT
TP28 / Surface	sandy gravel	NT	<10	<50	<100	<100	**Dieldrin 63.1**	<10	<0.04	Amosite Asbestos
TP28 / 0.3	sandy gravel	NT	<10	<50	<100	<100	Dieldrin 0.96	<10	NT	NT
TP30 / 0.1	gravelly sand	NT	<10	<50	<100	<100	Total - 23.4 **Dieldrin - 22.9** Chlordane - 0.47	<10	<0.04	NAD
TP30 / 0.5	sandy gravel	NT	<10	<50	<100	<100	Dieldrin - 0.59	<10	NT	NT
TP31 / 0.5	silty sandy gravel	NT	<10	<50	<100	<100	Dieldrin - 1.62	<10	<0.04	NT
TP32 / 0.3	sandy gravel	NT	<10	<50	<100	<100	Dieldrin - 2.56	<10	<0.04	NAD
TP33 / 0.5	silty sandy gravel	NT	<10	<50	<100	<100	<0.5	<10	<0.02	NT
TP34 / 0.1	gravelly sand	NT	<10	<50	<100	<100	Dieldrin - 4.97	<10	<0.04	NAD
Mean for samples up to 0.3m depth, excluding Hot Spots (>15mg/kg forAldrin & Dieldrin and Heptachlor)							Aldrin + Dieldrin - 1.5 and Heptachlor - 2.9			
95% Upper Confidence Limit for samples up to 0.3m depth, excluding Hot Spots (>15mg/kg forAldrin & Dieldrin and Heptachlor)							Aldrin + Dieldrin - 3.4 and Heptachlor - 6.7			
Assessment Criteria - Residential Land Use										
HIL / HSL	**All Exposures: Residential Land Use HIL A**		4400	3300	NC	NC	6 - 300 Aldrin & Dieldrin - 6 Heptachlor - 6 Chlordane - 50	160 - 320 Chlorpyrifos - 160	600-4500	NC
	All Exposures: Intrusive Worker Maintenance Worker		82000	62000	85000	120000	NC	NC	NC	NC
	Vapour Intrusion: Residential Land Use HIL A		45	110	NC	NC	NC	NC	NC	NC
	Vapour Intrusion: Intrusive Maintenance Worker		NL	NL	NC	NC	NC	NC	NC	NC
Ecological Screening Levels (fine soils)			180^	120^	1300	5600	NC	NC	NC	NC
Ecological Investigation Levels			NC	NC	NC	NC	0.32 to 34 Chlordane - 4 DDT - 1.7 DDE - 2.3 DDD - 34 Aldrin - 0.32 Heptachlor - 4 Heptachlor epoxide - 4	NC	MCPA - 4	NC
Management Limits			700	1000	3500	10000	NC	NC	NC	NC

See notes following

Douglas Partners
Geotechnics | Environment | Groundwater

Table C1: Results of Laboratory Tests (all results are in mg/kg unless otherwise stated)

Sample ID TP No. / Depth (m)	Sample Description	pH (pH units)	TRH				OCP	OPP	Phenoxy Herbicides	Asbestos ID
			C_6 - C_{10} (F1)	C_{10} - C_{16} (F2)	C_{16} - C_{34} (F3)	C_{34} - C_{40} (F4)				
Background Sampling										
TP29 / 0.1	sandy gravel	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NT
D8**		NT	<25	<50	<100	<100	NT	NT	NT	NT
TP29 / 0.3	sandy gravel	5.1	<10	<50	<100	<100	<0.5	<10	NT	NT
D7*		NT	<10	<50	<100	<100	NT	NT	NT	NT
S1	gravelly sand	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NT
S2	sandy gravel	NT	<10	<50	<100	<100	<0.5	<10	<0.04	NT
Assessment Criteria - Residential Land Use										
HIL / HSL	**All Exposures: Residential Land Use HIL A**		4400	3300	NC	NC	6 - 300 Aldrin & Dieldrin - 6 Heptachlor - 6 Chlordane - 50	160 - 320 Chlorpyrifos - 160	600-4500	NC
	All Exposures: Intrusive Worker Maintenance Worker		82000	62000	85000	120000	NC	NC	NC	NC
	Vapour Intrusion: Residential Land Use HIL A		45	110	NC	NC	NC	NC	NC	NC
	Vapour Intrusion: Intrusive Maintenance Worker		NL	NL	NC	NC	NC	NC	NC	NC
Ecological Screening Levels (fine soils)			180^	120^	1300	5600	NC	NC	NC	NC
Ecological Investigation Levels			NC	NC	NC	NC	0.32 to 34 Chlordane - 4 DDT - 1.7 DDE - 2.3 DDD - 34 Aldrin - 0.32 Heptachlor - 4 Heptachlor epoxide - 4	NC	MCPA - 4	NC
Management Limits			700	1000	3500	10000	NC	NC	NC	NC

Notes:

*	Intra-lab Replicate of sample listed directly above
**	Inter-lab Replicate of sample listed directly above
^	Ecological Screening Levels are low reliability, except those marked with ^ which are moderate reliability
NT	Not tested
NAD	No asbestos detected
<LOR	Less than Limit of Reporting
NL	'Not limiting" to human health for the proposed land use for vapour intrusion from petroleum hydrocarbons
NC	No applicable criteria
BOLD	Exceedance of HIL / HSL Assessment Criteria
Underlined	Exceedance of Adopted Ecological Investigation Levels

UCL Statistics for Uncensored Full Data Sets

User Selected Options	SD Zone Dieldrin up to 0.3m excluding Hotspots
Date/Time of Computation	16/07/2015 2:04:23 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

C0

General Statistics

Total Number of Observations	21	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.5	Mean	2.708
Maximum	11.2	Median	0.5
SD	3.892	Std. Error of Mean	0.849
Coefficient of Variation	1.437	Skewness	1.377

Normal GOF Test

Shapiro Wilk Test Statistic	0.602	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.908	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.414	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.193	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.172	95% Adjusted-CLT UCL (Chen-1995)	4.377
		95% Modified-t UCL (Johnson-1978)	4.215

Gamma GOF Test

A-D Test Statistic	4.106	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.79	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.407	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.198	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.67	k star (bias corrected MLE)	0.606
Theta hat (MLE)	4.044	Theta star (bias corrected MLE)	4.47
nu hat (MLE)	28.12	nu star (bias corrected)	25.44
MLE Mean (bias corrected)	2.708	MLE Sd (bias corrected)	3.479
		Approximate Chi Square Value (0.05)	14.95
Adjusted Level of Significance	0.0383	Adjusted Chi Square Value	14.33

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.608	95% Adjusted Gamma UCL (use when n<50)	4.806

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.618	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.908	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.397	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.193	Data Not Lognormal at 5% Significance Level

56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59						Minimum of Logged Data	-0.693				Mean of logged Data	0.0878
60						Maximum of Logged Data	2.416				SD of logged Data	1.272
61												
62	**Assuming Lognormal Distribution**											
63						95% H-UCL	5.682				90% Chebyshev (MVUE) UCL	4.543
64						95% Chebyshev (MVUE) UCL	5.559				97.5% Chebyshev (MVUE) UCL	6.969
65						99% Chebyshev (MVUE) UCL	9.738					
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71						95% CLT UCL	4.105				95% Jackknife UCL	4.172
72						95% Standard Bootstrap UCL	4.07				95% Bootstrap-t UCL	4.603
73						95% Hall's Bootstrap UCL	3.899				95% Percentile Bootstrap UCL	4.113
74						95% BCA Bootstrap UCL	4.355					
75						90% Chebyshev(Mean, Sd) UCL	5.256				95% Chebyshev(Mean, Sd) UCL	6.41
76						97.5% Chebyshev(Mean, Sd) UCL	8.012				99% Chebyshev(Mean, Sd) UCL	11.16
77												
78	**Suggested UCL to Use**											
79						95% Chebyshev (Mean, Sd) UCL	6.41					
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**C1**											
88												
89	**General Statistics**											
90						Total Number of Observations	21				Number of Distinct Observations	2
91											Number of Missing Observations	0
92						Minimum	0				Mean	0.381
93						Maximum	1				Median	0
94						SD	0.498				Std. Error of Mean	0.109
95						Coefficient of Variation	1.306				Skewness	0.529
96												
97	**Normal GOF Test**											
98						Shapiro Wilk Test Statistic	0.622				**Shapiro Wilk GOF Test**	
99						5% Shapiro Wilk Critical Value	0.908				Data Not Normal at 5% Significance Level	
100						Lilliefors Test Statistic	0.397				**Lilliefors GOF Test**	
101						5% Lilliefors Critical Value	0.193				Data Not Normal at 5% Significance Level	
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											
105						**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**	
106						95% Student's-t UCL	0.568				95% Adjusted-CLT UCL (Chen-1995)	0.573
107											95% Modified-t UCL (Johnson-1978)	0.57
108	**Gamma Statistics Not Available**											
109	**Lognormal Statistics Not Available**											
110												

	A	B	C	D	E	F	G	H	I	J	K	L
111	**Nonparametric Distribution Free UCL Statistics**											
112	**Data do not follow a Discernible Distribution (0.05)**											
113												
114	**Nonparametric Distribution Free UCLs**											
115	95% CLT UCL					0.56	95% Jackknife UCL					N/A
116	95% Standard Bootstrap UCL					N/A	95% Bootstrap-t UCL					N/A
117	95% Hall's Bootstrap UCL					N/A	95% Percentile Bootstrap UCL					N/A
118	95% BCA Bootstrap UCL					N/A						
119	90% Chebyshev(Mean, Sd) UCL					0.707	95% Chebyshev(Mean, Sd) UCL					0.854
120	97.5% Chebyshev(Mean, Sd) UCL					1.059	99% Chebyshev(Mean, Sd) UCL					1.461
121												
122	**Suggested UCL to Use**											
123	95% Chebyshev (Mean, Sd) UCL					0.854						
124												
125	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
126	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
127	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
128	For additional insight the user may want to consult a statistician.											
129												

UCL Statistics for Uncensored Full Data Sets

User Selected Options	MD Zone Aldrin + Dieldrin up to 0.3m depth, excluding hotspots
Date/Time of Computation	16/07/2015 2:52:51 PM
From File	WorkSheet_b.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

C0

General Statistics

Total Number of Observations	14	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	0.5	Mean	1.523
Maximum	5.12	Median	0.685
SD	1.616	Std. Error of Mean	0.432
Coefficient of Variation	1.061	Skewness	1.717

Normal GOF Test

Shapiro Wilk Test Statistic	0.682	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.279	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.237	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.288	95% Adjusted-CLT UCL (Chen-1995)	2.445
		95% Modified-t UCL (Johnson-1978)	2.321

Gamma GOF Test

A-D Test Statistic	1.363	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.233	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.379	k star (bias corrected MLE)	1.131
Theta hat (MLE)	1.104	Theta star (bias corrected MLE)	1.346
nu hat (MLE)	38.61	nu star (bias corrected)	31.67
MLE Mean (bias corrected)	1.523	MLE Sd (bias corrected)	1.432
		Approximate Chi Square Value (0.05)	19.81
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	18.58

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.434	95% Adjusted Gamma UCL (use when n<50)	2.597

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.799	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.234	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.237	Data appear Lognormal at 5% Significance Level

56	Data appear Approximate Lognormal at 5% Significance Level											
57												
58	Lognormal Statistics											
59						Minimum of Logged Data	-0.693				Mean of logged Data	0.0161
60						Maximum of Logged Data	1.633				SD of logged Data	0.871
61												
62	Assuming Lognormal Distribution											
63						95% H-UCL	2.775				90% Chebyshev (MVUE) UCL	2.507
64						95% Chebyshev (MVUE) UCL	2.993				97.5% Chebyshev (MVUE) UCL	3.668
65						99% Chebyshev (MVUE) UCL	4.993					
66												
67	Nonparametric Distribution Free UCL Statistics											
68	Data appear to follow a Discernible Distribution at 5% Significance Level											
69												
70	Nonparametric Distribution Free UCLs											
71						95% CLT UCL	2.233				95% Jackknife UCL	2.288
72						95% Standard Bootstrap UCL	2.214				95% Bootstrap-t UCL	3.185
73						95% Hall's Bootstrap UCL	3.069				95% Percentile Bootstrap UCL	2.247
74						95% BCA Bootstrap UCL	2.473					
75						90% Chebyshev(Mean, Sd) UCL	2.819				95% Chebyshev(Mean, Sd) UCL	3.406
76						97.5% Chebyshev(Mean, Sd) UCL	4.221				99% Chebyshev(Mean, Sd) UCL	5.821
77												
78	Suggested UCL to Use											
79						95% Chebyshev (Mean, Sd) UCL	3.406					
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	C1											
88												
89	General Statistics											
90						Total Number of Observations	14				Number of Distinct Observations	2
91											Number of Missing Observations	0
92						Minimum	0				Mean	0.571
93						Maximum	1				Median	1
94						SD	0.514				Std. Error of Mean	0.137
95						Coefficient of Variation	0.899				Skewness	-0.325
96												
97	Normal GOF Test											
98						Shapiro Wilk Test Statistic	0.639				Shapiro Wilk GOF Test	
99						5% Shapiro Wilk Critical Value	0.874				Data Not Normal at 5% Significance Level	
100						Lilliefors Test Statistic	0.369				Lilliefors GOF Test	
101						5% Lilliefors Critical Value	0.237				Data Not Normal at 5% Significance Level	
102	Data Not Normal at 5% Significance Level											
103												
104	Assuming Normal Distribution											
105						95% Normal UCL					95% UCLs (Adjusted for Skewness)	
106						95% Student's-t UCL	0.814				95% Adjusted-CLT UCL (Chen-1995)	0.784
107											95% Modified-t UCL (Johnson-1978)	0.813
108	Gamma Statistics Not Available											
109	Lognormal Statistics Not Available											
110												

	A	B	C	D	E	F	G	H	I	J	K	L
111	**Nonparametric Distribution Free UCL Statistics**											
112	**Data do not follow a Discernible Distribution (0.05)**											
113												
114	**Nonparametric Distribution Free UCLs**											
115					95% CLT UCL	0.797			95% Jackknife UCL	N/A		
116					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL	N/A		
117					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL	N/A		
118					95% BCA Bootstrap UCL	N/A						
119					90% Chebyshev(Mean, Sd) UCL	0.983			95% Chebyshev(Mean, Sd) UCL	1.17		
120					97.5% Chebyshev(Mean, Sd) UCL	1.429			99% Chebyshev(Mean, Sd) UCL	1.937		
121												
122	**Suggested UCL to Use**											
123					95% Chebyshev (Mean, Sd) UCL	1.17						
124												
125	**Recommended UCL exceeds the maximum observation**											
126												
127	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
128	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
129	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
130	For additional insight the user may want to consult a statistician.											
131												
132	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
133	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
134												

UCL Statistics for Uncensored Full Data Sets

User Selected Options	MD Zone Heptachlor up to 0.3m depth, excluding hotspots
Date/Time of Computation	16/07/2015 2:59:34 PM
From File	WorkSheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

C0

General Statistics

Total Number of Observations	13	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	0.5	Mean	2.086
Maximum	12.5	Median	0.5
SD	3.838	Std. Error of Mean	1.064
Coefficient of Variation	1.84	Skewness	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.484	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.453	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.983	95% Adjusted-CLT UCL (Chen-1995)	4.585
		95% Modified-t UCL (Johnson-1978)	4.1

Gamma GOF Test

A-D Test Statistic	3.328	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.776	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.465	**Kolmogrov-Smirnoff Gamma GOF Test**
5% K-S Critical Value	0.247	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.672	k star (bias corrected MLE)	0.568
Theta hat (MLE)	3.107	Theta star (bias corrected MLE)	3.674
nu hat (MLE)	17.46	nu star (bias corrected)	14.76
MLE Mean (bias corrected)	2.086	MLE Sd (bias corrected)	2.768
		Approximate Chi Square Value (0.05)	7.098
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	6.354

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.339	95% Adjusted Gamma UCL (use when n<50)	4.847

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.526	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.447	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level

