Appendix H

Waste Classification Letter

AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

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Commercial-in-Confidence

To Whom It May Concern

Subject to Legal and Professional Privilege
Waste Classification Letter - Block 6, Section 97, Charnwood, ACT

Introduction

AECOM Australia Pty Ltd (AECOM) was engaged by Justice and Community Safety Directorate (JACSD) to validate tank pull works at the former Fire Station site ('the Site') located at Block 6, Section 97, Charnwood, ACT. The works includes removal of Underground Storage Tanks (USTs) located at the Site. This Waste Classification Letter has been prepared to classify 110 m^3 of waste soil generated during excavation activities and is proposed for off-site disposal to a suitably licensed waste facility.

Objective

The objective of this letter was to classify the soil cuttings for off-site disposal in accordance with *ACT Environmental Standards (2000): Assessment and Classification of Liquid and Non-Liquid Wastes.*

Scope of Works

The scope of works comprised:

- Collection of soil samples to represent the 110 m^3 soil derived from the tank pull works.
- Analysis of 11 soil samples (SP01 to SP11) by a NATA accredited laboratory for the following contaminants of potential concern (CoPC):
    - Total petroleum hydrocarbons (TPH);
    - Total heavy metals;
    - Monocyclic aromatic hydrocarbons;
    - Oxygenated compounds, sulfonated compounds, fumigants;
    - Halogenated aliphatic/aromatic compounds;
    - Trihalomethanes;
    - Phenolic compounds;
    - Polynuclear aromatic hydrocarbons (PAHs);
    - Volatile halogenated compounds (VHCs);
    - Benzene, toluene, ethylbenzene, xylene and napthalene (BTEXN).
- Comparison of soil concentrations of the CoPC against ACT Environmental Standards (2000): Assessment and Classification of Liquid and Non-Liquid Wastes criteria; and
- Preparation of this waste classification letter.

Sampling Methodology

Soil samples were collected directly from a decontaminated hand auger or push tube liner by hand protected by disposable nitrile gloves. Soil samples were assessed for the presence of olfactory indicators of contamination (staining or odour).

Soil samples were immediately placed in an esky chilled with ice and were transported to the laboratory for analysis under chain of custody conditions.

Quality Assurance and Quality Control

During the course of the field program inter-laboratory and intra-laboratory duplicate soil samples, rinsate blanks and trip blanks were collected in accordance with the projects data quality objectives (DQOs).

AECOM

An assessment of these DQOs will be undertaken under a separate cover.

Summary of Results

The concentrations of the analytes tested met the *Solid Waste* classification under the ACT Environmental Standards (2000): Assessment and Classification of Liquid and Non-Liquid Wastes criteria.

The laboratory certificates are presented in **Attachment 1.**

Closure

Should you require further information please do not hesitate to contact Phil Limage via phone or email.

Yours faithfully
On Behalf of AECOM Australia Pty Ltd

[redacted]@aecom.com

Mobile: [redacted]
Direct Dial: +02 8934 0481

encl: Attachment 1 - Laboratory Reports

					BTEX								Chlorinated Hydrocarbons																			
				Benzo(a)pyrene TEQ (half LOR)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ (zero)	Benzene	Ethylbenzene	Toluene	Total BTEX	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 less BTEX (F1)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-Dichloroethene	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR				0.5	0.5	0.5	0.2	0.5	0.5	0.2	0.5	0.5	0.5	10	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
ACT Waste Classification (no TCLP) - Inert Waste (CT1)							1	60	28.8				100		20	60	2.6	2.4		1.4				1							1		
ACT Waste Classification (no TCLP) - Solid Waste (CT2)							10	600	288				1000		200	600	26	24		14				10							10		
ACT Waste Classification (no TCLP) - Industrial Waste (CT3)							40	2400	1152				4000		800	2400	104	96		56				40							40		
Location	Field ID	Sample Date	Sample Type																														
SP1	SP1	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP2	SP2	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP3	SP3	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP4	QC4	27/08/2014	Field_D	0.6	1.2	<0.5	0.3	4.4	8.7	43.2	21.2	8.6	29.8	149	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP4	SP4	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	<0.5	1.4	4.9	2.5	1	3.5	11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP5	SP5	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	0.5	1.2	5.8	2.9	1.2	4.1	15	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP6	SP6	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	<0.5	<0.5	0.9	0.9	<0.5	0.9 - 1.15	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP7	SP7	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP8	SP8	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	<0.5	<0.5	<0.2	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP9	SP9	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	<0.5	0.8	9.2	6.1	2.3	8.4	63	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP10	SP10	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	<0.5	1.1	12.3	8	3.2	11.2	80	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5
SP11	SP11	27/08/2014	Normal	0.6	1.2	<0.5	<0.2	<0.5	<0.5	2.9	2.1	0.8	2.9	40	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5

Notes:
* = selected chemicals are assessed by using SCC1, SCC2 and SCC3, no TCLP analysis is required, as per notes in *ACT's Environmental Standards: Assessment & Classification of Liquid & Non-liquid Wastes* (June 2000)
LOR = Limit of Reporting
mg/kg = milligrams per kilogram

													Halogenated Benzenes									Halogenated Hydrocarbons						Halogenated Phenols				
			Chloroform	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Hexachlorobutadiene	Trichloroethene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Vinyl chloride	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Chlorobenzene	1,2-dibromoethane	Bromomethane	Chloromethane	Dichlorodifluoromethane	Iodomethane	Trichlorofluoromethane	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,6-dichlorophenol	2-chlorophenol
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	5	5	0.5	5	0.5	0.5	0.5	0.5	0.5
ACT Waste Classification (no TCLP) - Inert Waste (CT1)			12					1	1.4			0.4			8.6		15				200							800	4			
ACT Waste Classification (no TCLP) - Solid Waste (CT2)			120					10	14			4			86		150				2000							8000	40			
ACT Waste Classification (no TCLP) - Industrial Waste (CT3)			480					40	56			16			34.4		600				8000							32000	160			
Location	Field ID	Sample Date	Sample Type																														
SP1	SP1	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP2	SP2	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP3	SP3	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP4	QC4	27/08/2014	Field_D	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP4	SP4	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP5	SP5	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP6	SP6	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP7	SP7	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP8	SP8	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP9	SP9	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP10	SP10	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5
SP11	SP11	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:
* = selected chemicals are assessed by using SCC1, SCC2 an
LOR = Limit of Reporting
mg/kg = milligrams per kilogram