56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-0.693			Mean of logged Data	-0.17		
60					Maximum of Logged Data	2.526			SD of logged Data	1.134		
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	4.404			90% Chebyshev (MVUE) UCL	3.028		
64					95% Chebyshev (MVUE) UCL	3.723			97.5% Chebyshev (MVUE) UCL	4.688		
65					99% Chebyshev (MVUE) UCL	6.584						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	3.837			95% Jackknife UCL	3.983		
72					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL	N/A		
73					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL	N/A		
74					95% BCA Bootstrap UCL	N/A						
75					90% Chebyshev(Mean, Sd) UCL	5.279			95% Chebyshev(Mean, Sd) UCL	6.726		
76					97.5% Chebyshev(Mean, Sd) UCL	8.733			99% Chebyshev(Mean, Sd) UCL	12.68		
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	6.726						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												
86												
87	**C1**											
88												
89	**General Statistics**											
90					Total Number of Observations	13			Number of Distinct Observations	2		
91									Number of Missing Observations	0		
92					Minimum	0			Mean	0.231		
93					Maximum	1			Median	0		
94					SD	0.439			Std. Error of Mean	0.122		
95					Coefficient of Variation	1.9			Skewness	1.451		
96												
97	**Normal GOF Test**											
98					Shapiro Wilk Test Statistic	0.534			**Shapiro Wilk GOF Test**			
99					5% Shapiro Wilk Critical Value	0.866			Data Not Normal at 5% Significance Level			
100					Lilliefors Test Statistic	0.47			**Lilliefors GOF Test**			
101					5% Lilliefors Critical Value	0.246			Data Not Normal at 5% Significance Level			
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											
105					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
106					95% Student's-t UCL	0.448			95% Adjusted-CLT UCL (Chen-1995)	0.483		
107									95% Modified-t UCL (Johnson-1978)	0.456		
108	**Gamma Statistics Not Available**											
109	**Lognormal Statistics Not Available**											
110												

	A	B	C	D	E	F	G	H	I	J	K	L
111	**Nonparametric Distribution Free UCL Statistics**											
112	**Data do not follow a Discernible Distribution (0.05)**											
113												
114	**Nonparametric Distribution Free UCLs**											
115					95% CLT UCL	0.431			95% Jackknife UCL			N/A
116					95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL			N/A
117					95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL			N/A
118					95% BCA Bootstrap UCL	N/A						
119					90% Chebyshev(Mean, Sd) UCL	0.596			95% Chebyshev(Mean, Sd) UCL			0.761
120					97.5% Chebyshev(Mean, Sd) UCL	0.99			99% Chebyshev(Mean, Sd) UCL			1.441
121												
122	**Suggested UCL to Use**											
123					95% Chebyshev (Mean, Sd) UCL	0.761						
124												
125	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
126	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
127	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
128	For additional insight the user may want to consult a statistician.											
129												

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	30/10/2015 1:03:12 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Dieldrin

General Statistics

Total Number of Observations	17	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	0	Mean	1.125
Maximum	11.2	Median	0
SD	3.227	Std. Error of Mean	0.783
Coefficient of Variation	2.87	Skewness	2.771

Normal GOF Test

Shapiro Wilk Test Statistic	0.399	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.519	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.215	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.491	95% Adjusted-CLT UCL (Chen-1995)	2.974
		95% Modified-t UCL (Johnson-1978)	2.579

Gamma Statistics Not Available

Lognormal Statistics Not Available

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.412	95% Jackknife UCL	2.491
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	3.473	95% Chebyshev(Mean, Sd) UCL	4.537
97.5% Chebyshev(Mean, Sd) UCL	6.013	99% Chebyshev(Mean, Sd) UCL	8.913

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	4.537

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.

For additional insight the user may want to consult a statistician.

CERTIFICATE OF ANALYSIS

Work Order	: **ES1524150**	Page	: 1 of 39
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS JESSICA PAULSEN	Contact	: Jenny Bevan
Address	: PO BOX 36858 WINNELLIE NT, AUSTRALIA 0821	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jessica.paulsen@douglaspartners.com.au	E-mail	: jenny.bevan@alsglobal.com
Telephone	: +61 08 8948 6800	Telephone	: 07 3552 8657
Facsimile	: +61 08 89474455	Facsimile	: +61-2-8784 8500
Project	: 78156.01 HUMPTY DOO	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 120337	Date Samples Received	: 23-Jun-2015 02:30
C-O-C number	: ----	Date Analysis Commenced	: 24-Jun-2015
Sampler	: BEN SIPOS	Issue Date	: 30-Jun-2015 15:20
Site	: ----		
		No. of samples received	: 57
Quote number	: ----	No. of samples analysed	: 57

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results

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*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos
Lana Nguyen	Senior LCMS Chemist	Sydney Organics
Phalak Inthakesone	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
ø = ALS is not NATA accredited for these tests.

- EP202: Particular samples required dilution due to matrix interferences. LOR values have been adjusted accordingly
- EP202: Poor matrix spike recoveries for Clopyralid due to matrix effects
- EP130: Positive results have been confirmed by re-extraction and re-analysis.
- **EA200: As only one sample container was submitted for multiple tests, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly and NATA accreditation does not apply to analysis on these samples.**
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP01/0.1	TP02/0.3	TP02/0.5	TP03/0.3	TP04/0.5
			Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-001	ES1524150-002	ES1524150-003	ES1524150-004	ES1524150-005
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	6.0	----	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	3.4	18.1	15.1	26.5	15.3
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	----	----	----
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP01/0.1	TP02/0.3	TP02/0.5	TP03/0.3	TP04/0.5
				Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-001	ES1524150-002	ES1524150-003	ES1524150-004	ES1524150-005
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg		<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg		<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg		<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg		<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg		<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg		<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg		<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg		<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg		<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg		<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg		<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg		<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg		<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg		<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	---	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg		**57.7**	<0.50	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP01/0.1	TP02/0.3	TP02/0.5	TP03/0.3	TP04/0.5
				Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-001	ES1524150-002	ES1524150-003	ES1524150-004	ES1524150-005
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
2.4-DB	94-82-6	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
Dicamba	1918-00-9	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
Mecoprop	93-65-2	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
MCPA	94-74-6	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
2.4-DP	120-36-5	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
2.4-D	94-75-7	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
Triclopyr	55335-06-3	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
2.4.5-T	93-76-5	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
MCPB	94-81-5	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
Picloram	1918-02-1	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
Clopyralid	1702-17-6	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.04	----	<0.02	<0.02	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**93.7**	**76.7**	**86.2**	**75.2**	**91.7**
Toluene-D8	2037-26-5	0.2	%		**108**	**91.6**	**90.1**	**88.5**	**99.8**
4-Bromofluorobenzene	460-00-4	0.2	%		**104**	**89.0**	**89.9**	**85.1**	**96.2**
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		**71.1**	**69.9**	**71.3**	**68.7**	**74.4**
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**78.5**	**51.5**	**58.5**	**47.4**	**59.2**
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		**74.6**	----	**82.7**	**88.3**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP05/0.25	TP05/0.5	TP06/0.1	TP07/SURFACE	TP07/0.5
			Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-006	ES1524150-007	ES1524150-008	ES1524150-009	ES1524150-010
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	---	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	**28.1**	**13.1**	<1.0	**2.6**	**23.6**
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	---	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	---	----	----
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP05/0.25	TP05/0.5	TP06/0.1	TP07/SURFACE	TP07/0.5
				Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-006	ES1524150-007	ES1524150-008	ES1524150-009	ES1524150-010
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg		**41**	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg		<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg		<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg		<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg		<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg		<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg		<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg		<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg		<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg		<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg		<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg		<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg		<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg		<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg		<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	---	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg		<0.50	<0.50	<0.50	**10.0**	<0.50
alpha-Endosulfan	959-98-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP05/0.25	TP05/0.5	TP06/0.1	TP07/SURFACE	TP07/0.5
				Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-006	ES1524150-007	ES1524150-008	ES1524150-009	ES1524150-010
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
2.4-DB	94-82-6	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
Dicamba	1918-00-9	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
Mecoprop	93-65-2	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
MCPA	94-74-6	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
2.4-DP	120-36-5	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
2.4-D	94-75-7	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
Triclopyr	55335-06-3	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
2.4.5-T	93-76-5	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
MCPB	94-81-5	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
Picloram	1918-02-1	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
Clopyralid	1702-17-6	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
Fluroxypyr	69377-81-7	0.02	mg/kg		----	<0.02	<0.04	----	<0.02
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**90.5**	**88.7**	**96.6**	**93.8**	**84.2**
Toluene-D8	2037-26-5	0.2	%		**97.2**	**96.4**	**104**	**106**	**90.4**
4-Bromofluorobenzene	460-00-4	0.2	%		**98.0**	**93.9**	**97.8**	**98.4**	**93.2**
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		**81.2**	**68.6**	**68.4**	**70.5**	**69.4**
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**68.3**	**50.8**	**43.3**	**59.7**	**45.5**
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		----	**90.8**	**82.9**	----	**76.6**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP08/0.3	TP09/0.3	TP09/0.5	TP10/0.1	TP11/SURFACE
			Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-011	ES1524150-012	ES1524150-013	ES1524150-014	ES1524150-015
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	---	----	5.5	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	9.3	7.3	6.1	4.7	3.2
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	---	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	---	----	----
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP08/0.3	TP09/0.3	TP09/0.5	TP10/0.1	TP11/SURFACE
				Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-011	ES1524150-012	ES1524150-013	ES1524150-014	ES1524150-015
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg		<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg		<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg		<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg		<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg		<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg		<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg		<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg		<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg		<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg		<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg		<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg		<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg		<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg		<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	---	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg		<0.50	<0.50	<0.50	**11.2**	**0.67**
alpha-Endosulfan	959-98-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP08/0.3	TP09/0.3	TP09/0.5	TP10/0.1	TP11/SURFACE
				Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]	[11-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-011	ES1524150-012	ES1524150-013	ES1524150-014	ES1524150-015
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
2.4-DB	94-82-6	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
Dicamba	1918-00-9	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
Mecoprop	93-65-2	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
MCPA	94-74-6	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
2.4-DP	120-36-5	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
2.4-D	94-75-7	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
Triclopyr	55335-06-3	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
2.4.5-T	93-76-5	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
MCPB	94-81-5	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
Picloram	1918-02-1	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
Clopyralid	1702-17-6	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.04	----	<0.02	<0.04	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**89.8**	**96.6**	**84.8**	**95.4**	**95.7**
Toluene-D8	2037-26-5	0.2	%		**94.8**	**100**	**96.1**	**100**	**100**
4-Bromofluorobenzene	460-00-4	0.2	%		**97.6**	**111**	**97.0**	**101**	**99.7**
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		**72.6**	**71.8**	**68.4**	**70.3**	**71.7**
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**51.2**	**56.8**	**58.2**	**60.0**	**50.4**
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		**88.6**	----	**82.1**	**85.3**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP11/0.3	TP12/SURFACE	TP12/0.5	TP13/0.3	TP14/0.1
			Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-016	ES1524150-017	ES1524150-018	ES1524150-019	ES1524150-020
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	---	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	6.8	6.3	20.4	9.4	4.1
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	---	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	---	----	----
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP11/0.3	TP12/SURFACE	TP12/0.5	TP13/0.3	TP14/0.1
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-016	ES1524150-017	ES1524150-018	ES1524150-019	ES1524150-020
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg		<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg		<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg		<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg		<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg		<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg		<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg		<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg		<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg		<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg		<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg		<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg		<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg		<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg		<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	---	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP11/0.3	TP12/SURFACE	TP12/0.5	TP13/0.3	TP14/0.1
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-016	ES1524150-017	ES1524150-018	ES1524150-019	ES1524150-020
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
2.4-DB	94-82-6	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
Dicamba	1918-00-9	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
Mecoprop	93-65-2	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
MCPA	94-74-6	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
2.4-DP	120-36-5	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
2.4-D	94-75-7	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
Triclopyr	55335-06-3	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
2.4.5-T	93-76-5	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
MCPB	94-81-5	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
Picloram	1918-02-1	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
Clopyralid	1702-17-6	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.04	<0.04	----	<0.04	<0.04
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**94.9**	**93.6**	**86.8**	**93.2**	**91.2**
Toluene-D8	2037-26-5	0.2	%		**95.5**	**95.7**	**89.9**	**94.5**	**95.2**
4-Bromofluorobenzene	460-00-4	0.2	%		**98.0**	**96.5**	**89.3**	**94.2**	**95.2**
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		**73.8**	**66.8**	**69.0**	**66.3**	**72.2**
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**55.9**	**56.6**	**43.2**	**52.9**	**54.7**
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		**77.2**	**84.9**	----	**83.8**	**96.9**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP14/0.3	TP15/0.45	TP16/0.1	TP16/0.45	TP17/0.1
			Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-021	ES1524150-022	ES1524150-023	ES1524150-024	ES1524150-025
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	6.0	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	8.5	6.3	6.4	7.7	6.5
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	---	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	---	----	----
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP14/0.3	TP15/0.45	TP16/0.1	TP16/0.45	TP17/0.1
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-021	ES1524150-022	ES1524150-023	ES1524150-024	ES1524150-025
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg		<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg		<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg		<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg		<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg		<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg		<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg		<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg		<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg		<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg		<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg		<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg		<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg		<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg		<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	---	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	**7.92**
alpha-Endosulfan	959-98-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP14/0.3	TP15/0.45	TP16/0.1	TP16/0.45	TP17/0.1
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-021	ES1524150-022	ES1524150-023	ES1524150-024	ES1524150-025
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
2.4-DB	94-82-6	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
Dicamba	1918-00-9	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
Mecoprop	93-65-2	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
MCPA	94-74-6	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
2.4-DP	120-36-5	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
2.4-D	94-75-7	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
Triclopyr	55335-06-3	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
2.4.5-T	93-76-5	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
MCPB	94-81-5	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
Picloram	1918-02-1	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
Clopyralid	1702-17-6	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
Fluroxypyr	69377-81-7	0.02	mg/kg		----	<0.02	<0.04	----	<0.04
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**90.3**	**116**	**95.0**	**86.0**	**94.0**
Toluene-D8	2037-26-5	0.2	%		**101**	**106**	**99.4**	**95.0**	**96.9**
4-Bromofluorobenzene	460-00-4	0.2	%		**79.5**	**99.8**	**81.2**	**93.0**	**94.8**
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		**67.7**	**70.0**	**72.1**	**67.5**	**71.1**
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**43.8**	**56.3**	**64.6**	**62.0**	**76.5**
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		----	**75.9**	**91.9**	----	**74.2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP18/SURFACE	TP19/0.1	TP20/0.1	TP21/0.1	TP21/0.3
			Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-026	ES1524150-027	ES1524150-028	ES1524150-029	ES1524150-030
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	---	6.1	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	1.7	3.4	6.1	3.7	24.0
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	---	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	---	----	----
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP18/SURFACE	TP19/0.1	TP20/0.1	TP21/0.1	TP21/0.3
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-026	ES1524150-027	ES1524150-028	ES1524150-029	ES1524150-030
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg		<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg		<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg		<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg		<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg		<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg		<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg		<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg		<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg		<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg		<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg		<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg		<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg		<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg		<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	---	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg		**8.81**	**2.18**	**18.2**	**9.08**	**0.50**
alpha-Endosulfan	959-98-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP18/SURFACE	TP19/0.1	TP20/0.1	TP21/0.1	TP21/0.3
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-026	ES1524150-027	ES1524150-028	ES1524150-029	ES1524150-030
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
2.4-DB	94-82-6	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
Dicamba	1918-00-9	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
Mecoprop	93-65-2	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
MCPA	94-74-6	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
2.4-DP	120-36-5	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
2.4-D	94-75-7	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
Triclopyr	55335-06-3	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
2.4.5-T	93-76-5	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
MCPB	94-81-5	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
Picloram	1918-02-1	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
Clopyralid	1702-17-6	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**103**	**87.6**	**83.2**	**89.5**	**76.3**
Toluene-D8	2037-26-5	0.2	%		**105**	**98.6**	**90.7**	**98.7**	**81.2**
4-Bromofluorobenzene	460-00-4	0.2	%		**98.0**	**94.1**	**88.2**	**94.0**	**78.3**
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		**83.3**	**73.8**	**81.4**	**72.4**	**71.8**
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**58.4**	**62.2**	**57.2**	**50.0**	**46.0**
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		**87.2**	**78.2**	**78.3**	**81.9**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	D1	D2	S1	S2	TP29/0.1
			Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-031	ES1524150-032	ES1524150-033	ES1524150-034	ES1524150-035
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	----	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	**14.5**	**21.9**	**1.0**	**1.3**	**6.7**
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	----	----	----
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	----	----	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	D1	D2	S1	S2	TP29/0.1
				Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-031	ES1524150-032	ES1524150-033	ES1524150-034	ES1524150-035
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		----	----	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		----	----	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		----	----	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg		----	----	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		----	----	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg		----	----	<10	<10	<10
Diazinon	333-41-5	10	µg/kg		----	----	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg		----	----	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg		----	----	<10	<10	<10
Ethion	563-12-2	10	µg/kg		----	----	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg		----	----	<10	<10	<10
Fenthion	55-38-9	10	µg/kg		----	----	<10	<10	<10
Malathion	121-75-5	10	µg/kg		----	----	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg		----	----	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg		----	----	<10	<10	<10
Parathion	56-38-2	10	µg/kg		----	----	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg		----	----	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg		----	----	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg		----	----	<10	<10	<10
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	----	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg		----	----	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	D1	D2	S1	S2	TP29/0.1
				Client sampling date / time	[11-Jun-2015]	[11-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-031	ES1524150-032	ES1524150-033	ES1524150-034	ES1524150-035
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		----	----	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		----	----	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		----	----	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg		----	----	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.5	µg/kg		----	----	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
2.4-DB	94-82-6	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
Dicamba	1918-00-9	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
Mecoprop	93-65-2	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
MCPA	94-74-6	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
2.4-DP	120-36-5	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
2.4-D	94-75-7	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
Triclopyr	55335-06-3	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
2.4.5-T	93-76-5	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
MCPB	94-81-5	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
Picloram	1918-02-1	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
Clopyralid	1702-17-6	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
Fluroxypyr	69377-81-7	0.02	mg/kg		----	----	<0.04	<0.04	<0.04
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		108	106	93.0	98.5	96.3
Toluene-D8	2037-26-5	0.2	%		99.7	103	102	114	108
4-Bromofluorobenzene	460-00-4	0.2	%		98.9	100	96.7	103	101
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		----	----	74.5	82.3	80.9
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		----	----	62.8	70.3	61.0
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		----	----	73.1	79.3	91.3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP29/0.3	D7	TP22/0.1	TP23/0.3	TP24/0.1
			Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-036	ES1524150-037	ES1524150-038	ES1524150-039	ES1524150-040
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	5.1	----	4.9	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	6.7	6.4	1.7	8.1	2.2
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	No	No	No
Asbestos Type	1332-21-4	-	--	----	----	-	-	-
Sample weight (dry)	----	0.01	g	----	----	25.4	26.6	48.5
APPROVED IDENTIFIER:	----	-	--	----	----	N.WEBB	N.WEBB	N.WEBB
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP29/0.3	D7	TP22/0.1	TP23/0.3	TP24/0.1
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-036	ES1524150-037	ES1524150-038	ES1524150-039	ES1524150-040
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		<10	----	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		<10.0	----	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		<10	----	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg		<10	----	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		<10	----	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg		<10	----	<10	<10	<10
Diazinon	333-41-5	10	µg/kg		<10	----	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg		<10	----	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg		<10	----	<10	<10	<10
Ethion	563-12-2	10	µg/kg		<10	----	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg		<10	----	<10	<10	<10
Fenthion	55-38-9	10	µg/kg		<10	----	<10	<10	<10
Malathion	121-75-5	10	µg/kg		<10	----	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg		<10	----	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg		<10	----	<10	<10	<10
Parathion	56-38-2	10	µg/kg		<10	----	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg		<10	----	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg		<10	----	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg		<10	----	<10	<10	<10
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	----	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP29/0.3	D7	TP22/0.1	TP23/0.3	TP24/0.1
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-036	ES1524150-037	ES1524150-038	ES1524150-039	ES1524150-040
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		<0.25	----	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		<0.25	----	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		<0.25	----	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg		<0.25	----	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.5	µg/kg		<0.50	----	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		----	----	<0.04	<0.04	----
2.4-DB	94-82-6	0.02	mg/kg		----	----	<0.04	<0.04	----
Dicamba	1918-00-9	0.02	mg/kg		----	----	<0.04	<0.04	----
Mecoprop	93-65-2	0.02	mg/kg		----	----	<0.04	<0.04	----
MCPA	94-74-6	0.02	mg/kg		----	----	<0.04	<0.04	----
2.4-DP	120-36-5	0.02	mg/kg		----	----	<0.04	<0.04	----
2.4-D	94-75-7	0.02	mg/kg		----	----	<0.04	<0.04	----
Triclopyr	55335-06-3	0.02	mg/kg		----	----	<0.04	<0.04	----
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		----	----	<0.04	<0.04	----
2.4.5-T	93-76-5	0.02	mg/kg		----	----	<0.04	<0.04	----
MCPB	94-81-5	0.02	mg/kg		----	----	<0.04	<0.04	----
Picloram	1918-02-1	0.02	mg/kg		----	----	<0.04	<0.04	----
Clopyralid	1702-17-6	0.02	mg/kg		----	----	<0.04	<0.04	----
Fluroxypyr	69377-81-7	0.02	mg/kg		----	----	<0.04	<0.04	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**79.3**	**91.0**	**88.2**	**96.1**	**101**
Toluene-D8	2037-26-5	0.2	%		**88.0**	**97.8**	**96.5**	**100**	**112**
4-Bromofluorobenzene	460-00-4	0.2	%		**80.6**	**88.2**	**87.2**	**92.9**	**102**
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		**61.5**	----	**75.6**	**67.2**	**81.3**
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**68.2**	----	**48.0**	**48.7**	**49.5**
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		----	----	**77.3**	**75.4**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP24/0.3	TP25/SURFACE	TP25/0.3	TP26/SURFACE	TP26/0.5
			Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-041	ES1524150-042	ES1524150-043	ES1524150-044	ES1524150-045
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	---	----	----	5.2
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	6.2	4.4	8.7	2.1	8.6
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	----
Asbestos Type	1332-21-4	-	--	-	-	-	-	----
Sample weight (dry)	----	0.01	g	68.1	63.8	69.8	71.5	----
APPROVED IDENTIFIER:	----	-	--	N.WEBB	N.WEBB	N.WEBB	N.WEBB	----
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP24/0.3	TP25/SURFACE	TP25/0.3	TP26/SURFACE	TP26/0.5
			Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-041	ES1524150-042	ES1524150-043	ES1524150-044	ES1524150-045
				Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.5	µg/kg	<0.50	**0.52**	<0.50	**2.92**	<0.50
alpha-BHC	319-84-6	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	---	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg	<0.50	**4.60**	<0.50	**26.8**	**1.72**
alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP24/0.3	TP25/SURFACE	TP25/0.3	TP26/SURFACE	TP26/0.5
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-041	ES1524150-042	ES1524150-043	ES1524150-044	ES1524150-045
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		<0.50	**1.05**	<0.50	**12.5**	**0.62**
Heptachlor epoxide	1024-57-3	0.5	µg/kg		<0.50	<0.50	<0.50	**3.98**	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		<0.25	**0.29**	<0.25	**2.91**	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		<0.25	**3.33**	<0.25	**25.8**	**1.13**
^ Total Chlordane (sum)	----	0.25	µg/kg		<0.25	**3.62**	<0.25	**28.7**	**1.13**
Oxychlordane	27304-13-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
2.4-DB	94-82-6	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
Dicamba	1918-00-9	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
Mecoprop	93-65-2	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
MCPA	94-74-6	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
2.4-DP	120-36-5	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
2.4-D	94-75-7	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
Triclopyr	55335-06-3	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
2.4.5-T	93-76-5	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
MCPB	94-81-5	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
Picloram	1918-02-1	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
Clopyralid	1702-17-6	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.04	<0.04	----	----	<0.04
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**93.8**	**101**	**104**	**100.0**	**99.1**
Toluene-D8	2037-26-5	0.2	%		**91.8**	**97.8**	**99.2**	**96.1**	**106**
4-Bromofluorobenzene	460-00-4	0.2	%		**92.1**	**101**	**101**	**97.9**	**114**
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		**76.4**	**70.2**	**80.2**	**68.1**	**85.9**
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**66.2**	**55.7**	**61.0**	**57.3**	**75.3**
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		**82.9**	**79.1**	----	----	**87.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP27/0.1	TP27/0.5	TP28/SURFACE	TP28/0.3	TP30/0.1
			Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-046	ES1524150-047	ES1524150-048	ES1524150-049	ES1524150-050
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	---	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	1.9	11.1	<1.0	4.5	2.2
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	----	Yes	----	No
Asbestos Type	1332-21-4	-	--	-	----	Am	----	-
Sample weight (dry)	----	0.01	g	65.1	---	82.0	----	70.6
APPROVED IDENTIFIER:	----	-	--	N.WEBB	----	N.WEBB	----	N.WEBB
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP27/0.1	TP27/0.5	TP28/SURFACE	TP28/0.3	TP30/0.1
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-046	ES1524150-047	ES1524150-048	ES1524150-049	ES1524150-050
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg		<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg		<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg		<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg		<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg		<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg		<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg		<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg		<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg		<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg		<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg		<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg		<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg		<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg		<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		**1.83**	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	---	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg		**44.0**	**0.78**	**63.1**	**0.96**	**22.9**
alpha-Endosulfan	959-98-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP27/0.1	TP27/0.5	TP28/SURFACE	TP28/0.3	TP30/0.1
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-046	ES1524150-047	ES1524150-048	ES1524150-049	ES1524150-050
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		**8.57**	**5.06**	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.5	µg/kg		**3.72**	**0.64**	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		**1.98**	<0.25	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		**24.5**	**1.88**	<0.25	<0.25	**0.47**
^ Total Chlordane (sum)	----	0.25	µg/kg		**26.5**	**1.88**	<0.25	<0.25	**0.47**
Oxychlordane	27304-13-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
2.4-DB	94-82-6	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
Dicamba	1918-00-9	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
Mecoprop	93-65-2	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
MCPA	94-74-6	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
2.4-DP	120-36-5	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
2.4-D	94-75-7	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
Triclopyr	55335-06-3	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
2.4.5-T	93-76-5	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
MCPB	94-81-5	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
Picloram	1918-02-1	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
Clopyralid	1702-17-6	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.04	----	<0.04	----	<0.04
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**107**	**101**	**112**	**99.7**	**97.1**
Toluene-D8	2037-26-5	0.2	%		**102**	**95.1**	**113**	**95.8**	**97.4**
4-Bromofluorobenzene	460-00-4	0.2	%		**102**	**96.0**	**109**	**92.6**	**95.5**
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		**69.8**	**77.3**	**67.6**	**69.0**	**70.5**
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**60.9**	**56.0**	**40.9**	**46.1**	**67.0**
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		**80.0**	----	**79.0**	----	**73.3**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP30/0.5	TP31/0.5	TP32/0.3	TP33/0.5	TP34/0.1
			Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit	ES1524150-051	ES1524150-052	ES1524150-053	ES1524150-054	ES1524150-055
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	---	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	7.9	9.6	7.8	6.3	2.4
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	No	----	No
Asbestos Type	1332-21-4	-	--	----	----	-	----	-
Sample weight (dry)	----	0.01	g	----	---	89.3	----	56.1
APPROVED IDENTIFIER:	----	-	--	----	----	N.WEBB	----	N.WEBB
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	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
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	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	<50
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
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP30/0.5	TP31/0.5	TP32/0.3	TP33/0.5	TP34/0.1
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-051	ES1524150-052	ES1524150-053	ES1524150-054	ES1524150-055
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		<10	<10	<10	<10	<10
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg		<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg		<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg		<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg		<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg		<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg		<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg		<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg		<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg		<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg		<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg		<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg		<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg		<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg		<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg		<10	<10	<10	<10	<10
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDD	72-54-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDE	72-55-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
4.4`-DDT	50-29-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Sum of DDD + DDE + DDT	----	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.5	µg/kg		**0.59**	**1.62**	**2.56**	<0.50	**4.97**
alpha-Endosulfan	959-98-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP30/0.5	TP31/0.5	TP32/0.3	TP33/0.5	TP34/0.1
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]	[12-Jun-2015]
Compound	CAS Number	LOR	Unit		ES1524150-051	ES1524150-052	ES1524150-053	ES1524150-054	ES1524150-055
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.5	µg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
2.4-DB	94-82-6	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
Dicamba	1918-00-9	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
Mecoprop	93-65-2	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
MCPA	94-74-6	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
2.4-DP	120-36-5	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
2.4-D	94-75-7	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
Triclopyr	55335-06-3	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
2.4.5-T	93-76-5	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
MCPB	94-81-5	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
Picloram	1918-02-1	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
Clopyralid	1702-17-6	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
Fluroxypyr	69377-81-7	0.02	mg/kg		----	<0.04	<0.04	<0.02	<0.04
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**92.0**	**97.9**	**97.3**	**98.9**	**101**
Toluene-D8	2037-26-5	0.2	%		**94.6**	**92.6**	**93.4**	**95.6**	**98.0**
4-Bromofluorobenzene	460-00-4	0.2	%		**90.4**	**94.1**	**95.7**	**94.0**	**98.4**
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		**70.4**	**89.6**	**74.6**	**71.2**	**68.2**
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**58.2**	**71.7**	**65.4**	**59.2**	**47.5**
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		----	**94.1**	**81.8**	**78.5**	**75.1**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	D4	D5	----	----	----
			Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	----	----	----
Compound	CAS Number	LOR	Unit	ES1524150-056	ES1524150-057	--------	--------	--------
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	----	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1	%	3.8	9.9	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	----	----
Sample weight (dry)	----	0.01	g	----	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	----	----	----
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 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	----	----	----
>C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	----	----	----
EP080: BTEXN								
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	----	----	----
^ 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	----	----	----
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	D4	D5	----	----	----
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	----	----	----
Compound	CAS Number	LOR	Unit		ES1524150-056	ES1524150-057	--------	--------	--------
					Result	Result	Result	Result	Result
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued									
Carbophenothion	786-19-6	10	µg/kg		----	----	----	----	----
Chlorfenvinphos (E)	18708-86-6	10	µg/kg		----	----	----	----	----
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg		----	----	----	----	----
Chlorpyrifos	2921-88-2	10	µg/kg		----	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg		----	----	----	----	----
Demeton-S-methyl	919-86-8	10	µg/kg		----	----	----	----	----
Diazinon	333-41-5	10	µg/kg		----	----	----	----	----
Dichlorvos	62-73-7	10	µg/kg		----	----	----	----	----
Dimethoate	60-51-5	10	µg/kg		----	----	----	----	----
Ethion	563-12-2	10	µg/kg		----	----	----	----	----
Fenamiphos	22224-92-6	10	µg/kg		----	----	----	----	----
Fenthion	55-38-9	10	µg/kg		----	----	----	----	----
Malathion	121-75-5	10	µg/kg		----	----	----	----	----
Azinphos Methyl	86-50-0	10	µg/kg		----	----	----	----	----
Monocrotophos	6923-22-4	10	µg/kg		----	----	----	----	----
Parathion	56-38-2	10	µg/kg		----	----	----	----	----
Parathion-methyl	298-00-0	10	µg/kg		----	----	----	----	----
Pirimphos-ethyl	23505-41-1	10	µg/kg		----	----	----	----	----
Prothiofos	34643-46-4	10	µg/kg		----	----	----	----	----
EP131A: Organochlorine Pesticides									
Aldrin	309-00-2	0.5	µg/kg		----	----	----	----	----
alpha-BHC	319-84-6	0.5	µg/kg		----	----	----	----	----
beta-BHC	319-85-7	0.5	µg/kg		----	----	----	----	----
delta-BHC	319-86-8	0.5	µg/kg		----	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/kg		----	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/kg		----	----	----	----	----
4.4`-DDT	50-29-3	0.5	µg/kg		----	----	----	----	----
^ Sum of DDD + DDE + DDT	----	0.5	µg/kg		----	----	----	----	----
Dieldrin	60-57-1	0.5	µg/kg		----	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/kg		----	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/kg		----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/kg		----	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.5	µg/kg		----	----	----	----	----
Endrin	72-20-8	0.5	µg/kg		----	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/kg		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	D4	D5	----	----	----
				Client sampling date / time	[12-Jun-2015]	[12-Jun-2015]	----	----	----
Compound	CAS Number	LOR	Unit		ES1524150-056	ES1524150-057	--------	--------	--------
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
Endrin ketone	53494-70-5	0.5	µg/kg		----	----	----	----	----
Heptachlor	76-44-8	0.5	µg/kg		----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/kg		----	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg		----	----	----	----	----
gamma-BHC	58-89-9	0.25	µg/kg		----	----	----	----	----
Methoxychlor	72-43-5	0.5	µg/kg		----	----	----	----	----
cis-Chlordane	5103-71-9	0.25	µg/kg		----	----	----	----	----
trans-Chlordane	5103-74-2	0.25	µg/kg		----	----	----	----	----
^ Total Chlordane (sum)	----	0.25	µg/kg		----	----	----	----	----
Oxychlordane	27304-13-8	0.5	µg/kg		----	----	----	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		----	----	----	----	----
2.4-DB	94-82-6	0.02	mg/kg		----	----	----	----	----
Dicamba	1918-00-9	0.02	mg/kg		----	----	----	----	----
Mecoprop	93-65-2	0.02	mg/kg		----	----	----	----	----
MCPA	94-74-6	0.02	mg/kg		----	----	----	----	----
2.4-DP	120-36-5	0.02	mg/kg		----	----	----	----	----
2.4-D	94-75-7	0.02	mg/kg		----	----	----	----	----
Triclopyr	55335-06-3	0.02	mg/kg		----	----	----	----	----
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		----	----	----	----	----
2.4.5-T	93-76-5	0.02	mg/kg		----	----	----	----	----
MCPB	94-81-5	0.02	mg/kg		----	----	----	----	----
Picloram	1918-02-1	0.02	mg/kg		----	----	----	----	----
Clopyralid	1702-17-6	0.02	mg/kg		----	----	----	----	----
Fluroxypyr	69377-81-7	0.02	mg/kg		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		106	103	----	----	----
Toluene-D8	2037-26-5	0.2	%		107	98.8	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		102	98.1	----	----	----
EP130S: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	10	%		----	----	----	----	----
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		----	----	----	----	----
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		----	----	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	TP22/0.1 - [12-Jun-2015]	Brown clay soil with red rocks and plenty of vegetation
EA200: Description	TP23/0.3 - [12-Jun-2015]	Brown clay soil with red rocks and plenty of vegetation
EA200: Description	TP24/0.1 - [12-Jun-2015]	Brown clay soil with red rocks and plenty of vegetation
EA200: Description	TP24/0.3 - [12-Jun-2015]	Brown-orange clay soil with brown rocks and plenty of vegetation
EA200: Description	TP25/SURFACE - [12-Jun-2015]	Dark brown clay soil with black rocks and plenty of vegetation
EA200: Description	TP25/0.3 - [12-Jun-2015]	Brown-orange clay soil with brown rocks and plenty of vegetation
EA200: Description	TP26/SURFACE - [12-Jun-2015]	Dark brown clay soil with black rocks and plenty of vegetation
EA200: Description	TP27/0.1 - [12-Jun-2015]	Dark brown clay soil with black rocks and plenty of vegetation
EA200: Description	TP28/SURFACE - [12-Jun-2015]	Dark brown clay soil with black rocks and plenty of vegetation plus two friable asbestos fibre bundles approximately 2 x 1 x 0.5mm
EA200: Description	TP30/0.1 - [12-Jun-2015]	Dark brown clay soil with black rocks and plenty of vegetation
EA200: Description	TP32/0.3 - [12-Jun-2015]	Brown-orange clay soil with red rocks and plenty of vegetation
EA200: Description	TP34/0.1 - [12-Jun-2015]	Brown-orange clay soil with red rocks and plenty of vegetation