		Inorganics	MAH									Metals																					
	Pentachlorophenol	Moisture	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	Isopropylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	2,4-dimethylphenol	2-methylphenol	2-nitrophenol	3-&4-methylphenol	4-chloro-3-methylphenol	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene				
	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				
LOR	2	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	1	2	5	5	0.1	2	5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5				
ACT Waste Classification (no TCLP) - Inert Waste (CT1)										6		10	2			10	0.4	4			400								0.08				
ACT Waste Classification (no TCLP) - Solid Waste (CT2)										60		100	20			100	4	40			4000								0.8				
ACT Waste Classification (no TCLP) - Industrial Waste (CT3)										240		400	80			400	16	160			16000								3.2				
Location	**Field ID**	**Sample Date**	**Sample Type**																														
SP1	SP1	27/08/2014	Normal	<2	14.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	18	7	41	<0.1	6	96	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP2	SP2	27/08/2014	Normal	<2	12.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	25	8	16	<0.1	9	26	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP3	SP3	27/08/2014	Normal	<2	7.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	15	<1	23	10	13	<0.1	13	27	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP4	QC4	27/08/2014	Field_D	<2	10.8	20	5.1	<0.5	0.8	2	<0.5	<0.5	<0.5	<0.5	<5	<1	7	<5	46	<0.1	4	39	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP4	SP4	27/08/2014	Normal	<2	9.3	1.7	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	5	<5	31	<0.1	3	36	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP5	SP5	27/08/2014	Normal	<2	7.7	2.4	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	6	<5	14	<0.1	3	48	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP6	SP6	27/08/2014	Normal	<2	9.8	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	5	<5	7	<0.1	2	26	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP7	SP7	27/08/2014	Normal	<2	7.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	10	<5	12	<0.1	5	69	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP8	SP8	27/08/2014	Normal	<2	7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	8	<5	6	<0.1	4	61	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP9	SP9	27/08/2014	Normal	<2	15	8.4	3.5	<0.5	0.7	<0.5	0.6	0.5	<0.5	<0.5	6	<1	37	8	34	<0.1	8	84	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP10	SP10	27/08/2014	Normal	<2	15.8	10.6	4.4	<0.5	0.8	<0.5	0.8	0.7	<0.5	<0.5	<5	<1	21	8	37	<0.1	8	81	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
SP11	SP11	27/08/2014	Normal	<2	19.5	2.8	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	30	7	25	<0.1	8	57	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		

Notes:
* = selected chemicals are assessed by using SCC1, SCC2 an
LOR = Limit of Reporting
mg/kg = milligrams per kilogram

				PAH/Phenols													Solvents					TPH									
				Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	PAHs (Sum of total)	Phenanthrene	Phenol*	Pyrene	Methyl Ethyl Ketone	2-hexanone (MBK)	4-Methyl-2-pentanone	Carbon disulfide	Vinyl acetate	F2-NAPHTHALENE	C6 - C9*	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)*	C10 - C40 (Sum of total)	C10-C16	C16-C34	C6-C9 ALIPHATIC	C34-C40
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	F	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	5	5	0.5	5	50	10	50	100	100	50	50	50	100		100
ACT Waste Classification (no TCLP) - Inert Waste (CT1)													200		28.8		400						650				5000					
ACT Waste Classification (no TCLP) - Solid Waste (CT2)													200		288		4000						650				10000					
ACT Waste Classification (no TCLP) - Industrial Waste (CT3)													800		1152		16000						2600				40000					
Location	Field ID	Sample Date	Sample Type																													
SP1	SP1	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<0.5	<5	<50	<10	<50	<100	<100	<50	<50	<50	<100	<7.8	<100
SP2	SP2	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<0.5	<5	170	<10	70	260	<100	330 - 380	340	170	170	<7.8	<100
SP3	SP3	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<0.5	<5	<50	<10	<50	<100	<100	<50	<50	<50	<100	<7.8	<100
SP4	QC4	27/08/2014	Field_D	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	1.6 - 5	3.8	0.7	<0.5	0.7	<5	<5	<5	<0.5	<5	<50	134	<50	<100	<100	<50	<50	<50	<100	90.55	<100
SP4	SP4	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<0.5	<5	<50	12	<50	<100	<100	<50	<50	<50	<100	6.5	<100
SP5	SP5	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5 - 1	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<0.5	<5	<50	14	<50	<100	<100	<50	<50	<50	<100	7.85	<100
SP6	SP6	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<0.5	<5	<50	<10	<50	<100	<100	<50	<50	<50	<100	3.25	<100
SP7	SP7	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<0.5	<5	<50	<10	<50	<100	<100	<50	<50	<50	<100	<7.8	<100
SP8	SP8	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<5	<0.5	<5	<50	<10	<50	<100	<100	<50	<50	<50	<100	<7.8	<100
SP9	SP9	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5.7	<0.5	<1 - 0.7	18.6	10.3	<0.5	1.9	<5	<5	<5	<0.5	<5	3140	45	1300	4280	<100	5580 - 5630	5600	3140	2460	35.2	<100
SP10	SP10	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	8.3	<0.5	<1 - 1	28	15.3	<0.5	2.8	<5	<5	<5	<0.5	<5	4570	58	1870	6260	<100	8130 - 8180	8190	4570	3620	45.1	<100
SP11	SP11	27/08/2014	Normal	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.1	<0.5	<0.5	9.8	5.7	<0.5	1	<5	<5	<5	<0.5	<5	1590	23	690	2370	<100	3060 - 3110	3070	1590	1480	19.25	<100

Notes:
* = selected chemicals are assessed by using SCC1, SCC2 an
LOR = Limit of Reporting
mg/kg = milligrams per kilogram

						VOCs			
				+C15 - C36 (Sum of total)	C6-C10	1,3-Dichloropropene	cis-1,4-Dichloro-2-butene	Pentachloroethane	trans-1,4-Dichloro-2-butene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR					10		0.5	0.5	0.5
ACT Waste Classification (no TCLP) - Inert Waste (CT1)									
ACT Waste Classification (no TCLP) - Solid Waste (CT2)									
ACT Waste Classification (no TCLP) - Industrial Waste (CT3)									
Location	Field ID	Sample Date	Sample Type						
SP1	SP1	27/08/2014	Normal	<200	<10	<1	<0.5	<0.5	<0.5
SP2	SP2	27/08/2014	Normal	310	<10	<1	<0.5	<0.5	<0.5
SP3	SP3	27/08/2014	Normal	<200	<10	<1	<0.5	<0.5	<0.5
SP4	QC4	27/08/2014	Field_D	<200	192	<1	<0.5	<0.5	<0.5
SP4	SP4	27/08/2014	Normal	<200	16	<1	<0.5	<0.5	<0.5
SP5	SP5	27/08/2014	Normal	<200	21	<1	<0.5	<0.5	<0.5
SP6	SP6	27/08/2014	Normal	<200	<10	<1	<0.5	<0.5	<0.5
SP7	SP7	27/08/2014	Normal	<200	<10	<1	<0.5	<0.5	<0.5
SP8	SP8	27/08/2014	Normal	<200	<10	<1	<0.5	<0.5	<0.5
SP9	SP9	27/08/2014	Normal	4330	72	<1	<0.5	<0.5	<0.5
SP10	SP10	27/08/2014	Normal	6310	92	<1	<0.5	<0.5	<0.5
SP11	SP11	27/08/2014	Normal	2420	43	<1	<0.5	<0.5	<0.5

Notes:
* = selected chemicals are assessed by using SCC1, SCC2 an
LOR = Limit of Reporting
mg/kg = milligrams per kilogram

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AECOM Australia Pty Ltd (2015a) *Former Charnwood Fire Station, Stage 2 Environmental Site Assessment Report*, issued 13 March 2015.

AECOM Australia Pty Ltd
Level 2
60 Marcus Clarke Street
Canberra ACT 2600
Australia
www.aecom.com

+61 2 6201 3000 tel
+61 2 6201 3099 fax
ABN 20 093 846 925

13 March 2015

Peter Johns
Planning Delivery Division, Environment and Sustainable Development Directorate
Dame Pattie Menzies House
Challis Street
Dickson, Canberra, ACT 2601

Dear Peter

Former Charnwood Fire Station: Stage 2 Environmental Site Assessment Report

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was engaged by the Environment and Sustainable Development Directorate (ESDD) to carry out a targeted Phase 2 Environmental Site Assessment (ESA) for the property identified as Block 6, Section 97 Charnwood, ACT.

This letter should be read in conjunction with the report *ESDD Charnwood: Stage 1 Environmental Site Assessment*, issued 18 November 2014 (AECOM, 2014).

2.0 Objective

The objectives of these works were to investigate five areas of environmental concern (AECs) which were previously identified in AECOM (2014) and to assess the potential presence and evaluate any risks posed by the AECs to the proposed future childcare centre land use.

3.0 Scope of Works

The scope of works to achieve the objectives outlined above comprised the following:

- Development of a health and safety plan (HASP) and safe work method statement (SWMS).
- Dial-before-you-dig (DBYD) search.
- On-site service clearance by a licensed surveyor.
- Site supervision by AECOM Environmental Scientist of sub-contractor's environmental scope of work.
- Collection of 20 soil samples from 3 soil bores, 9 test pits and one hand auger location, inclusive of quality control/quality assurance (QAQC) samples.
- Analysis of soils samples for the following contaminants of potential concern (CoPC): lead (Pb), asbestos, total recoverable hydrocarbons (TRH); benzene, toluene, ethylbenzene and xylenes and naphthalene (BTEXN); polycyclic aromatic hydrocarbons (PAHs) including Naphthalene; phenols; heavy metals; organochlorine and organophosphorus pesticides (OCP and OPP) and polychlorinated biphenyls (PCBs).
- All analysis was completed by National Association of Testing Authority (NATA) accredited laboratories.
- This letter report.

4.0 Site Identification

The site is identified as:

Table 1 Site Identification Details

Consideration	Details
Site Owner	Justice & Community Safety Directorate
Site Occupier	Formerly ESA/ACT Fire and Rescue
Site Address & Legal Description	35 Lhotsky Street Block 6, Section 97 Charnwood
Zoning	TSZ2- Services
Geographical Coordinates (AMG)	35°12'15.4"S 149°01'42.2"E
Site Elevation (m AHD)	572.7

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Consideration	Details
Site Area (approximate)	3638 m²

The findings of the Stage 1 ESA developed a conceptual site model (CSM) identifying the sources of CoPC, potential receptors (humans and the environment) and transport mechanisms from which a pathway may be complete between the two.

Table 2 Conceptual Site Model

Consideration	Details
On-site Sources of CoPCs	- Heavy metals from fill material of unknown origin (e.g. from former industrial properties), and deterioration of stored metal products, general workshop activities (e.g. welding, vehicle/equipment maintenance and servicing). Lead (Pb) has been used as an indicator heavy metal for the purposes of this investigation. - Asbestos, from building structures, imported fill and illegal dumping - Aliphatic hydrocarbons from fuel leaks from underground fuel storage tanks may have occurred and fuels, solvents, oils, etc. may occur in fill material of unknown origin. - Aromatic hydrocarbons i.e. BTEX from fuel leaks from underground fuel storage tanks may have occurred and fuels, solvents, oils, etc. may occur in fill material of unknown origin. - PAHs related to some petroleum hydrocarbons, such as waste and lubricating oils and diesel fuel, bitumen/asphalt. - PFOA and PFOS may have historically been used to make aqueous film forming foam (AFFF), a component of fire-fighting foams. - Volatile halogenated compounds (VHC) related to solvent use, such as degreasers and 'thinners'. - Common pesticides (OPPs and OCPs) of unknown origin potentially present in fill imported to the Site.
Potential Transport Mechanisms and Exposure Pathways for Contaminants	The potential transport mechanisms include: - Transport of contamination through surface water flows to stormwater drains. - Transport of contamination to underlying groundwater aquifers. - Inhalation and ingestion of airborne contaminated dust and potentially asbestos fibres. - Dermal contact with contaminated soils. - Transport of contaminants through mechanical transport.
Potential Receptors of Contamination	The potential receptors identified include: - Workers and visitors and construction/maintenance workers through direct dermal contact or ingestion of contaminants in soil. - Environmental receptors associated with on and off site water bodies. - Workers carrying out installation or maintenance within the Site. - Residents and workers in adjacent properties. - Potential future residence if the site developed into residential dwellings.

The outcomes of the preliminary CSM and recommendations from the Stage 1 ESA identified five AECs potentially present at the Site on the basis of former land uses, current Site conditions and proposed future land use receptors. The AECs comprise the following and are presented on **Figure 2** in **Attachment A**:

- **AEC 01:** The presence of three (3) underground fuel storage tanks (now decommissioned) in the eastern portion of the Site.
- **AEC 02:** Car wrecks were stored in the southern car park section of the rear yard, adjacent to the green metal garage.
- **AEC 03:** A small quantity of 20L drums of aqueous fil,-forming foam (AFFF) (only a few drums at any one time) were stored in the internal store room (off the engine bay) for topping up the foam tank on the fire engine. Based on an interview undertaken with Greg Kent, Superintendent – Station Upgrade and Relocation, ACT Fire and Rescue (ACTF&R's) Fairburn offices on 24 September 2014, AECOM considers

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that areas (in particular AEC 05) were unlikely to have been affected by AFFF. Analysis for AFFF was therefore not undertaken for this targeted Phase 2 ESA.

- **AEC 04:** Some uncontrolled fill may be present in the back of the Site, near the back fence line.
- **AEC 05:** Onsite septic tanks and/or septic lines.

5.0 Site Assessment Criteria

Based on the development of the preliminary CSM in AECOM (2014) for the Site, the following criteria are appropriate to the works.

5.1 Soil Assessment

The following national and international guidance documents have been reviewed to provide screening criteria which have been adopted for comparison to concentrations identified in Site soil samples.