QUALITY CONTROL REPORT

Work Order	: **ES1524150**	Page	: 1 of 26
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS JESSICA PAULSEN	Contact	: Jenny Bevan
Address	: PO BOX 36858 WINNELLIE NT, AUSTRALIA 0821	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jessica.paulsen@douglaspartners.com.au	E-mail	: jenny.bevan@alsglobal.com
Telephone	: +61 08 8948 6800	Telephone	: 07 3552 8657
Facsimile	: +61 08 89474455	Facsimile	: +61-2-8784 8500
Project	: 78156.01 HUMPTY DOO	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 120337	Date Samples Received	: 23-Jun-2015
C-O-C number	: ----	Date Analysis Commenced	: 24-Jun-2015
Sampler	: BEN SIPOS	Issue Date	: 30-Jun-2015
Site	: ----	No. of samples received	: 57
Quote number	: ----	No. of samples analysed	: 57

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos
Lana Nguyen	Senior LCMS Chemist	Sydney Organics
Phalak Inthakesone	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

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 (%)*
EA002 : pH (Soils) (QC Lot: 135891)									
ES1524150-001	TP01/0.1	EA002: pH Value	----	0.1	pH Unit	6.0	5.8	2.20	0% - 20%
ES1524481-002	Anonymous	EA002: pH Value	----	0.1	pH Unit	7.0	7.0	0.00	0% - 20%
EA055: Moisture Content (QC Lot: 135146)									
ES1524150-003	TP02/0.5	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	15.1	14.3	5.68	0% - 50%
ES1524150-014	TP10/0.1	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	4.7	4.5	4.33	No Limit
EA055: Moisture Content (QC Lot: 135147)									
ES1524150-023	TP16/0.1	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	6.4	6.6	2.74	No Limit
ES1524150-034	S2	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	1.3	1.2	0.00	No Limit
EA055: Moisture Content (QC Lot: 135148)									
ES1524150-043	TP25/0.3	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	8.7	9.5	8.48	No Limit
ES1524150-054	TP33/0.5	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	6.3	6.6	5.02	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 135059)									
ES1524150-001	TP01/0.1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1524150-011	TP08/0.3	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 135061)									
ES1524150-001	TP01/0.1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1524150-011	TP08/0.3	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 135062)									
ES1524150-021	TP14/0.3	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1524150-031	D1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 135068)									
ES1524150-041	TP24/0.3	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1524150-051	TP30/0.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 135160)									
ES1524150-021	TP14/0.3	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1524150-031	D1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit

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: 135196)									
ES1524150-041	TP24/0.3	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1524150-051	TP30/0.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 135059)									
ES1524150-001	TP01/0.1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.00	No Limit
ES1524150-011	TP08/0.3	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 135061)									
ES1524150-001	TP01/0.1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1524150-011	TP08/0.3	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 135062)									
ES1524150-021	TP14/0.3	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1524150-031	D1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 135068)									
ES1524150-041	TP24/0.3	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1524150-051	TP30/0.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 135160)									
ES1524150-021	TP14/0.3	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.00	No Limit
ES1524150-031	D1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 135196)									
ES1524150-041	TP24/0.3	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.00	No Limit
ES1524150-051	TP30/0.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 135061)									
ES1524150-001	TP01/0.1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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: 135061) - continued									
ES1524150-001	TP01/0.1	EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1524150-011	TP08/0.3	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 135062)									
ES1524150-021	TP14/0.3	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1524150-031	D1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 135068)									
ES1524150-041	TP24/0.3	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1524150-051	TP30/0.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 135068) - continued									
ES1524150-051	TP30/0.5	EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 135053)									
ES1524150-001	TP01/0.1	EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	<10.0	0.00	No Limit
		EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.00	No Limit
ES1524150-011	TP08/0.3	EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	<10.0	0.00	No Limit
		EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 135053) - continued									
ES1524150-011	TP08/0.3	EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.00	No Limit
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 135158)									
ES1524150-021	TP14/0.3	EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	<10.0	0.00	No Limit
		EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.00	No Limit
ES1524150-033	S1	EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	<10.0	0.00	No Limit
		EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 135158) - continued									
ES1524150-033	S1	EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.00	No Limit
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 135168)									
ES1524150-044	TP26/SURFACE	EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	<10.0	0.00	No Limit
		EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.00	No Limit
ES1524150-054	TP33/0.5	EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	<10.0	0.00	No Limit
		EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 135168) - continued									
ES1524150-054	TP33/0.5	EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.00	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.00	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 135052)									
ES1524150-001	TP01/0.1	EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Dieldrin	60-57-1	0.5	µg/kg	57.7	50.1	14.0	0% - 20%
		EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Sum of DDD + DDE + DDT	----	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
ES1524150-011	TP08/0.3	EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP131A: Organochlorine Pesticides (QC Lot: 135052) - continued									
ES1524150-011	TP08/0.3	EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Sum of DDD + DDE + DDT	----	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 135157)									
ES1524150-021	TP14/0.3	EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Sum of DDD + DDE + DDT	----	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
ES1524150-033	S1	EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP131A: Organochlorine Pesticides (QC Lot: 135157) - continued									
ES1524150-033	S1	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Sum of DDD + DDE + DDT	----	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 135169)									
ES1524150-044	TP26/SURFACE	EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	2.91	3.76	25.8	0% - 50%
		EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	28.7	34.2	17.3	0% - 20%
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	25.8	30.4	16.2	0% - 20%
		EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Aldrin	309-00-2	0.5	µg/kg	2.92	3.09	5.65	No Limit
		EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Dieldrin	60-57-1	0.5	µg/kg	26.8	28.3	5.33	0% - 20%
		EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP131A: Organochlorine Pesticides (QC Lot: 135169) - continued									
ES1524150-044	TP26/SURFACE	EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor	76-44-8	0.5	µg/kg	12.5	12.3	1.34	0% - 20%
		EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	3.98	4.33	8.44	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Sum of DDD + DDE + DDT	----	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
ES1524150-054	TP33/0.5	EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.00	No Limit
		EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
		EP131A: Sum of DDD + DDE + DDT	----	0.5	µg/kg	<0.50	<0.50	0.00	No Limit
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 135857)									
ES1524150-001	TP01/0.1	EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 135857) - continued									
ES1524150-001	TP01/0.1	EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
ES1524150-017	TP12/SURFACE	EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 135858)									
EM1511145-024	Anonymous	EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
ES1524150-041	TP24/0.3	EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 135858) - continued									
ES1524150-041	TP24/0.3	EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.04	<0.04	0.00	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.04	<0.04	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control 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: 135059)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	106	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	250 mg/kg	114	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	108	64	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 135061)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	95.0	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 135062)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	97.5	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 135068)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	93.4	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 135160)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	104	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	250 mg/kg	116	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	101	64	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 135196)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	102	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	250 mg/kg	118	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	106	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135059)								
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	118	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	200 mg/kg	95.2	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135061)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	95.9	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135062)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	97.4	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135068)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	93.8	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135160)								
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	118	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	200 mg/kg	104	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135196)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	104	70	130

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 Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135196) - continued								
EP071: >C16 - C34 Fraction	---	100	mg/kg	<100	350 mg/kg	118	74	138
EP071: >C34 - C40 Fraction	---	100	mg/kg	<100	200 mg/kg	97.4	63	131
EP080: BTEXN (QCLot: 135061)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	89.1	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	90.6	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	91.8	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	97.5	62	138
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	93.1	60	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	105	62	128
EP080: BTEXN (QCLot: 135062)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	87.8	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	86.5	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	90.4	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	87.4	62	138
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	93.3	60	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	98.1	62	128
EP080: BTEXN (QCLot: 135068)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	91.1	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	92.2	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	92.8	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	99.5	62	138
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	96.4	60	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	103	62	128
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 135053)								
EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	50 µg/kg	82.0	33	137
EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	50 µg/kg	73.3	45	139
EP130: Carbophenothion	786-19-6	10	µg/kg	<10	50 µg/kg	85.0	47	117
EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	5 µg/kg	58.0	48	156
EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	50 µg/kg	78.2	62	136
EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	50 µg/kg	86.2	57	137
EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	50 µg/kg	83.2	57	121
EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	50 µg/kg	86.4	20	142
EP130: Diazinon	333-41-5	10	µg/kg	<10	50 µg/kg	91.8	57	121
EP130: Dichlorvos	62-73-7	10	µg/kg	<10	50 µg/kg	99.6	47	115
EP130: Dimethoate	60-51-5	10	µg/kg	<10	50 µg/kg	72.9	55	133
EP130: Ethion	563-12-2	10	µg/kg	<10	50 µg/kg	85.3	54	130

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
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 135053) - continued								
EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	50 µg/kg	76.9	57	131
EP130: Fenthion	55-38-9	10	µg/kg	<10	50 µg/kg	98.5	38	130
EP130: Malathion	121-75-5	10	µg/kg	<10	50 µg/kg	79.9	62	138
EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	50 µg/kg	98.9	50	148
EP130: Parathion	56-38-2	10	µg/kg	<10	50 µg/kg	75.8	64	140
EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	50 µg/kg	84.3	56	136
EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	50 µg/kg	78.0	50	132
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	50 µg/kg	74.1	55	135
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 135158)								
EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	50 µg/kg	76.6	33	137
EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	50 µg/kg	82.4	45	139
EP130: Carbophenothion	786-19-6	10	µg/kg	<10	50 µg/kg	85.5	47	117
EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	5 µg/kg	62.1	48	156
EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	50 µg/kg	81.2	62	136
EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	50 µg/kg	84.1	57	137
EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	50 µg/kg	73.2	57	121
EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	50 µg/kg	69.6	20	142
EP130: Diazinon	333-41-5	10	µg/kg	<10	50 µg/kg	78.1	57	121
EP130: Dichlorvos	62-73-7	10	µg/kg	<10	50 µg/kg	70.5	47	115
EP130: Dimethoate	60-51-5	10	µg/kg	<10	50 µg/kg	78.0	55	133
EP130: Ethion	563-12-2	10	µg/kg	<10	50 µg/kg	85.6	54	130
EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	50 µg/kg	82.5	57	131
EP130: Fenthion	55-38-9	10	µg/kg	<10	50 µg/kg	70.3	38	130
EP130: Malathion	121-75-5	10	µg/kg	<10	50 µg/kg	73.2	62	138
EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	50 µg/kg	76.4	50	148
EP130: Parathion	56-38-2	10	µg/kg	<10	50 µg/kg	80.8	64	140
EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	50 µg/kg	92.0	56	136
EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	50 µg/kg	85.6	50	132
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	50 µg/kg	90.8	55	135
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 135168)								
EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	50 µg/kg	88.4	33	137
EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	50 µg/kg	73.1	45	139
EP130: Carbophenothion	786-19-6	10	µg/kg	<10	50 µg/kg	72.0	47	117
EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	5 µg/kg	67.8	48	156
EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	50 µg/kg	89.6	62	136
EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	50 µg/kg	71.7	57	137
EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	50 µg/kg	94.2	57	121
EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	50 µg/kg	83.2	20	142
EP130: Diazinon	333-41-5	10	µg/kg	<10	50 µg/kg	71.4	57	121

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
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 135168) - continued								
EP130: Dichlorvos	62-73-7	10	µg/kg	<10	50 µg/kg	71.4	47	115
EP130: Dimethoate	60-51-5	10	µg/kg	<10	50 µg/kg	84.8	55	133
EP130: Ethion	563-12-2	10	µg/kg	<10	50 µg/kg	75.4	54	130
EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	50 µg/kg	86.6	57	131
EP130: Fenthion	55-38-9	10	µg/kg	<10	50 µg/kg	80.0	38	130
EP130: Malathion	121-75-5	10	µg/kg	<10	50 µg/kg	76.3	62	138
EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	50 µg/kg	91.6	50	148
EP130: Parathion	56-38-2	10	µg/kg	<10	50 µg/kg	72.4	64	140
EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	50 µg/kg	77.0	56	136
EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	50 µg/kg	72.8	50	132
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	50 µg/kg	74.6	55	135
EP131A: Organochlorine Pesticides (QCLot: 135052)								
EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	56.5	26	150
EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	64.0	35	129
EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	68.8	23	163
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	91.0	38	150
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	54.3	18	156
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	66.3	38	140
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	56.7	31	152
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	62.6	32	152
EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	5 µg/kg	53.1	36	142
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	76.6	37	151
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	93.7	30	140
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	63.9	36	162
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	54.9	26	166
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	58.5	20	116
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	57.4	13	151
EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	5 µg/kg	56.8	31	159
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	62.1	39	173
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	57.5	34	148
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	52.3	26	152
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	91.0	36	160
EP131A: Sum of DDD + DDE + DDT	----	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	----	----
EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	5 µg/kg	58.7	30	138
EP131A: Organochlorine Pesticides (QCLot: 135157)								
EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	49.6	26	150
EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	46.5	35	129