For the purpose of the assessment the most conservative screening criteria were adopted. Given the future childcare centre land use of the Site, the following hierarchy of screening criteria will be adopted:

During demolition and construction of the childcare centre, protection of human health and the environment should be addressed by a Construction Environmental Management Plan endorsed by the ACT EPA.

As the childcare centre is the most sensitive land use receptor, risks future commercial and intrusive maintenance workers (i.e. less sensitive land use scenarios) are considered covered within the assessment.

- National Environment Protection Measure (NEPM), Assessment of Site Contamination (ASC) (National Environment Protection Council [NEPC], 1999 as amended (2013): Schedule B1. Soil Health Investigation Levels (HILs) and Health Screening Levels (HSLs) for vapour intrusion (ASC NEPM), specifically:
  - HIL A (Childcare centre).
  - Vapour intrusion –Soil HSL A (Childcare centre) – Sand.
- Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) Technical Report No.10 - HSLs for direct contact to soil. (Friebel, E. and Nadebaum, P., 2011):
  - Direct Contact –HSL A (Childcare centre).
- United States Environmental Protection Agency (US EPA) (January, 2015) - Regional Screening Levels (RSLs) – Residential Soil (US EPA, 2015).

The resultant Soil Assessment Criteria (SAC) comprise five screening criteria which vary based on the receptor (childcare centre user adult and child) and depth to contamination. The screening criteria are:

- Childcare user adult and child – (contamination at) 0 to 1 m below ground surface (bgs).
- Childcare user adult and child – (contamination at) 1 to <2 m bgs.
- Childcare user adult and child – (contamination at) 2 to <4 m bgs.
- Childcare user adult and child – (contamination at) >4 m bgs.

The adopted soil assessment criteria (SAC) are summarised in **Table 3** below.

Table 3 Soil Assessment Criteria for Key Contaminants

Chemical Names	ASC NEPM – Childcare Centre - HIL A (mg/kg)			
	Childcare 0 to < 1.0 m	Childcare 1 to < 2.0 m	Childcare 2 to <4.0 m	Childcare 4.0 m +
Soil HIL A (Childcare Centre)				
Lead	300			
Total PAHs	300			
Benzo(a)pyrene TEQ	3			
Total PCBs	1			
OCPs/OPPs	Refer to footnote (a)			

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Chemical Names	ASC NEPM – Childcare Centre - HIL A (mg/kg)			
	Childcare 0 to < 1.0 m	Childcare 1 to < 2.0 m	Childcare 2 to <4.0 m	Childcare 4.0 m +
Vapour intrusion –Soil HSL A (Childcare centre) – Sand				
Naphthalene	3	NL	NL	NL
TRH F1 C_6-C_{10} (Less BTEX)	45	70	110	200
TRH F2 >C_{10}-C_{16} (Less naphthalene)	110	240	440	NL
Benzene	0.5	0.5	0.5	0.5
Toluene	160	220	310	540
Ethylbenzene	55	NL	NL	NL
Xylenes	40	60	95	170
US EPA Regional Screening Levels (RSLs) – Residential Soil				
OCPs/OPPs	Refer to footnote (b)			
VOCs	Refer to footnote (c)-			
sVOCs	Refer to footnote (d)			

CW Commercial Worker
IMW Intrusive Maintenance Worker – assume direct contact with soils
NL No Limit
NA Not Applicable
TEQ Carcinogenic PAHs assessed as the concentration multiplied by their potency relative to benzo(a)pyrene.
(a) OCPs and OPPs will be assessed based upon individual criterion per analyte as per ASC NEPM HIL A.
(b) Individual OCPs and OPPs without a criterion in ASC NEPM HIL A will be obtained from USEPA RSL – Residential Soils.
(c) Individual VOCs without a criterion in ASC NEPM HIL A will be obtained from USEPA RSL – Residential Soils.
(d) Individual sVOCs without a criterion in ASC NEPM HIL A will be obtained from USEPA RSL – Residential Soils.

5.2 Aesthetics, Ecological Investigation Levels (EILs), & Ecological Screening Levels (ESLs)

Neither the ASC NEPM nor Friebel, E. and Nadebaum, P. (2011) provide numeric aesthetic guidelines, however, NEPC (2013) states that "*site assessment requires balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity.*"

As the Site will change to childcare centre land use with minimal plant life, an assessment of potential on-Site ecological risks from soils is not considered applicable for further investigation.

5.3 Asbestos Assessment Criteria

The current assessment criteria endorsed by the NSW EPA to evaluate asbestos is soil is based on the ASC NEPM.

AECOM notes that the asbestos criteria in the ASC NEPM are sourced from the Western Australia Department of Health (WA DoH) (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos – Contaminated Sites in Western Australia*.

The ASC NEPM and WA DoH 2009 guidelines make the following definitions in relation to asbestos materials:

- **Bonded ACM**: comprises asbestos containing material (ACM) which is in sound condition, although possibly broken of fragments, and where the asbestos is bound in a matrix such as cement or resin. This definition applies to material that cannot pass a 7 mm x 7 mm sieve.
- **Fibrous asbestos (FA)**: comprises friable asbestos and includes severely weathered cement sheet, insulation products and woven asbestos material. Friable asbestos is defined as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. This material is typically unbonded or was previously bonded and is now significantly degraded.
- **Asbestos fines (AF)**: includes free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.

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The guideline emphasises that the assessment and management of asbestos contamination should take into account the condition of the asbestos materials and the potential for damage and resulting release of asbestos fibres.

Table 4 Asbestos Assessment Criteria

Land use	Asbestos Group	% w/w asbestos
Residential (child care centres)	ACM	0.01
All land uses	FA and AF[1]	0.001
All forms of asbestos	No visible or free fibre asbestos in surface soil	

w/w = weight for weight of asbestos in soil

1) Not applicable for free fibres.

6.0 Methodology

The fieldworks were completed between 04 to 05 February 2015. The methodology used for the collection of soil samples for laboratory analysis is summarised in below.

Table 5 Stage 2 ESA Methodology

Activity	Details
Service Clearance	The Site was checked for underground services by a Telstra accredited service locator (D-Tech Services Pty Ltd), using radio-detection and reference to utility plans obtained through the Dial-Before-You-Dig service.
Drilling Works	Epocha Environmental Pty Ltd was engaged to provide a Geoprobe drill rig to advance boreholes using push tubes for sample collection to a maximum depth of 8.0 m below ground surface (bgs). A solid stem augering method was employed to ream out the boreholes for installation of monitoring wells to the maximum depth of 8.0 m bgs.
Test Pitting Works	Ground Control ACT Pty Ltd was engaged to undertake the test-pitting. An excavator was used to collect samples from regular depth intervals from test pit excavations. Test pits were extended to a maximum depth of 1.5 m bgs.
Field Screening for VOCs	Soil sub-samples were collected from each sample collection location and were placed in snap-lock plastic bag and the headspace in the bag was screened for volatile organic compounds (VOC) using a calibrated photo-ionisation detector (PID) equipped with a 10.6 eV lamp.
Soil Logging	Soil logging was generally in accordance with the Unified Soil Classification System (USCS) and the AECOM documented standard field procedures. Borelogs and test pit logs are presented in **Attachment 3**.
Decontamination	A new pair of disposable gloves was used to collect each soil sample. It was deemed unnecessary to collect rinsate samples during excavation sampling as non-disposable equipment was not utilised during the works. Furthermore, soil samples were collected from the relatively undisturbed soil materials contained within the bucket rather than soils that had been in contact with the bucket edges. Decontamination of the hand trowel during stockpile soil sampling was undertaken using a phosphate free detergent (Decon 90) solution followed by a double rinse with de-ionised water.
Field QAQC Samples	The following quality assurance and quality control samples were collected during the sampling program: - Intra-laboratory duplicates at a rate of 1 per 20 primary samples. - Inter-laboratory duplicates (Splits) at a rate of 1 per 20 primary samples. - Rinsate blank at a rate of 1 per day of soil sampling (during GMEs only, not for validation of soils). These are further detailed and discussed in **Attachment 5**.

7.0 Quality Assurance and Quality Control

An assessment of field and laboratory QAQC data was conducted and the results are summarised below.

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7.1 Field QAQC

A review of the AECOM field QAQC is summarised below:

- Use of standard procedures for soil sampling;
- Use of a new pair of disposable nitrile gloves for each soil sample collection event;
- Use of calibrated equipment;
- No requirement for equipment decontamination procedures;
- Use of laboratory prepared and supplied sampling containers appropriate for each CoPC investigated;
- Use of appropriate sample Chain of Custody (COC) documentation. Copies of the COCs are included in the laboratory reports (**Attachment 5**);
- Analysis of field duplicate samples at a rate of one per ten primary samples (requirement one per twenty primary samples);
- Analysis of inter-laboratory (split) field duplicate samples at a rate of approximately one per twenty primary samples (requirement one per twenty primary samples); and
- The relative percentage difference (RPD) of the primary and duplicated sample results to be less than 50%.

7.2 Laboratory QAQC

A review of the laboratory QAQC is summarised below:

- Samples were collected in appropriate sample containers, transported in chilled sealed containers with appropriate COC documentation;
- Laboratory LORs were below the assessment criteria with the exception of select OCP and PAH compounds, however it is noted that these compounds were not detected in any of the samples analysed;
- All method blank sample results were less than laboratory LORs;
- All laboratory duplicate samples reported RPDs within acceptable DQI ranges and analyte-specific acceptance criteria;
- All matrix spike recoveries were within acceptable DQI ranges and analyte-specific acceptance criteria;
- All laboratory control spike samples were within acceptable DQI ranges and analyte-specific acceptance criteria; and
- All surrogate spikes were within acceptable DQI ranges and analyte-specific acceptance criteria.

7.3 Data Validation and Useability

The data validation procedure employed in the assessment of the field and laboratory QAQC data indicated that the reported analytical results are representative of groundwater conditions at the sample locations and that the overall quality of the analytical data produced is acceptable and reliable for the purpose of this investigation.

8.0 Results

8.1 Soil Conditions

Based on borehole, test pit and hand auger advancement and observations from Stage 2 and previous Stage 1 remediation works, AECOM considers geology at the Site to typically comprise:

- **AEC01**
  - Fill materials: 0.0 to 2.0 m bgs (BH01), 0.0 to 0.2 (BH02 to BH03).
  - Clay: 2.0 to 8.0 m bgs (BH01), 0.2 to 1.0 (BH02 to BH03).
  - Silty Sand: 1.0 to 8.0 m bgs (BH02 to BH03).
- **AEC02**
  - Fill materials: 0.0 to 0.5 m bgs.
  - Clay: 0.5 to 1.5 m bgs.

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- **AEC04 and AEC05**
  - Topsoil: 0.0 to 0.2 m bgs.
  - Sand: 0.2 to 0.5 m bgs.
  - Clay: 0.5 to 1.4 m bgs.

No hydrocarbon odour was observed in any of the sampling locations and PID readings screenings ranged from 0.0 to 4.7 parts per million (ppm).

8.2 Analytical Results

Analytical results were compared to the site assessment criteria in **Section 5.0** above and are presented in **Attachment 2**.

8.2.1 Soil Analytical Results

Soil analytical results were compared to the site assessment criteria based on depth ranges 0-1 m bgs (18 samples analysed, including 4 QAQC samples), 1-<2 m bgs (1 sample analysed) and >4 m bgs (6 samples analysed).

Soil analytical results indicated no exceedences of the site assessment criteria with the exception of the following:

- TP05_0.0-0.1: Concentration of TRH C_{10}-C_{16} (less naphthalene) 190 mg/kg exceeded the site assessment criterion of 110 mg/kg.

8.2.2 Asbestos

13 primary soil samples and 1 duplicate were analysed for asbestos.

Analytical results indicated asbestos was not detected in any of the soil samples analysed.

9.0 Discussion

The Stage 2 ESA identified fill materials typically 0.5 m bgs to a maximum of 2.0 m bgs within the former UST area (AEC 01). Natural soil conditions across the Site to comprise sandy clay soils. No visual or olfactory observations of contamination impact were noted across the boreholes, test pits and hand auger locations.

The data set collected during the Stage 2 ESA was screened against criteria for the land use scenario of a childcare centre. One sample (TP05_0.0-0.1), located adjacent to the former vehicle maintenance shed in the south east unsealed corner of the Site, exceeded these criteria and indicates low-level impact. All other samples obtained from the AECs were below the criteria for all analytes for childcare centre usage.

The extent of low-level impact from TRH is limited to TP05 at and was reported below the surface at depth ranges 0.4-0.5 and 1.3-1.4 m bgs. Adjacent results in TP04 and TP06 surface soils reported no exceedances of the same TRH criteria or any other analytes.

Transport mechanisms, potential for exposure (using qualitative tier 1 risk assessment) and recommended mitigation for the elevated TRH concentrations in surface soils at TP05 are presented in below.

Table 6 Transport Mechanisms, Potential for Exposure and Recommended Mitigation

Transport Mechanism	Details	Potential for Exposure	Recommended Mitigation
Direct contact, ingestion of impacted soils and contaminant vapour inhalation by future Site users.	Volatile contaminants exist in surface soils.	Isolated to the surface - as demonstrated with vertical and lateral samples reporting no exceedances- and able to be mitigated and reduced to not pose an unacceptable on-going risk during the design and construction phase of the childcare centre.	Bulk removal of the existing topsoils to a depth below TP05_0.0-0.1, off-Site disposal of the impacted material and importation of clean fill to replace.