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
EP131A: Organochlorine Pesticides (QCLot: 135157) - continued								
EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	52.2	23	163
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	120	38	150
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	44.2	18	156
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	49.6	38	140
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	68.5	31	152
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	42.2	32	152
EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	5 µg/kg	63.0	36	142
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	81.0	37	151
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	66.9	30	140
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	40.4	36	162
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	64.1	26	166
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	41.9	20	116
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	39.5	13	151
EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	5 µg/kg	38.8	31	159
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	47.8	39	173
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	45.0	34	148
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	41.1	26	152
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	46.9	36	160
EP131A: Sum of DDD + DDE + DDT	----	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	----	----
EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	5 µg/kg	56.2	30	138
EP131A: Organochlorine Pesticides (QCLot: 135169)								
EP131A: 4.4`-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	54.0	26	150
EP131A: 4.4`-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	50.2	35	129
EP131A: 4.4`-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	57.6	23	163
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	54.5	38	150
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	54.2	18	156
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	54.3	38	140
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	58.6	31	152
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	56.4	32	152
EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	5 µg/kg	56.8	36	142
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	57.2	37	151
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	84.0	30	140
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	61.1	36	162
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	49.3	26	166
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	51.7	20	116
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	54.6	13	151

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
EP131A: Organochlorine Pesticides (QCLot: 135169) - continued								
EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	5 µg/kg	52.2	31	159
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	57.6	39	173
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	62.0	34	148
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	60.5	26	152
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	102	36	160
EP131A: Sum of DDD + DDE + DDT	----	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	----	----
EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	5 µg/kg	61.3	30	138
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 135857)								
EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	0.1 mg/kg	74.5	57	142
EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	0.1 mg/kg	78.1	41	135
EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	0.1 mg/kg	78.9	69	139
EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	0.1 mg/kg	102	46	144
EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	0.1 mg/kg	86.8	50	141
EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	0.1 mg/kg	88.7	54	136
EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	0.1 mg/kg	90.7	49	149
EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	0.1 mg/kg	75.3	52	146
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	0.1 mg/kg	88.8	53	145
EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	0.1 mg/kg	87.8	57	143
EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	0.1 mg/kg	107	39	147
EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	0.1 mg/kg	93.3	60	140
EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	0.1 mg/kg	71.6	49	138
EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	0.1 mg/kg	79.1	51	145
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 135858)								
EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	0.1 mg/kg	109	57	142
EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	0.1 mg/kg	104	41	135
EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	0.1 mg/kg	113	69	139
EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	0.1 mg/kg	106	46	144
EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	0.1 mg/kg	107	50	141
EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	0.1 mg/kg	106	54	136
EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	0.1 mg/kg	106	49	149
EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	0.1 mg/kg	103	52	146
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	0.1 mg/kg	107	53	145
EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	0.1 mg/kg	104	57	143
EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	0.1 mg/kg	110	39	147
EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	0.1 mg/kg	106	60	140
EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	0.1 mg/kg	81.1	49	138
EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	0.1 mg/kg	109	51	145

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: 135059)							
ES1524150-001	TP01/0.1	EP071: C10 - C14 Fraction	----	523 mg/kg	101	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	104	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	123	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 135061)							
ES1524150-001	TP01/0.1	EP080: C6 - C9 Fraction	----	32.5 mg/kg	122	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 135062)							
ES1524150-021	TP14/0.3	EP080: C6 - C9 Fraction	----	32.5 mg/kg	99.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 135068)							
ES1524150-041	TP24/0.3	EP080: C6 - C9 Fraction	----	32.5 mg/kg	108	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 135160)							
ES1524150-021	TP14/0.3	EP071: C10 - C14 Fraction	----	523 mg/kg	110	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	104	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	125	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 135196)							
ES1524150-041	TP24/0.3	EP071: C10 - C14 Fraction	----	523 mg/kg	100	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	104	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	124	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135059)							
ES1524150-001	TP01/0.1	EP071: >C10 - C16 Fraction	>C10_C16	860 mg/kg	97.4	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	113	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	114	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135061)							
ES1524150-001	TP01/0.1	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	120	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135062)							
ES1524150-021	TP14/0.3	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	98.0	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135068)							
ES1524150-041	TP24/0.3	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	107	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 135160)							
ES1524150-021	TP14/0.3	EP071: >C10 - C16 Fraction	>C10_C16	860 mg/kg	97.0	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	115	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	113	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 Fractions (QCLot: 135196)							
ES1524150-041	TP24/0.3	EP071: >C10 - C16 Fraction	>C10_C16	860 mg/kg	91.2	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	122	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	108	52	132
EP080: BTEXN (QCLot: 135061)							
ES1524150-001	TP01/0.1	EP080: Benzene	71-43-2	2.5 mg/kg	92.1	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	98.2	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	96.0	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	96.1	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	98.2	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	102	70	130
EP080: BTEXN (QCLot: 135062)							
ES1524150-021	TP14/0.3	EP080: Benzene	71-43-2	2.5 mg/kg	90.5	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	88.2	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	87.6	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	84.0	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	97.1	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	87.9	70	130
EP080: BTEXN (QCLot: 135068)							
ES1524150-041	TP24/0.3	EP080: Benzene	71-43-2	2.5 mg/kg	83.9	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	92.3	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	91.2	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	83.1	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	95.7	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	94.6	70	130
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 135053)							
ES1524150-001	TP01/0.1	EP130: Azinphos Methyl	86-50-0	50 µg/kg	71.0	24	132
		EP130: Bromophos-ethyl	4824-78-6	50 µg/kg	73.0	36	144
		EP130: Carbophenothion	786-19-6	50 µg/kg	71.9	38	120
		EP130: Chlorfenvinphos (E)	18708-86-6	5 µg/kg	95.2	49	157
		EP130: Chlorfenvinphos (Z)	18708-87-7	50 µg/kg	78.4	53	145
		EP130: Chlorpyrifos	2921-88-2	50 µg/kg	75.2	60	140
		EP130: Chlorpyrifos-methyl	5598-13-0	50 µg/kg	72.7	56	126
		EP130: Demeton-S-methyl	919-86-8	50 µg/kg	86.8	10	148
		EP130: Diazinon	333-41-5	50 µg/kg	70.9	60	122
		EP130: Dichlorvos	62-73-7	50 µg/kg	70.1	33	123

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
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 135053) - continued							
ES1524150-001	TP01/0.1	EP130: Dimethoate	60-51-5	50 µg/kg	90.5	36	142
		EP130: Ethion	563-12-2	50 µg/kg	77.3	48	136
		EP130: Fenamiphos	22224-92-6	50 µg/kg	80.9	42	136
		EP130: Fenthion	55-38-9	50 µg/kg	71.5	35	131
		EP130: Malathion	121-75-5	50 µg/kg	89.5	55	141
		EP130: Monocrotophos	6923-22-4	50 µg/kg	79.3	35	153
		EP130: Parathion	56-38-2	50 µg/kg	71.5	57	147
		EP130: Parathion-methyl	298-00-0	50 µg/kg	82.1	48	140
		EP130: Pirimphos-ethyl	23505-41-1	50 µg/kg	71.8	45	137
		EP130: Prothiofos	34643-46-4	50 µg/kg	76.9	51	137
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 135158)							
ES1524150-021	TP14/0.3	EP130: Azinphos Methyl	86-50-0	50 µg/kg	94.4	24	132
		EP130: Bromophos-ethyl	4824-78-6	50 µg/kg	86.7	36	144
		EP130: Carbophenothion	786-19-6	50 µg/kg	98.1	38	120
		EP130: Chlorfenvinphos (E)	18708-86-6	5 µg/kg	102	49	157
		EP130: Chlorfenvinphos (Z)	18708-87-7	50 µg/kg	90.7	53	145
		EP130: Chlorpyrifos	2921-88-2	50 µg/kg	84.6	60	140
		EP130: Chlorpyrifos-methyl	5598-13-0	50 µg/kg	84.1	56	126
		EP130: Demeton-S-methyl	919-86-8	50 µg/kg	76.7	10	148
		EP130: Diazinon	333-41-5	50 µg/kg	84.2	60	122
		EP130: Dichlorvos	62-73-7	50 µg/kg	89.8	33	123
		EP130: Dimethoate	60-51-5	50 µg/kg	83.2	36	142
		EP130: Ethion	563-12-2	50 µg/kg	94.7	48	136
		EP130: Fenamiphos	22224-92-6	50 µg/kg	93.1	42	136
		EP130: Fenthion	55-38-9	50 µg/kg	75.3	35	131
		EP130: Malathion	121-75-5	50 µg/kg	95.0	55	141
		EP130: Monocrotophos	6923-22-4	50 µg/kg	76.2	35	153
		EP130: Parathion	56-38-2	50 µg/kg	73.2	57	147
		EP130: Parathion-methyl	298-00-0	50 µg/kg	74.9	48	140
		EP130: Pirimphos-ethyl	23505-41-1	50 µg/kg	98.4	45	137
		EP130: Prothiofos	34643-46-4	50 µg/kg	91.4	51	137
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 135168)							
ES1524150-044	TP26/SURFACE	EP130: Azinphos Methyl	86-50-0	50 µg/kg	74.5	24	132
		EP130: Bromophos-ethyl	4824-78-6	50 µg/kg	82.4	36	144
		EP130: Carbophenothion	786-19-6	50 µg/kg	76.2	38	120
		EP130: Chlorfenvinphos (E)	18708-86-6	5 µg/kg	85.5	49	157
		EP130: Chlorfenvinphos (Z)	18708-87-7	50 µg/kg	90.1	53	145
		EP130: Chlorpyrifos	2921-88-2	50 µg/kg	85.9	60	140
		EP130: Chlorpyrifos-methyl	5598-13-0	50 µg/kg	84.4	56	126

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
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 135168) - continued							
ES1524150-044	TP26/SURFACE	EP130: Demeton-S-methyl	919-86-8	50 µg/kg	90.4	10	148
		EP130: Diazinon	333-41-5	50 µg/kg	77.5	60	122
		EP130: Dichlorvos	62-73-7	50 µg/kg	70.5	33	123
		EP130: Dimethoate	60-51-5	50 µg/kg	74.6	36	142
		EP130: Ethion	563-12-2	50 µg/kg	94.4	48	136
		EP130: Fenamiphos	22224-92-6	50 µg/kg	94.5	42	136
		EP130: Fenthion	55-38-9	50 µg/kg	72.9	35	131
		EP130: Malathion	121-75-5	50 µg/kg	89.4	55	141
		EP130: Monocrotophos	6923-22-4	50 µg/kg	72.2	35	153
		EP130: Parathion	56-38-2	50 µg/kg	70.8	57	147
		EP130: Parathion-methyl	298-00-0	50 µg/kg	87.7	48	140
		EP130: Pirimphos-ethyl	23505-41-1	50 µg/kg	87.8	45	137
		EP130: Prothiofos	34643-46-4	50 µg/kg	87.1	51	137
EP131A: Organochlorine Pesticides (QCLot: 135052)							
ES1524150-001	TP01/0.1	EP131A: 4.4`-DDD	72-54-8	5 µg/kg	45.8	26	150
		EP131A: 4.4`-DDE	72-55-9	5 µg/kg	50.8	31	125
		EP131A: 4.4`-DDT	50-29-3	5 µg/kg	77.8	23	163
		EP131A: Aldrin	309-00-2	5 µg/kg	40.6	23	153
		EP131A: alpha-BHC	319-84-6	5 µg/kg	36.9	18	156
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	38.2	29	135
		EP131A: beta-BHC	319-85-7	5 µg/kg	72.0	25	153
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	50.8	23	141
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	41.2	27	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	47.0	25	147
		EP131A: Dieldrin	60-57-1	5 µg/kg	# Not Determined	30	140
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	54.5	16	156
		EP131A: Endrin	72-20-8	5 µg/kg	82.5	18	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	51.2	20	116
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	43.1	13	151
		EP131A: gamma-BHC	58-89-9	5 µg/kg	56.9	22	158
		EP131A: Heptachlor	76-44-8	5 µg/kg	39.6	24	170
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	42.2	28	140
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	37.5	18	144
		EP131A: Methoxychlor	72-43-5	5 µg/kg	60.4	24	158
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	50.0	30	138
EP131A: Organochlorine Pesticides (QCLot: 135157)							
ES1524150-021	TP14/0.3	EP131A: 4.4`-DDD	72-54-8	5 µg/kg	73.1	26	150
		EP131A: 4.4`-DDE	72-55-9	5 µg/kg	50.2	31	125

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
EP131A: Organochlorine Pesticides (QCLot: 135157) - continued							
ES1524150-021	TP14/0.3	EP131A: 4.4`-DDT	50-29-3	5 µg/kg	63.9	23	163
		EP131A: Aldrin	309-00-2	5 µg/kg	58.6	23	153
		EP131A: alpha-BHC	319-84-6	5 µg/kg	58.5	18	156
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	63.6	29	135
		EP131A: beta-BHC	319-85-7	5 µg/kg	55.7	25	153
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	58.5	23	141
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	60.9	27	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	59.0	25	147
		EP131A: Dieldrin	60-57-1	5 µg/kg	117	30	140
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	53.6	16	156
		EP131A: Endrin	72-20-8	5 µg/kg	102	18	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	48.1	20	116
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	55.9	13	151
		EP131A: gamma-BHC	58-89-9	5 µg/kg	55.7	22	158
		EP131A: Heptachlor	76-44-8	5 µg/kg	52.3	24	170
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	68.1	28	140
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	51.0	18	144
		EP131A: Methoxychlor	72-43-5	5 µg/kg	75.5	24	158
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	66.9	30	138
EP131A: Organochlorine Pesticides (QCLot: 135169)							
ES1524150-044	TP26/SURFACE	EP131A: 4.4`-DDD	72-54-8	5 µg/kg	62.9	26	150
		EP131A: 4.4`-DDE	72-55-9	5 µg/kg	66.6	31	125
		EP131A: 4.4`-DDT	50-29-3	5 µg/kg	57.0	23	163
		EP131A: Aldrin	309-00-2	5 µg/kg	57.2	23	153
		EP131A: alpha-BHC	319-84-6	5 µg/kg	51.1	18	156
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	55.3	29	135
		EP131A: beta-BHC	319-85-7	5 µg/kg	49.2	25	153
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	82.1	23	141
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	80.0	27	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	60.8	25	147
		EP131A: Dieldrin	60-57-1	5 µg/kg	# Not Determined	30	140
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	72.8	16	156
		EP131A: Endrin	72-20-8	5 µg/kg	56.6	18	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	58.8	20	116
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	71.3	13	151
		EP131A: gamma-BHC	58-89-9	5 µg/kg	52.4	22	158
		EP131A: Heptachlor	76-44-8	5 µg/kg	79.2	24	170
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	64.4	28	140