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10.0 Conclusions

The objectives of the Stage 2 ESA works were to investigate five AECs which were previously identified in a Stage 1 ESA, assess their potential presence and evaluate any risks posed by the AECs to the proposed future childcare centre land use.

Based on the targeted sampling and analysis completed at the Site, AECOM considers the five nominated AECs to have been adequately characterised in relation to risks to future proposed receptors at the Site.

Site Assessment Screening Criteria were exceeded for soils in one location (TP05) in AEC 01 in surface soil sample (0 – 0.10m bgs). Qualitative assessment of potential risks to future human receptors indicates that there are potential exposure pathways (and therefore risk) between the identified TRH impacts in TP05 and the future childcare users of the Site.

Remedial action via targeted removal and validation of the surface soils in AEC01 in the immediate vicinity of sample location TP05 is recommended to address the identified potential exposure pathways (and risk) for the proposed childcare facility development on the Site.

11.0 References

1) AECOM Australia Pty Ltd (2014) *ESDD Charnwood: Stage 1 Environmental Assessment*, issued 18 November 2014.

2) National Environment Protection Council (1999). National Environmental Protection Measure (Assessment of Site Contamination) (ASC NEPM), as amended May 2013.

Yours sincerely

[redacted]

Mobile: +61 (0) [redacted]
Direct Dial: +61 (0) 2 8934 0481

[redacted]@aecom.com

Mobile: [redacted]
Direct Dial: +61 2 4911 4982

encl: Attachment 1 - Figures
Attachment 2 - Tables
Attachment 3 - Borelogs and Test Pit Logs
Attachment 4 - Photographs
Attachment 5 - QAQC and Laboratory Certificates
Attachment 6 - Calibration Records

AECOM

ATTACHMENT 1 – FIGURES

AECOM

Site Location

Charnwood Phase 2 Environmental Site Assessment Report
Site Location of Former Charnwood Fire Station at 35 Lhotsky Street, Charnwood, ACT

FEB 2015
60339175

0 5 10 20 m

N

Fig. 1

AECOM

Charnwood Phase 2 Environmental Site Assessment Report
Phase 2 ESA Sampling Locations

MAR 2015
60339175

Fig. 2

AECOM

Site Location
Borehole
Hand Auger
Test Pit

AEC 01 - Former USTs
AEC 02 - Car wrecks/training
AEC 03 - AFFF storage
AEC 04 - Potential uncontrolled fill
AEC 05 - Septic tanks and drainage (assumed)

Charnwood Phase 2 Environmental Site Assessment Report
Phase 2 ESA Soil Exceedances

0 5 10 20 m

N

MAR 2015
60339175

Fig. 3

AECOM

ATTACHMENT 2 – TABLES

AECOM

ATTACHMENT 3 – BORELOGS AND TEST PIT LOGS

BOREHOLE LOG BH01

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 4/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Solid-Stem Auger
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
1.3			BH01_0.0-0.1	*			FILL. Sandy gravel, dark brown, loose, moist, some stones and shale present, blue metal (5%), organic plant material (i.e. sticks).	
1.4			BH01_0.4-0.5				FILL. Sandy gravel, dark brown, some stones and shale present, loose, moist and blue metal (5%).	0.50
0.8			BH01_1.0-1.1	*	1.0			
4.7			BH01_2.0-2.1		2.0		FILL. Sandy clay with gravels, dark brown, moist, medium plasticity, blue metal (2-5%) and shale (5%) present.	1.90 2.10
							NATURAL. Sandy clay, slightly moist, low plasticity, loose to fine grained, no odours or staining observed.	
3.8			BH01_3.0-3.1		3.0			
0.1			BH01_4.0-4.1		4.0			
0.5			BH01_5.0-5.1	*	5.0			
0.1			BH01_6.0-6.1		6.0			
0.0			BH01_7.0-7.1		7.0			
			BH01_7.9-8.0	*				8.00

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

Total Depth: 8.00 m

BOREHOLE LOG BH01

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 4/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT **GROUND WATER ELEVATION**

- Continued from Previous Page -

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.1								

BOREHOLE LOG BH02

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 4/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Solid-Stem Auger
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.1		☒	BH02_0.05-0.15				ASPHALT (0.0-0.05 m bgs). ROADBASE (0.0.5-0.2 m bgs). Grey, fine grained silt, dry, very loose/low density with cobbles.	0.20
0.2		☒	BH02_0.2-0.3	✳			NATURAL. Silt, orange mottled grey, very loose, fine grained, medium to coarse subangular to angular gravels at 20 mm size, low density, no odours or staining observed.	0.30
0.1		☒	BH02_0.5-0.6	✳			NATURAL. Silty sand, orange, inclusion of gravels, dry, very loose/low density.	0.50
0.2		☒	BH02_1.0-1.1		1.0		NATURAL. Weathered igneous clay, orange with grey, slightly moist, medim to stiff, high plasticity.	1.10
							NATURAL. Silty sand, pale grey, fine grained (80%), very loose, dry with gravels present (20 mm size).	
0.3		☒	BH02_2.0-2.1		2.0			
0.2		☒	BH02_3.0-3.1		3.0			
0.2		☒	BH02_4.0-4.1		4.0			
0.3		☒	BH02_5.0-5.1	✳	5.0			
0.0		☒	BH02_6.0-6.1		6.0			
0.0		☒	BH02_7.0-7.1		7.0			8.00

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

Total Depth: 8.00 m

BOREHOLE LOG BH02

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 4/2/2015

PROJECT NAME Charnwood Phase 2

LOCATION 35 Lhotsky Street, Charnwood ACT **GROUND WATER ELEVATION**

- Continued from Previous Page -

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.1		X	BH02_7.9-8.0	*				

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

BOREHOLE LOG BH03

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 4/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Solid-Stem Auger
SAMPLING METHOD Push Tube and Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
							ASPHALT (0.0-0.05 m bgs). ROADBASE (0.0.5-0.2 m bgs). Grey, fine grained silt, dry, very loose/low density with cobbles.	0.05
0.5			BH03_0.1-0.2					
2.9			BH03_0.2-0.3	*				0.30
			BH03_0.4-0.5				NATURAL. Silt, orange with grey, very loose, fine grained, medium to coarse gravels at 20 mm size (subangular to angular), no odours or staining observed.	0.50
0.1							Silty sand with gravels, orange., dry, very loose.	
							Weathered igneous clay, orange with grey, slightly moist, hard, high plasticity.	
			BH03_1.0-1.1		1.0			
0.0								1.10
							Silty sand, grey, fine grained (80%), very loose, dry with gravels present at 20 mm size.	
0.0			BH03_2.0-2.1		2.0			
2.9			BH03_3.0-3.1		3.0			
0.0			BH03_4.0-4.1		4.0			
0.8			BH03_5.0-5.1	*	5.0			
3.0			BH03_6.0-6.1		6.0			
0.0			BH03_7.0-7.1		7.0			8.00

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

Total Depth: 8.00 m

BOREHOLE LOG BH03

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 4/2/2015

PROJECT NAME Charnwood Phase 2

LOCATION 35 Lhotsky Street, Charnwood ACT **GROUND WATER ELEVATION**

- Continued from Previous Page -

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.2		☒	BH03_7.9-8.0	✳				

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

HAND AUGER LOG HA01

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 5/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Hand Auger
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
		☒	HA01_0.0-0.1	✳			NATURAL. Fine pale brown silty sand, very loose, sticks and plant matter present.	0.25
		☒	HA01_0.4-0.5				NATURAL. Medium to coarse silty sand with gravels. Brown/red in colour.	0.50
							NATURAL. Gravelly clay, med to stiff, low plasticity, no odours or staining observed.	1.00
		☒	HA01_1.0-1.1		1.0		NATURAL. Fine pale grey/brown silty sand, very loose.	1.10
							Total Depth: 1.10 m	

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

TEST PIT LOG TP01

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 5/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Excavator
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
			TP01_0.0-0.1				ASPHALT (0.0-0.05 m bgs). ROADBASE (0.0.5-0.2 m bgs). Grey, fine grained silt, dry, very loose/low density with cobbles.	
0.5								
			TP01_0.2-0.3	*			FILL. Decomposed granite, orange, extremely weathered rock, gravelly sand.	0.20
0.5								
			TP01_0.4-0.5					
0.5							NATURAL. Clay, slightly moist, brown stiff, medium plasticity.	0.45
								0.90
							NATURAL. Bedrock, sandstone (60%), slightly moist, dense, pale brown/grey.	
					1.0			
0.3								1.10

Total Depth: 1.10 m

TEST PIT LOG TP02

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 5/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Excavator
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
							ASPHALT (0.0-0.05 m bgs). ROADBASE (0.0.5-0.2 m bgs). Grey, fine grained silt, dry, very loose/low density with cobbles.	0.05
0.4			TP02_0.2-0.3	✳			FILL. Gravelly Sand, orange, slightly moist, gravels are 2-5 mm in size.	0.45
0.2			TP02_0.4-0.5				NATURAL. Clay, brown/yellow with occasional red, moist, mediu plasticity.	
0.5					1.0			1.00
			TP02_1.3-1.4				NATURAL. Bedrock with shale, grey.	1.40
							Total Depth: 1.40 m	

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

TEST PIT LOG TP03

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 5/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Excavator
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
			TP03_0.2-0.3	✳			ASPHALT (0.0-0.05 m bgs). ROADBASE (0.0.5-0.2 m bgs). Grey, fine grained silt, dry, very loose/low density with cobbles.	0.20
0.3			TP03_0.4-0.5				FILL. Gravelly sand, orange, slightly moist, gravels at 20-50 mm size.	0.45
0.5							NATURAL. Sandy clay, dark orange, slightly moist low plasticity, soft to medium.	0.70
							NATURAL. Gravelly clay, pale orange/brown, slightly moist, medium plasticity, medium to firm.	0.90
					1.0		NATURAL. Bedrock woith sandy gravel, grey.	1.20
0.6			TP03_1.2-1.3				Total Depth: 1.30 m	

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

TEST PIT LOG TP04

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 5/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Excavator
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.2			TP04_0.0-0.1				NATURAL. Topsoil, roots, soil clumped together.	0.15
							NATURAL. Silty sand, brown, medium dense, fine to medium grained.	0.30
0.6			TP04_0.4-0.5				NATURAL. Sandy clay, orange, slightly moist., low to medium plasticity,gravels at 20mm in size.	0.50
							NATURAL. Sandy clay with silt, light orange, medium plasticity, fine to medium grained, slightly moist.	0.75 0.85
0.8			TP04_0.9-1.0		1.0		NATURAL. Sandy clay, orange/brown, medium plasticity, moist.	1.00
							NATURAL. Weathered rock, grey, includes small pieces of sandstone.	
							Total Depth: 1.00 m	

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

TEST PIT LOG TP05

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 5/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Excavator
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.3			TP05_0.0-0.1				NATURAL. Silty sand, dark brown/black, dry, roots and plant matter present.	0.20
							NATURAL. Sandy clay, orange, medium plasticity, moist.	0.30
0.3			TP05_0.4-0.5				NATURAL. Sandy clay with silt, moist.	0.50
							NATURAL. Sandy clay, orange with brwon, moist, rootlets present.	0.70
							NATURAL. Sandy clay, pale brown/grey, dry, gravels at 5-20mm size (40%).	1.00
					1.0		NATURAL. Weathered rock, pale grey, gravels (20%) at 10-25mm size, dry, sandstone present.	
0.6			TP05_1.3-1.4					1.40
							Total Depth: 1.40 m	

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

TEST PIT LOG TP06

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 5/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Excavator
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.3			TP06_0.0-0.1				NATURAL. Topsoil, dark brown, sand with cobbles (20%), dry.	0.20
0.5			TP06_0.4-0.5				NATURAL. Silty sand, orange dry.	0.60
							NATURAL. Sandy clay, orange, stiff.	0.80
					1.0		NATURAL. Sandy clay with cobbles, pale brown, stiff and bedrock.	
0.5			TP06_1.2-1.3					1.30
							Total Depth: 1.30 m	

TEST PIT LOG TP07

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 5/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Excavator
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
							ASPHALT (0.0-0.05 m bgs). ROADBASE (0.0.5-0.2 m bgs). Grey, fine grained silt, dry, very loose/low density with cobbles.	0.20
0.2			TP08_0.2-0.3				FILL. Gravelly sand, orange, slightly moist, gravels at 20-50 mm size.	0.45
0.3			TP08_0.4-0.5				NATURAL. Sandy clay, dark orange, slightly moist low plasticity, soft to medium.	0.70
							NATURAL. Gravelly clay, pale orange/brown, slightly moist, medium plasticity, medium to firm.	0.90
0.2			TP08_1.0-1.1		1.0		NATURAL. Bedrock woith sandy gravel, grey.	1.20
							Total Depth: 1.10 m	

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

TEST PIT LOG TP08

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 5/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Excavator
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
			TP08_0.2-0.3	✳			ASPHALT (0.0-0.05 m bgs). ROADBASE (0.0.5-0.2 m bgs). Grey, fine grained silt, dry, very loose/low density with cobbles.	0.20
0.2			TP08_0.4-0.5				FILL. Gravelly sand, orange, slightly moist, gravels at 20-50 mm size.	0.45
0.2							NATURAL. Sandy clay, dark orange, slightly moist low plasticity, soft to medium.	0.70
							NATURAL. Gravelly clay, pale orange/brown, slightly moist, medium plasticity, medium to firm.	0.90
			TP08_1.1-1.2		1.0			
0.2							NATURAL. Bedrock woith sandy gravel, grey.	1.20
							Total Depth: 1.20 m	