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
EP131A: Organochlorine Pesticides (QCLot: 135169) - continued							
ES1524150-044	TP26/SURFACE	EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	51.3	18	144
		EP131A: Methoxychlor	72-43-5	5 µg/kg	98.5	24	158
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	# Not Determined	30	138
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 135857)							
ES1524150-001	TP01/0.1	EP202: 2.4.5-T	93-76-5	0.1 mg/kg	76.0	57	142
		EP202: 2.4-D	94-75-7	0.1 mg/kg	72.9	68	139
		EP202: Clopyralid	1702-17-6	0.1 mg/kg	# 31.1	49	149
		EP202: MCPA	94-74-6	0.1 mg/kg	75.6	57	143
		EP202: Mecoprop	93-65-2	0.1 mg/kg	60.3	60	140
		EP202: Picloram	1918-02-1	0.1 mg/kg	67.4	49	138
		EP202: Triclopyr	55335-06-3	0.1 mg/kg	80.1	51	145
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 135858)							
EM1511145-024	Anonymous	EP202: 2.4.5-T	93-76-5	0.1 mg/kg	101	57	142
		EP202: 2.4-D	94-75-7	0.1 mg/kg	94.3	68	139
		EP202: Clopyralid	1702-17-6	0.1 mg/kg	69.4	49	149
		EP202: MCPA	94-74-6	0.1 mg/kg	77.1	57	143
		EP202: Mecoprop	93-65-2	0.1 mg/kg	76.8	60	140
		EP202: Picloram	1918-02-1	0.1 mg/kg	76.4	49	138
		EP202: Triclopyr	55335-06-3	0.1 mg/kg	113	51	145

QA/QC Compliance Assessment for DQO Reporting

Work Order	: **ES1524150**	Page	: 1 of 10
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS JESSICA PAULSEN	Telephone	: 07 3552 8657
Project	: 78156.01 HUMPTY DOO	Date Samples Received	: 23-Jun-2015
Site	: ----	Issue Date	: 30-Jun-2015
Sampler	: BEN SIPOS	No. of samples received	: 57
Order number	: 120337	No. of samples analysed	: 57

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP131A: Organochlorine Pesticides	ES1524150--001	TP01/0.1	**Dieldrin**	60-57-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP131A: Organochlorine Pesticides	ES1524150--044	TP26/SURFACE	**Dieldrin**	60-57-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP131A: Organochlorine Pesticides	ES1524150--044	TP26/SURFACE	**trans-Chlordane**	5103-74-2	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP202A: Phenoxyacetic Acid Herbicides by LCMS	ES1524150--001	TP01/0.1	**Clopyralid**	1702-17-6	31.1 %	49-149%	**Recovery less than lower data quality objective**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)						
Soil Glass Jar - Unpreserved						
TP01/0.1, TP10/0.1	25-Jun-2015	18-Jun-2015	**7**	----	----	----
Soil Glass Jar - Unpreserved						
TP15/0.45, TP20/0.1, TP29/0.3, TP22/0.1, TP26/0.5	25-Jun-2015	19-Jun-2015	**6**	----	----	----

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **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

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
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
TP01/0.1, TP10/0.1	**11-Jun-2015**	**25-Jun-2015**	18-Jun-2015	×	**25-Jun-2015**	25-Jun-2015	✓
Soil Glass Jar - Unpreserved (EA002)							
TP15/0.45, TP20/0.1, TP29/0.3, TP22/0.1, TP26/0.5	**12-Jun-2015**	**25-Jun-2015**	19-Jun-2015	×	**25-Jun-2015**	25-Jun-2015	✓
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
TP01/0.1, TP02/0.3, TP02/0.5, TP03/0.3, TP04/0.5, TP05/0.25, TP05/0.5, TP06/0.1, TP07/SURFACE, TP07/0.5, TP08/0.3, TP09/0.3, TP09/0.5, TP10/0.1, TP11/SURFACE, D1, D2	**11-Jun-2015**	**----**	----	----	**24-Jun-2015**	25-Jun-2015	✓
Soil Glass Jar - Unpreserved (EA055-103)							
TP11/0.3, TP12/SURFACE, TP12/0.5, TP13/0.3, TP14/0.1, TP14/0.3, TP15/0.45, TP16/0.1, TP16/0.45, TP17/0.1, TP18/SURFACE, TP19/0.1, TP20/0.1, TP21/0.1, TP21/0.3, S1, S2, TP29/0.1, TP29/0.3, D7, TP22/0.1, TP23/0.3, TP24/0.1, TP24/0.3, TP25/SURFACE, D4, TP25/0.3, TP26/SURFACE, TP26/0.5, TP27/0.1, TP27/0.5, TP28/SURFACE, TP28/0.3, TP30/0.1, TP30/0.5, TP31/0.5, TP32/0.3, TP33/0.5, TP34/0.1, D5	**12-Jun-2015**	**----**	----	----	**24-Jun-2015**	26-Jun-2015	✓

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
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Snap Lock Bag - Subsampled by ALS (EA200)								
TP22/0.1,	TP23/0.3,	**12-Jun-2015**	**----**	----	----	**29-Jun-2015**	09-Dec-2015	✓
TP24/0.1,	TP24/0.3,							
TP25/SURFACE,	TP25/0.3,							
TP26/SURFACE,	TP27/0.1,							
TP28/SURFACE,	TP30/0.1,							
TP32/0.3,	TP34/0.1							
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP071)								
D1,	D2	**11-Jun-2015**	**24-Jun-2015**	25-Jun-2015	✓	**25-Jun-2015**	03-Aug-2015	✓
Soil Glass Jar - Unpreserved (EP071)								
TP01/0.1,	TP02/0.3,	**11-Jun-2015**	**24-Jun-2015**	25-Jun-2015	✓	**26-Jun-2015**	03-Aug-2015	✓
TP02/0.5,	TP03/0.3,							
TP04/0.5,	TP05/0.25,							
TP05/0.5,	TP06/0.1,							
TP07/SURFACE,	TP07/0.5,							
TP08/0.3,	TP09/0.3,							
TP09/0.5,	TP10/0.1,							
TP11/SURFACE								
Soil Glass Jar - Unpreserved (EP071)								
TP14/0.3,	TP15/0.45,	**12-Jun-2015**	**24-Jun-2015**	26-Jun-2015	✓	**25-Jun-2015**	03-Aug-2015	✓
TP16/0.1,	TP16/0.45,							
TP17/0.1,	TP18/SURFACE,							
TP19/0.1,	TP20/0.1,							
TP21/0.1,	TP21/0.3,							
S1,	S2,							
TP29/0.1,	TP29/0.3,							
D7,	TP22/0.1,							
TP23/0.3,	TP24/0.1							
Soil Glass Jar - Unpreserved (EP071)								
TP11/0.3,	TP12/SURFACE,	**12-Jun-2015**	**24-Jun-2015**	26-Jun-2015	✓	**26-Jun-2015**	03-Aug-2015	✓
TP12/0.5,	TP13/0.3,							
TP14/0.1,	TP24/0.3,							
TP25/SURFACE,	TP25/0.3,							
TP26/SURFACE,	TP26/0.5,							
TP27/0.1,	TP27/0.5,							
TP28/SURFACE,	TP28/0.3,							
TP30/0.1,	TP30/0.5,							
TP31/0.5,	TP32/0.3,							
TP33/0.5,	TP34/0.1,							
D4,	D5							

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
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
TP01/0.1, TP02/0.3, TP02/0.5, TP03/0.3, TP04/0.5, TP05/0.25, TP05/0.5, TP06/0.1, TP07/SURFACE, TP07/0.5, TP08/0.3, TP09/0.3, TP09/0.5, TP10/0.1, TP11/SURFACE, D1, D2	**11-Jun-2015**	**24-Jun-2015**	25-Jun-2015	✓	**25-Jun-2015**	25-Jun-2015	✓
Soil Glass Jar - Unpreserved (EP080)							
TP11/0.3, TP12/SURFACE, TP12/0.5, TP13/0.3, TP14/0.1, TP14/0.3, TP15/0.45, TP16/0.1, TP16/0.45, TP17/0.1, TP18/SURFACE, TP19/0.1, TP20/0.1, TP21/0.1, TP21/0.3, S1, S2, TP29/0.1, TP29/0.3, D7, TP22/0.1, TP23/0.3, TP24/0.1	**12-Jun-2015**	**24-Jun-2015**	26-Jun-2015	✓	**25-Jun-2015**	26-Jun-2015	✓
Soil Glass Jar - Unpreserved (EP080)							
TP24/0.3, TP25/SURFACE, TP25/0.3, TP26/SURFACE, TP26/0.5, TP27/0.1, TP27/0.5, TP28/SURFACE, TP28/0.3, TP30/0.1, TP30/0.5, TP31/0.5, TP32/0.3, TP33/0.5, TP34/0.1, D4, D5	**12-Jun-2015**	**24-Jun-2015**	26-Jun-2015	✓	**26-Jun-2015**	26-Jun-2015	✓

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
EP130A: Organophosphorus Pesticides (Ultra-trace)							
Soil Glass Jar - Unpreserved (EP130)							
TP01/0.1, TP02/0.3, TP02/0.5, TP03/0.3, TP04/0.5, TP05/0.25, TP05/0.5, TP06/0.1, TP07/SURFACE, TP07/0.5, TP08/0.3, TP09/0.3, TP09/0.5, TP10/0.1, TP11/SURFACE	**11-Jun-2015**	**24-Jun-2015**	25-Jun-2015	✓	**26-Jun-2015**	03-Aug-2015	✓
Soil Glass Jar - Unpreserved (EP130)							
TP11/0.3, TP12/SURFACE, TP12/0.5, TP13/0.3, TP14/0.1, TP26/SURFACE, TP26/0.5, TP27/0.1, TP27/0.5, TP28/SURFACE, TP28/0.3, TP30/0.1, TP30/0.5, TP31/0.5, TP32/0.3, TP33/0.5, TP34/0.1	**12-Jun-2015**	**24-Jun-2015**	26-Jun-2015	✓	**26-Jun-2015**	03-Aug-2015	✓
Soil Glass Jar - Unpreserved (EP130)							
TP14/0.3, TP15/0.45, TP16/0.1, TP16/0.45, TP17/0.1, TP18/SURFACE, TP19/0.1, TP20/0.1, TP21/0.1, TP21/0.3, S1, S2, TP29/0.1, TP29/0.3, TP22/0.1, TP23/0.3, TP24/0.1, TP24/0.3, TP25/SURFACE, TP25/0.3	**12-Jun-2015**	**24-Jun-2015**	26-Jun-2015	✓	**29-Jun-2015**	03-Aug-2015	✓

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
EP131A: Organochlorine Pesticides							
Soil Glass Jar - Unpreserved (EP131A)							
TP01/0.1, TP02/0.3, TP02/0.5, TP03/0.3, TP04/0.5, TP05/0.25, TP05/0.5, TP06/0.1, TP07/SURFACE, TP07/0.5, TP08/0.3, TP09/0.3, TP09/0.5, TP10/0.1, TP11/SURFACE	**11-Jun-2015**	**24-Jun-2015**	25-Jun-2015	✓	**26-Jun-2015**	03-Aug-2015	✓
Soil Glass Jar - Unpreserved (EP131A)							
TP11/0.3, TP12/SURFACE, TP12/0.5, TP13/0.3, TP14/0.1, TP26/SURFACE, TP26/0.5, TP27/0.1, TP27/0.5, TP28/SURFACE, TP28/0.3, TP30/0.1, TP30/0.5, TP31/0.5, TP32/0.3, TP33/0.5, TP34/0.1	**12-Jun-2015**	**24-Jun-2015**	26-Jun-2015	✓	**26-Jun-2015**	03-Aug-2015	✓
Soil Glass Jar - Unpreserved (EP131A)							
TP14/0.3, TP15/0.45, TP16/0.1, TP16/0.45, TP17/0.1, TP18/SURFACE, TP19/0.1, TP20/0.1, TP21/0.1, TP21/0.3, S1, S2, TP29/0.1, TP29/0.3, TP22/0.1, TP23/0.3, TP24/0.1, TP24/0.3, TP25/SURFACE, TP25/0.3	**12-Jun-2015**	**24-Jun-2015**	26-Jun-2015	✓	**29-Jun-2015**	03-Aug-2015	✓

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
EP202A: Phenoxyacetic Acid Herbicides by LCMS							
Soil Glass Jar - Unpreserved (EP202)							
TP01/0.1, TP02/0.5, TP03/0.3, TP05/0.5, TP06/0.1, TP07/0.5, TP08/0.3, TP09/0.5, TP10/0.1	**11-Jun-2015**	**25-Jun-2015**	25-Jun-2015	✓	**26-Jun-2015**	04-Aug-2015	✓
Soil Glass Jar - Unpreserved (EP202)							
TP11/0.3, TP12/SURFACE, TP13/0.3, TP14/0.1, TP15/0.45, TP16/0.1, TP17/0.1, TP18/SURFACE, TP19/0.1, TP20/0.1, TP21/0.1	**12-Jun-2015**	**25-Jun-2015**	26-Jun-2015	✓	**26-Jun-2015**	04-Aug-2015	✓
Soil Glass Jar - Unpreserved (EP202)							
S1, S2, TP29/0.1, TP22/0.1, TP23/0.3, TP24/0.3, TP25/SURFACE, TP26/0.5, TP27/0.1, TP28/SURFACE, TP30/0.1, TP31/0.5, TP32/0.3, TP33/0.5, TP34/0.1	**12-Jun-2015**	**26-Jun-2015**	26-Jun-2015	✓	**26-Jun-2015**	05-Aug-2015	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	2	15	**13.33**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	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
pH (1:5)	EA002	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Moisture Content	EA055-103	SOIL	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
TRH - 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 - C40.
TRH 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.
Organophosphorus Pesticides (Ultra-trace)	EP130	SOIL	USEPA Method 3640 (GPC cleanup), 8141 (GC/FPD - Capillary Column) This technique is compliant with NEPM (2013) Schedule B(3) (Method 505)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (2013) Schedule B(3) (Method 504)
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	SOIL	In-House, LCMS (Electrospray in negative mode). Residues of acid herbicides are extracted from soil samples under the alkaline condition. An aliquot of the alkaline aqueous phase is taken and acidified before a SPE cleanup. After eluting off from the SPE cartridge, residues of acid herbicides are dissolved in HPLC mobile phase prior to instrument analysis.

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	ORG17	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1524150**

Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS JESSICA PAULSEN	Contact	: Jenny Bevan
Address	: PO BOX 36858 WINNELLIE NT, AUSTRALIA 0821	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: jessica.paulsen@douglaspartners.com.au	E-mail	: jenny.bevan@alsglobal.com
Telephone	: +61 08 8948 6800	Telephone	: 07 3552 8657
Facsimile	: +61 08 89474455	Facsimile	: +61-2-8784 8500
Project	: 78156.01 HUMPTY DOO	Page	: 1 of 4
Order number	: 120337	Quote number	: EB2014DOUPAR0262 (EN/020/14)
C-O-C number	: ----	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
Sampler	: BEN SIPOS		

Dates

Date Samples Received	: 23-Jun-2015	Issue Date	: 24-Jun-2015
Client Requested Due Date	: 30-Jun-2015	Scheduled Reporting Date	: **30-Jun-2015**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 3	Temperature	: 25.7 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 57 / 57

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
- **TPH and PH will be reported on the scheduled due date of 30/06/15, Ultra trace OCP& OPP/EP202 analysis will be reported on 06/07/15**
- **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).**
- **Asbestos analysis will be conducted by ALS Newcastle.**
- Sample D3 and D8 sent to Envirolab 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.
- **EA200: As only one sample container was submitted for multiple tests, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly.**

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

Method / Client sample ID	Sample Container Received	Preferred Sample Container for Analysis
Asbestos Identification in Soils : EA200		
TP22/0.1	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP23/0.3	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP24/0.1	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP24/0.3	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP25/SURFACE	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP25/0.3	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP26/SURFACE	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP27/0.1	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP28/SURFACE	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP30/0.1	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP32/0.3	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag
TP34/0.1	- Snap Lock Bag - Subsampled by ALS	- Snap Lock Bag - ACM/Asbestos Grab Sample bag

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA002 pH (1:5)	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EP202(solids) Phenoxyacetic acids	SOIL - TPH only TRH (C6 - C40)	SOIL - UTO-1S Ultratrace OP / OC Pesticides
ES1524150-001	[11-Jun-2015]	TP01/0.1	✓	✓		✓	✓	✓
ES1524150-002	[11-Jun-2015]	TP02/0.3		✓			✓	✓
ES1524150-003	[11-Jun-2015]	TP02/0.5		✓		✓	✓	✓
ES1524150-004	[11-Jun-2015]	TP03/0.3		✓		✓	✓	✓
ES1524150-005	[11-Jun-2015]	TP04/0.5		✓			✓	✓
ES1524150-006	[11-Jun-2015]	TP05/0.25		✓			✓	✓
ES1524150-007	[11-Jun-2015]	TP05/0.5		✓		✓	✓	✓
ES1524150-008	[11-Jun-2015]	TP06/0.1		✓		✓	✓	✓
ES1524150-009	[11-Jun-2015]	TP07/SURFACE		✓			✓	✓
ES1524150-010	[11-Jun-2015]	TP07/0.5		✓		✓	✓	✓
ES1524150-011	[11-Jun-2015]	TP08/0.3		✓		✓	✓	✓
ES1524150-012	[11-Jun-2015]	TP09/0.3		✓			✓	✓
ES1524150-013	[11-Jun-2015]	TP09/0.5		✓		✓	✓	✓
ES1524150-014	[11-Jun-2015]	TP10/0.1	✓	✓		✓	✓	✓
ES1524150-015	[11-Jun-2015]	TP11/SURFACE		✓			✓	✓

			SOIL - EA002 pH (1:5)	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EP202(solids) Phenoxyacetic acids	SOIL - TPH only TRH (C6 - C40)	SOIL - UTO-1S Ultratrace OP / OC Pesticides
ES1524150-016	[12-Jun-2015]	TP11/0.3		✓		✓	✓	✓
ES1524150-017	[12-Jun-2015]	TP12/SURFACE		✓		✓	✓	✓
ES1524150-018	[12-Jun-2015]	TP12/0.5		✓			✓	✓
ES1524150-019	[12-Jun-2015]	TP13/0.3		✓		✓	✓	✓
ES1524150-020	[12-Jun-2015]	TP14/0.1		✓		✓	✓	✓
ES1524150-021	[12-Jun-2015]	TP14/0.3		✓			✓	✓
ES1524150-022	[12-Jun-2015]	TP15/0.45	✓	✓		✓	✓	✓
ES1524150-023	[12-Jun-2015]	TP16/0.1		✓		✓	✓	✓
ES1524150-024	[12-Jun-2015]	TP16/0.45		✓			✓	✓
ES1524150-025	[12-Jun-2015]	TP17/0.1		✓		✓	✓	✓
ES1524150-026	[12-Jun-2015]	TP18/SURFACE		✓		✓	✓	✓
ES1524150-027	[12-Jun-2015]	TP19/0.1		✓		✓	✓	✓
ES1524150-028	[12-Jun-2015]	TP20/0.1	✓	✓		✓	✓	✓
ES1524150-029	[12-Jun-2015]	TP21/0.1		✓		✓	✓	✓
ES1524150-030	[12-Jun-2015]	TP21/0.3		✓			✓	✓
ES1524150-031	[11-Jun-2015]	D1		✓			✓	
ES1524150-032	[11-Jun-2015]	D2		✓			✓	
ES1524150-033	[12-Jun-2015]	S1		✓		✓	✓	✓
ES1524150-034	[12-Jun-2015]	S2		✓		✓	✓	✓
ES1524150-035	[12-Jun-2015]	TP29/0.1		✓		✓	✓	✓
ES1524150-036	[12-Jun-2015]	TP29/0.3	✓	✓			✓	✓
ES1524150-037	[12-Jun-2015]	D7		✓			✓	
ES1524150-038	[12-Jun-2015]	TP22/0.1	✓	✓	✓	✓	✓	✓
ES1524150-039	[12-Jun-2015]	TP23/0.3		✓	✓	✓	✓	✓
ES1524150-040	[12-Jun-2015]	TP24/0.1		✓	✓		✓	✓
ES1524150-041	[12-Jun-2015]	TP24/0.3		✓	✓	✓	✓	✓
ES1524150-042	[12-Jun-2015]	TP25/SURFACE		✓	✓	✓	✓	✓
ES1524150-043	[12-Jun-2015]	TP25/0.3		✓	✓		✓	✓
ES1524150-044	[12-Jun-2015]	TP26/SURFACE		✓	✓		✓	✓
ES1524150-045	[12-Jun-2015]	TP26/0.5	✓	✓		✓	✓	✓
ES1524150-046	[12-Jun-2015]	TP27/0.1		✓	✓	✓	✓	✓
ES1524150-047	[12-Jun-2015]	TP27/0.5		✓			✓	✓
ES1524150-048	[12-Jun-2015]	TP28/SURFACE		✓	✓	✓	✓	✓
ES1524150-049	[12-Jun-2015]	TP28/0.3		✓			✓	✓
ES1524150-050	[12-Jun-2015]	TP30/0.1		✓	✓	✓	✓	✓
ES1524150-051	[12-Jun-2015]	TP30/0.5		✓			✓	✓
ES1524150-052	[12-Jun-2015]	TP31/0.5		✓		✓	✓	✓
ES1524150-053	[12-Jun-2015]	TP32/0.3		✓	✓	✓	✓	✓
ES1524150-054	[12-Jun-2015]	TP33/0.5		✓		✓	✓	✓
ES1524150-055	[12-Jun-2015]	TP34/0.1		✓	✓	✓	✓	✓
ES1524150-056	[12-Jun-2015]	D4		✓			✓	

			SOIL - EA002 pH (1:5)	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EP202(solids) Phenoxyacetic acids	SOIL - TPH only TRH (C6 - C40)	SOIL - UTO-1S Ultratrace OP / OC Pesticides
ES1524150-057	[12-Jun-2015]	D5		✓			✓	

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received		Instructions Received	
				Date	Evaluation	Date	Evaluation
EA002: pH (1:5)							
TP01/0.1	Soil Glass Jar - Unpreserved	18-Jun-2015	18-Jun-2015	23-Jun-2015	×	----	----
TP10/0.1	Soil Glass Jar - Unpreserved	18-Jun-2015	18-Jun-2015	23-Jun-2015	×	----	----
TP15/0.45	Soil Glass Jar - Unpreserved	19-Jun-2015	19-Jun-2015	23-Jun-2015	×	----	----
TP20/0.1	Soil Glass Jar - Unpreserved	19-Jun-2015	19-Jun-2015	23-Jun-2015	×	----	----
TP22/0.1	Soil Glass Jar - Unpreserved	19-Jun-2015	19-Jun-2015	23-Jun-2015	×	----	----
TP26/0.5	Soil Glass Jar - Unpreserved	19-Jun-2015	19-Jun-2015	23-Jun-2015	×	----	----
TP29/0.3	Soil Glass Jar - Unpreserved	19-Jun-2015	19-Jun-2015	23-Jun-2015	×	----	----

Requested Deliverables

JESSICA PAULSEN

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

DATA QUALITY ASSESSMENT

Q1. Data Quality Objectives

The Environmental Site Investigation (ESI) with Limited Sampling was prepared with reference to the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC, 2013). The DQO process is outlined as follows:

(1) State the Problem

The site is proposed to be subdivided into two zones for future residential subdivision, these being a single dwelling (SD) zone and a multiple dwelling (MD) zone. The preliminary conceptual site model (CSM) identified a number of potential contaminant sources and potential complete source-pathway-receptor linkages (refer Report Section 8). The problem to be addressed is whether any complete contamination source-pathway-receptor linkages exist at the site and whether remediation and/or management is required to break those linkages.

The objective of the DSI was to characterise the nature of contamination, if any, which could present a risk under the proposed land use/development. This has been done through addressing the source-pathway-receptor linkages identified in the CSM with respect to their potential impact on the suitability of the site, from a contamination perspective, for the proposed development.

The site is within the Local Government Area (LGA) of Litchfield Council. The regulatory authority is the Northern Territory Environment Protection Authority (NTEPA). The Douglas Partners (DP) project team included Jessica Paulsen (Project Manager) and Ben Sipos (Geotechnical Engineer / Site Supervisor).

The fieldwork for the DSI was constrained by budget (with reference to DP's proposal), and physical access to current building footprints and due to underground and overhead services.

(2) Identify the Decision/Goal of the Study

Based on the CSM it is considered that the contaminants of potential concern are pesticides, herbicides, insecticides, petroleum hydrocarbons and asbestos and the potentially affected media are soil, groundwater and soil vapour. The assessment of soil and groundwater is used to screen the potential for contamination to be present in soil vapour. As such, the analysis focused primarily on these contaminants in soil.

The soil analytical data was compared to health and ecological investigation and screening levels for a residential land use with minimal soil access, as discussed in Report Section 12. The suitability of the site for the proposed development was assessed through the comparison of individual results and, where relevant, the 95% UCL of the mean concentrations.

Other decisions that were addressed by the ESI are as follows:

- What is the updated CSM when incorporating the additional data obtained through the ESI (Report Section 14);

- Is the field and laboratory data sufficient to address the objectives of the ESI (Report Section Appendix C)?
- Are additional investigations required to address the ESI objectives, or to determine the need for remediation and/ or management to render the site suitable for the proposed development (Report Section 15)?
- Are there any off-site migration issues that need to be considered further (Report Section 15)?
- Does contamination at the site trigger the Duty to Report requirements under the CLM Act 1997 (Report Section 15)?
- Is the data sufficient to enable the preparation of a Remediation Action Plan (RAP) and/or Environmental Management Plan (EMP) should the data suggest these are required?

(3) Identify Information Inputs

Inputs into the decisions were as follows:

- The preliminary CSM which identified potential contaminant sources, contaminant migration pathways and receptors to site contaminants;
- The results of previous investigations undertaken at the site as discussed in Report Section 3;
- Site and regional geology, topography and hydrogeology;
- Site observations during the fieldwork for the ESI;
- The lithology of the site as described in the field logs;
- Field and laboratory methods and QA/QC data to assess the suitability of the environmental data;
- Analytical results for the contaminants of potential concern (COPC) on soil samples; and
- Assessment of the analytical data against the SAC discussed in Report Section 12.

(4) Define the Study Boundaries

The site is identified as Lot 3 Freds Pass Road, Humpty Doo, NT, covers an area of 8.11ha and has lateral boundaries as shown on Drawing 1, Appendix A.

The vertical boundary of the ESI is the vertical extent of the test pits, being to a maximum of 1.0 m below ground level (bgl). Soil samples were recovered to a maximum depth of 0.5 m bgl. The potential for soil contaminants below this depth is considered to be low as there are no identified deep contaminant sources and there is a generally low risk of contaminant migration (refer to CSM, Report Section 7).

(5) Develop the Analytical Approach (or decision rule)

The decision rules used in addressing the objective of the DSI were as follows:

- The adopted SAC were the NTEPA endorsed criteria as discussed in Report Section 12. Where such criteria are not available, the laboratory reporting limits and/or other recognised national or international standards were used as screening criteria, as discussed in Report Section 12;

- Laboratory test results for soil samples were assessed individually against the adopted SAC (or statistically, if considered appropriate, to determine the 95% upper confidence level (UCL) of the mean concentration for each analyte or analyte group (of like materials));
- Exceedance of the SAC or screening criteria triggered a review of the potential risks to human health and the environment, and were a potential unacceptable risk was identified, a recommendation has been made for additional targeted investigation, remediation and/ or management (refer Report Section 15);
- The QA/QC results were evaluated with respect to the specific limits (their acceptable range, where applicable) as outlined in Sections Q3 and Q4; and
- The usability of the field and laboratory test results were evaluated against the Data Quality Indicators (DQIs) discussed in Section Q2.

(6) Specify the Performance or Acceptable Criteria

Decision errors for the respective COPC are:

- Deciding that the analyte concentration exceeds the SAC when it truly does not;
- Deciding that the analyte concentration is within the SAC when it truly is not;
- Deciding that the site requires remediation when it truly does not; and
- Deciding that the site is suitable for the proposed land use when it truly is not.

Decision errors were minimised by the following:

- Comparison of analytical concentrations with those reported in previous investigations for like media (where available);
- Systematic soil sample numbers comply with those recommended in the Australian Standard AS 4482.1-2005;
- The sampling regime targeted each stratum identified as being potentially impacted by the CSM to account for site variability;
- Sample collection and handling techniques were in accordance with standard industry practice, (refer Report Section 9);
- The analyte selection was based on the CSM. The potential for contaminants other than those analysed was considered to be low;
- Samples were prepared and analysed by NATA-accredited laboratories, with NATA endorsed testing procedures;
- The analytical data was assessed by DP for usability and reliability (refer Section Q5);
- The SAC were adopted from established and NTEPA endorsed guidelines, which have risk probabilities already incorporated;
- Use of statistical analysis to characterise the significance of minor detected exceedances of the SAC. A significance level of 0.05 was adopted for data with statistical analysis of 95% UCL of average concentrations; and

- Use of risk-based decision making, including development of a CSM, when determining the need for remediation or management of contamination.

(7) Optimise the design for obtaining data

The sampling design and procedures that were implemented to optimise data collection for achieving the DQOs comprised the following:

- The investigation was undertaken by appropriately trained and experienced environmental and geotechnical scientists / engineers;
- The sampling method adopted enabled collection of representative samples;
- NATA accredited laboratories using NATA endorsed methods were used to perform laboratory analysis;
- More soil samples were collected than required for laboratory analysis; and
- Samples not initially chosen for analysis were held under appropriate storage conditions pending results of initial analysis to allow laboratory analysis on additional samples if required to further characterise or delineate initial results.

Q2. Data Quality Indicators

The reliability of field procedures and analytical results were assessed against the following data quality indicators (DQIs):

- Completeness – a measure of the amount of usable data from a data collection activity;
- Comparability – the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness – the confidence (qualitative) of data representativeness of media present on-site;
- Precision – a measure of variability or reproducibility of data; and
- Accuracy – a measure of closeness of the data to the 'true' value.

The DQIs were assessed as outlined in the following table.

DQI	Considerations with reference to NEPC (2013) Schedule B2	Comment
Completeness		
Field Considerations	Critical locations sampled	Samples were taken from target locations determined in the proposal and CSM, and from systematic locations for site coverage.
	Samples collected (from grid and at depth)	Systematic soil sampling complied with the EPA sampling guidelines; potentially impacted media (soil) was sampled.
	Standard operating procedures (SOPs) appropriate and complied with	Field staff followed SOPs, and discussed further in Report Sections 2 and 9
	Experienced sampler	DP geotechnical engineer, Ben Sipos was the site supervisor, with two years' experience. The project manager, Jessica Paulsen, with eight years' experience, instructed the site supervisor.
	Documentation correct	The DP site supervisor completed a safe work method statement (SWMS), chain of custody and test pit logs. The project manager reviewed the documentation.
Laboratory Considerations	Critical samples analysed according to the Proposal	The proposal was followed in the selection of samples for analysis. Samples of media initially considered to be potentially impacted by COPC were analysed. Any variation to the proposal was recorded in the report.
	Analytes analysed according to Proposal	The analytes were selected on the basis of the COPC as outlined in the proposal. Any variation has been recorded in the report.
	Appropriate methods and PQLs/LOR	NATA approved methods were adopted by the selected analytical laboratories. Any non-NATA methods were recorded and the implications discussed in Report Section 11. Limits of reporting (LORs) and practical quantitation limits (PQLs) in accordance with the method have been used by the contract laboratories.
	Sample documentation complete	Chain-of-custody (CoC) maintained and appended to the Certificates of Analysis(s). Certificates of Analysis complete and appended to the report.
	Sample holding times complied with	All samples were analysed within the holding times, as discussed in Section Q4.3. The implications of analysis outside the holding times are discussed in the same section.
Comparability		
Field Considerations	Same SOPs used on each occasion	Field staff followed the same SOPs for each day of sampling as defined in the Proposal.
	Climatic conditions	Field staff recorded the weather at the time of sampling and reported in Report Section 10.
	Same types of samples collected	Soil samples were collected using hand tools and were placed in laboratory supplied jars.
Laboratory Considerations	Sample analytical methods used	Laboratories used are accredited by NATA for the analyses undertaken. Laboratory analytical methods were the same for each sample, for the same analyte, in the same laboratory, and are as stated on the

DQI	Considerations with reference to NEPC (2013) Schedule B2	Comment
		Certificates of Analysis. Analytical methods are generally the same or similar between NATA accredited laboratories.
	Sample PQLs / LORs	PQL or LOR set by the laboratories are generally below the adopted SAC. Any differences in PQLs between laboratories is negated by the PQLs being generally significantly lower than the SAC. Where this is not the case, and where there are implications on the results, these are discussed in Report Section 13.
	Same laboratories	Australian Laboratory Services Pty Ltd (ALS) was used for primary sample analysis. Envirolab Services Pty Ltd (ELS) was used for inter-laboratory replicate sample analysis. The reliability of the data provided by both laboratories is discussed in Section Q4.
	Same units	Laboratory results are expressed in consistent units for each media / analyte.
Representativeness		
Field Considerations	Appropriate media sampled according to Proposal	Appropriate media were sampled with reference to the Proposal. This included media considered to be potentially impacted by the COPC such as soil.
	Media identified in Proposal sampled	Media identified as requiring investigation in the Proposal were sampled.
Laboratory Considerations	Samples analysed according to Proposal	Samples were analysed according to Proposal, and as stipulated in the COC.
Precision		
Field Considerations	SOPs appropriate and complied with	Field staff followed SOPs as defined in the Proposal. SOPs specific for contamination investigation purposes.
Laboratory Considerations	Analysis of laboratory duplicates	Refer to Section Q4.5. The majority of duplicate results were within the laboratory acceptance standards. The relevance of those outside the standards are discussed in the same section.
	Field duplicates	The analysis included 10% intra-laboratory and 4% inter-laboratory replicates prepared in the field. The majority of RPDs were within acceptable limits, as discussed in Section Q3.5. The relevance of those outside the limits are discussed in the same section.
Accuracy (bias)		
Field Considerations	SOPs appropriate and complied with	Field staff followed SOPs as defined in the Proposal. SOPs specific for contamination investigation purposes.
	Analysis of laboratory control samples	Refer to Section Q4.9. The LCS were generally within laboratory acceptance standards.

Q3. FIELD QUALITY ASSURANCE AND QUALITY CONTROL

The field QC procedures for sampling as prescribed in the DP *Field Procedures Manual* were followed at all times during the investigation.

Q3.1 Sampling Team and Weather Conditions

Field sampling was undertaken by a DP Geotechnical Engineer; Ben Sipos. Site works were undertaken between 11 and 12 June 2015. Ben Sipos was instructed by the Project Manager regarding the sampling methods to be adopted.

Climatic or weather conditions are not considered to have impeded or significantly impacted the investigation.

Q3.2 Sample Collection

Soil

Soil samples were collected from excavator bucket returns. Further details of the excavation and sampling methodology are presented in Report Section 2. The QA/QC samples collected during the course of soil sampling comprised the following:

- 5 intra-laboratory replicates (10% of soil samples analysed), exceeding the target of 5%; and
- 2 inter-laboratory replicates (4% of soil samples analysed), which did not reach the target not of 5%;
- Overall replicates (14% of the soil samples analysed), exceeding the target of 10%.

Q3.3 Logs and Field Sheets

Logs for each soil sampling location were recorded in the field. The individual samples were recorded on the field logs along with the sample identity, depth, replicate sample locations, and observations. Logs are presented in Appendix B.

Q3.4 Chain of Custody

Chain of custody information was recorded on the Chain-of-Custody (COC) sheets which accompanied samples to the analytical laboratory. Signed copies of COCs are presented in Appendix C, following the laboratory certificates of analysis.

The COC documented, *inter alia*, the analytical laboratory, dispatch courier, DP dispatcher, date, time, sample identifications, sample type and date and analysis to be performed on each sample.

Q3.5 Field Replicates

Replicate samples were collected in the field as a measure of accuracy, precision and repeatability of the results.

Field replicate samples for soil were collected from the same location and an identical depth to the primary sample. Equal portions of the subject material were placed into the primary and replicate sampling jars and sealed. The sample was not homogenised so as to minimise the possible loss of volatiles. Replicate samples were labelled with a DP identification number, recorded on DP's field logs, so as to conceal their relationship to their primary sample from the analytical laboratory.

A measure of the consistency of results is derived by the calculation of relative percentage differences (RPDs) for replicate samples. A RPD of +/- 30% is generally considered acceptable for inorganic analytes by the industry, although in general a wider RPD range (50%) may be acceptable for organic analytes. RPDs above the generally acceptable limits (if applicable) are shown in **bold** on the relevant tables below.

Q3.5.1 Intra-Laboratory Analysis

Intra-laboratory replicates were analysed as an internal check of the reproducibility within the primary laboratory ALS and as a measure of consistency of sampling techniques. The comparative results of analysis between original and intra-laboratory replicate samples are summarised in Table Q1.

Note that, where both samples are below LOR/PQL the difference and RPD has been given as zero. Where one sample is reported below LOR/PQL, but a concentration is reported for the other, the LOR/PQL value has been used for calculation of the RPD for the less than LOR/PQL sample.

Table C1 in Appendix C presents the results. Overall, five intra-laboratory replicates (D1, D2, D4, D5 and D7) and their primary samples did not detect TRH above the laboratory LOR, equating to no difference in results and RPD values of 0%.

The calculated RPD values were within the acceptable range. Overall, the intra-laboratory replicate comparisons indicate that the sampling techniques were generally consistent and repeatable.

Q3.5.2 Inter-Laboratory Analysis

Inter-laboratory replicates were conducted as a check of the reproducibility of results between the primary laboratory ALS and the secondary laboratory ELS and as a measure of consistency of sampling techniques.

The comparative results of analysis between original and inter-laboratory replicate samples are summarised below.

Note that, where both samples are below LOR/PQL the difference and RPD has been given as zero. Where one sample is reported below LOR/PQL, but a concentration is reported for the other, the LOR/PQL value has been used for calculation of the RPD for the less than LOR/PQL sample.

Table C1 in Appendix C presents the results. Overall, two inter-laboratory replicates (D3 and D8) and their primary samples did not detect TRH above the laboratory LOR, equating to no difference in results and RPD values of 0%.

The calculated RPD values were within the acceptable range of ± 50% for organics. The overall inter-laboratory replicate comparisons indicate that the sampling technique was generally consistent and repeatable and the two laboratory sampling handling and analytical methods are comparable.

Q4. LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Q4.1 Chain of Custody

Chain-of-custody procedures are discussed in Section Q3.4.

Q4.2 Analytical Laboratories

Samples were submitted to the following laboratories for analysis:

- Primary Laboratory: Australian Laboratory Services (ALS)
- Secondary Laboratory: Envirolab Services (ELS)

The laboratories are both NATA accredited for the analysis undertaken. ALS's accreditation number is 825 and it is accredited for compliance with ISO/IEC 17025. ELS's NATA accreditation number is 2901 and it is accredited for compliance with ISO/IEC 17025.

It is noted, however, that some of the test methods adopted are not NATA accredited. Where no NATA accredited method exists standard international analytical methods were adopted.

Q4.3 Holding Times

A review of the laboratory certificates of analysis and chain-of-custody documentation indicated that holding times were met.

Q4.4 Analytical Methods

The laboratory analytical methods are provided on the laboratory certificates of analysis in Appendix C, along with the PQL/LOR.

Q4.5 Laboratory Replicate Results

Laboratory replicates are additional portions of a sample which are analysed in the same manner as the other samples. Laboratory replicate samples were generally analysed at a rate of 1 for every 10 samples in a batch. The laboratory acceptance criteria for replicate samples for both laboratories is as follows:

Table Q1 Laboratory Replicate Acceptance Criteria

Laboratory	PQL / LOR Range	Acceptance Criteria

ALS	<5 x PQL	Any RPD
	>5 x PQL	0 – 50%
ELS	<10 x PQL	Any RPD
	10-20 x PQL	0 – 50%
	>20 x PQL	0 – 30%

The laboratory QC for laboratory replicate results, were generally within the acceptance criteria for both laboratories.

Q4.6 Laboratory Blank (Reagent Blank) Results

The laboratory blank, sometimes referred to as the method blank or reagent blank is the sample prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus. This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, it can be determined by processing solvents and reagents in the same manner as for samples. Laboratory blanks are generally analysed at a frequency of 1 in 20, with a minimum of one per batch.

All results should be less than the method PQL or LOR. The report results for the method blanks were generally within the acceptance criteria for both laboratories.

Q4.7 Matrix Spike

The matrix spike is a sample replicate prepared by adding a known amount of analyte prior to analysis, and then treated exactly the same as all other samples. The recovery result indicates the proportion of the known concentration of the analyte that is detected during analysis. The laboratory acceptance criteria for matrix spike recoveries for both laboratories is as follows:

Table Q2 Laboratory Matrix Spike Acceptance Criteria

Laboratory	Analyte(s)	Accepted Recoveries
ALS	Inorganics / metals	70 – 130%
	organics	60 – 140%
	SVOC and speciated phenols	10 – 140%
ELS	Inorganics / organics	70 – 130%

The laboratory QC for matrix spikes were generally within the acceptance criteria for both laboratories.

Q4.8 Surrogate Spike

The surrogate spike sample is prepared by adding a known amount of surrogate, which behaves similarly to the analyte, prior to analysis of each sample. The recovery result indicates the proportion of the known concentration of the surrogate that is detected during analysis. The laboratory acceptance criteria for surrogate spike recoveries for both laboratories is as follows:

Table Q3 Laboratory Surrogate Spike Acceptance Criteria

Laboratory	Analyte(s)	Accepted Recoveries
ALS	Inorganics / metals	70 – 130%
	organics	60 – 140%
	SVOC and speciated phenols	10 – 140%
ELS	Inorganics / organics	50 – 150%
	Phenols	20 – 130%

The laboratory QC for surrogate spikes were generally within the acceptance criteria for both laboratories.

Q4.9 Reference / Laboratory Control Sample (LCS)

This sample comprises spiking either a standard reference material or a control matrix (such as a blank of sand or water) with a known concentration of specific analytes. The LCS is then analysed and results compared against each other to determine how the laboratory has performed with regard to sample preparation and analytical procedure. LCSs are generally analysed at a frequency of 1 in 20, with a minimum of one analysed per batch.

The laboratory acceptance criteria for LCS recoveries for both laboratories is as follows:

Table Q4 Laboratory LCS Acceptance Criteria

Laboratory	Analyte(s)	Accepted Recoveries
ALS	Inorganics / metals	70 – 130%
	organics	60 – 140%
	SVOC and speciated phenols	10 – 140%
ELS	Inorganics / organics	70 – 130%

The laboratory QC for LCSs were generally within the acceptance criteria for both laboratories.

Q5. QA/QC DATA EVALUATION

An evaluation of field and laboratory QA/QC information against the stated DQOs has been undertaken. Overall, the SOPs were generally complied with in the field, and the laboratory quality control samples were generally within the laboratory acceptance criteria. The QC non-conformances, where they occurred, are not considered to have significantly impacted the quality of the results overall as they were generally minor in number compared to the overall QC data. On this basis, it is considered that an acceptable level of laboratory precision and consistency was achieved and that the laboratory data sets are reliable and useable for this assessment.

Appendix D

Table D1: Summary Details of Site Groundwater Bores

									66.5 m - 80 m: Do
RN007082	45	84.7	-39.7	Abandoned*	9/6/1970	Water Supply	0 m to 84.7 m: Casing / Void **	Rotary	0 m - 3.7 m: Tops 3.7 m - 59.4 m: C 59.4 m – 76.2 m: clay, some slate 76.2 m – 76.8 m:
RN009500	45	60.7	-15.7	Unknown	5/1/1979	Water Supply	0 m to 60.7 m: Casing / Void **	Cable Tool	0 m - 0.9 m: Tops 0.9 m - 3.4 m: Iro 3.4 m - 59.2 m: C 59.2 m - 60.7 m:
RN022694	43	67	-24	Unknown	-	Water Supply	0 m to 61 m: Steel Casing 61 m to 67 m: Screen	Rotary	0 m - 2 m: Topsoi 2 m - 54 m: Clay, 54 m - 64 m: Clay 64 m - 72 m: Dolo
RN033150	42	48	-6	Unknown	26/1/2008	Water Supply	0 m to 36 m: Steel/PVC Casing 36 m to 42 m: Screen 42 m to 48: Sump (?)	Rotary	0 m - 1 m: Topsoi 1 m - 9 m: Soil, re 9 m - 15 m: Sands 15 m - 27 m: San 27 m - 36 m: San 36 m - 48 m: San
RN020894	44	78	-34	Unknown	1/4/1981	Water Supply	0 m to 74 m: Steel Casing 74 m to 78: Screen	Unknown	0 m - 74 m: Clay, 74 m - 78 m: Qua hard dolomite
RN027440	42	64.5	-22.5	Unknown	6/10/1990	Water Supply	0 m to 62 m: Casing 62 m to 64.5: Screen	Rotary	0 m - 4 m: Ironsto 4 m - 11 m: Clay, 11 m - 41 m: Silts 41 m - 61.8 m: Cl 61.8 m - 62 m: Ro 62.8 m - 64.5 m:
RN036988	42	74.5	-32.5	Unknown	21/1/2010	Water Supply	0 m to 73 m: Casing 73 m to 74.5 m: Screen?	Rotary	0 m - 1 m: Topsoi 1 m - 5 m: Laterite 5 m - 55 m: Clays 55 m - 62 m: Dolo
RN029626	42	77.5	-35.5	Unknown	30/5/1994	Water Supply	0 m to 77.5 m: Casing / Void **	Rotary	0 m - 2 m: Topsoi 2 m - 4 m: Laterite 4 m - 73 m: Clays 73 m - 77.5 m: Qu
RN026040	44	80	-36	Unknown	4/12/1987	Water Supply	0 m to 75 m: Assumed Casing 75 m to 80 m: Assumed Screen?	Rotary	-
RN036455	41	83	-42	Unknown	4/12/2008	Water Supply	0 m to 78 m: Assumed Casing 78 m to 81 m: Screen	Rotary	0 m - 1 m: Topsoi 1 m - 60 m: Lateri 4 m - 78 m: Clays 78 m - 83 m: Dolo
RN020269	42	10.2	31.8	Unknown	-	Water Supply	0 m to 10.2 m: Assumed Screen	Unknown	-
RN008860	41	60	-19	Unknown	26/8/1976	Water Supply	0 m to 75 m: Casing 75 m to 85 m: Screen	Rotary	0 m - 66.5 m: Clay 66.5 m - 69 m: Sa 69 m - 85 m: Dolo
RN020268	43	13	30	Unknown	-	Water Supply	0 m to 13 m: Assumed Screen	Unknown	-
RN020267	42	15	27	Unknown	-	Water Supply	0 m to 15 m: Assumed Screen	Unknown	-
RN026981	41	70	-29	Unknown	1990-05-05	Water Supply	0 m to 70 m: Casing / Void **	Rotary	0 m - 5 m: Topsoi 5 m - 57 m: Clay (57 m - 57.5 m: Ro 57.5 m - 61.5 m: I 61.5 m - 66 m: Cl
RN036981	38	67	-29	Unknown	2009-11-30	Water Supply	0 m to 59.5 m: Assumed Casing 57.5 m to 59.5 m: Assumed Screen	Rotary	0 m - 3 m: Topsoi 3 m - 5 m: Laterite 5 m - 56 m: Clays 56 m - 57 m: Dolo
RN008702	46	57	-11	Unknown	1975-09-21	Water Supply	0 m to 61 m: Assumed Casing 61 m to 74.5 m: Assumed Screen	Unknown	0 m - 0.7 m: Soil 0.7 m - 29.9 m: C 29.9 m - 39.6 m: S 39.6 m - 67.1 m: C 67.1 m - 74.7 m: C
RN009550	45	55	-10	Unknown	3/3/1979	Water Supply	0 m to 52 m: Steel Casing 52 m to 55 m: Screen	Rotary	0 m - 48 m: Clay, 48 m - 52 m: Qua 52 m - 55 m: Dolo

n provided by the client indicates the well is still active
ssumed to be incorrect