60339175 - CHARNWOOD PHASE 2.GPJ 17/2/15

TEST PIT LOG TP09

ENSR Australia Pty Ltd
Level 5, 828 Pacific Highway
Gordon NSW 2073

PROJECT NUMBER 60339175 **DATE** 5/2/2015
PROJECT NAME Charnwood Phase 2
LOCATION 35 Lhotsky Street, Charnwood ACT
DRILLING METHOD Excavator
SAMPLING METHOD Grab
SURFACE ELEVATION
WELL HEAD/TOC
LOGGED BY [redacted] **NORTHING**
COMMENTS **EASTING**

PID (ppm)	Penetrometer (Kg/cm2)	RECOVERY	SAMPLE NUMBER	ANALYSED	DEPTH (m BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH
0.2			TP09_0.0-0.1				NATURAL. Silty sand, pale brown, fine, very loose, stick and plants matter present.	0.25
0.2			TP09_0.4-0.5				NATURAL. Silty sand with gravels, medium to coarse, brown/red, loose.	0.50
							Total Depth: 0.80 m	

AECOM

ATTACHMENT 4 – PHOTOGRAPHS

AECOM

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No:
Former West Belconnen Fire Station	35 Lhotsky Street, Belconnen, ACT	60339175

Plate No.	Date:
1	4/2/2015

Direction Photo Taken:

South-East

Description:

Drill rig at borehole (BH) number 3 in AEC 01 (former UST's). This particular location was immediately adjacent to former underground storage tank (UST) number 1.

Plate No.	Date:
2	4/02/2015

Direction Photo Taken:

N/A

Description:

Push tube of BH03. Push tube terminated at 1.1 m below ground level (bgl) due to refusal and started to use solid flight auger (SFA).

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Plate No. 3	Date: 4/2/2015
Direction Photo Taken: South-East	
Description: Drill rig at BH02. SFA attachment to be used.	

Plate No. 4	Date: 4/2/2015
Direction Photo Taken: North-East	
Description: BH01 location adjacent to former UST03.	

AECOM

Plate No. 5	Date: 4/2/2015
Direction Photo Taken: N/A	
Description: Solid flight auger being used at BH01. Hole terminated at 8.0 m bgl.	

Plate No. 6	Date: 4/2/2015
Direction Photo Taken: N/A	
Description: Reinstatement of BH02 with quick drying cement.	

AECOM

Plate No.	Date:
7	4/2/2015

Direction Photo Taken:

N/A

Description:

Backfilled BH01 following completion of drilling.

Plate No.	Date:
8	5/2/2015

Direction Photo Taken:

South-East

Description:

Backhoe excavator excavating test pit (TP) number 4.

AECOM

Plate No.	Date:
9	5/2/2015

Direction Photo Taken:

N/A

Description:

Tope excavation of TP04 - terminated at 1.0 m bgl following refusal on bedrock.

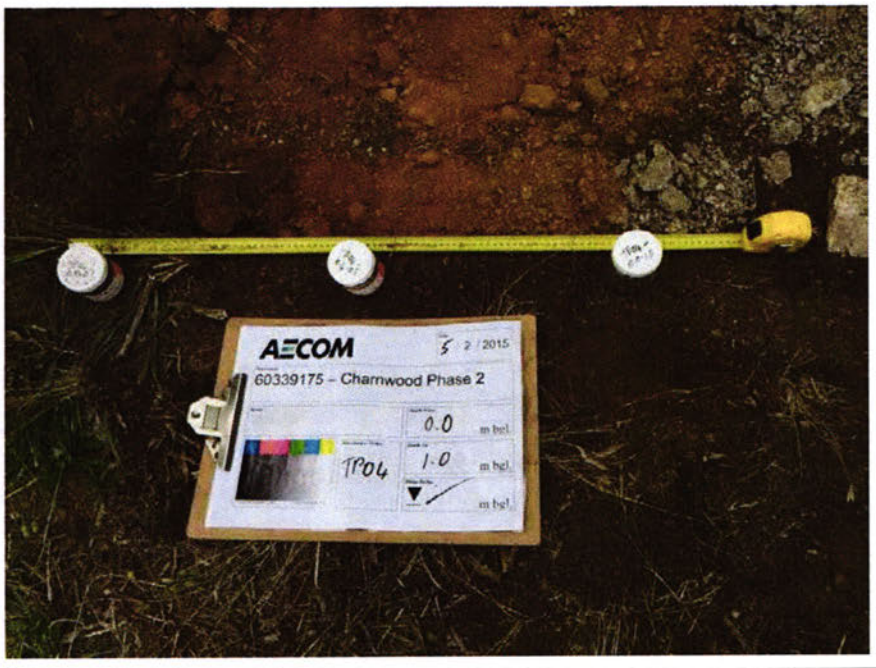
Plate No.	Date:
10	5/2/2015

Direction Photo Taken:

N/A

Description:

Soil profile of TP04 which terminated at 1.0 m bgl. Note the topsoil, silty sand, sandy clay and weathered rock encounterd.



AECOM

Plate No. 11	Date: 5/2/2015
Direction Photo Taken: South-East	
Description: Backhoe excavating TP07. First 0.05 m bgl comprised asphalt and roadbase.	

Plate No. 12	Date: 5/2/2015
Direction Photo Taken: South-West	
Description: Backhoe excavating TP09. After completing Dial Before You Dig searches and engaging a service clearance contractor, a 20 mm copper water pipe was struck at approximately 0.8 m bgl. Works stopped and the inci was investigated.	

AECOM

Plate No. 13	Date: 5/2/2015
Direction Photo Taken: South-East	
Description: The test pit filled up quickly with water being released at mains pressure into the test pit.	

Plate No. 14	Date: 5/2/2015
Direction Photo Taken: North west	
Description: TP09 was located on a grassed area adjacent to the former fire station building and driveway.	

AECOM

Plate No. 15	Date: 5/2/2015
Direction Photo Taken: West	
Description: A plumber (AJ's Plumbing) was called and arrived to remedy the situation.	

Plate No. 16	Date: 5/2/2015
Direction Photo Taken: North	
Description: Pit where water main valve is located.	

AECOM

Plate No. 17	Date: 5/2/2015
Direction Photo Taken: N/A	
Description: Plumber turning off water main to the building.	

Plate No. 18	Date: 5/2/2015
Direction Photo Taken: North-West	
Description: Water was removed from TP09 via the use of buckets and the hole backfilled. Note the conduit adjacent to the test pit.	

AECOM

Plate No.	Date:
19	5/2/2015

Direction Photo Taken:

N/A

Description:

Soil profile of hand auger (HA) location 1. Note the silty sand, gravelly sand and clay which is characteristic of the entire project area.

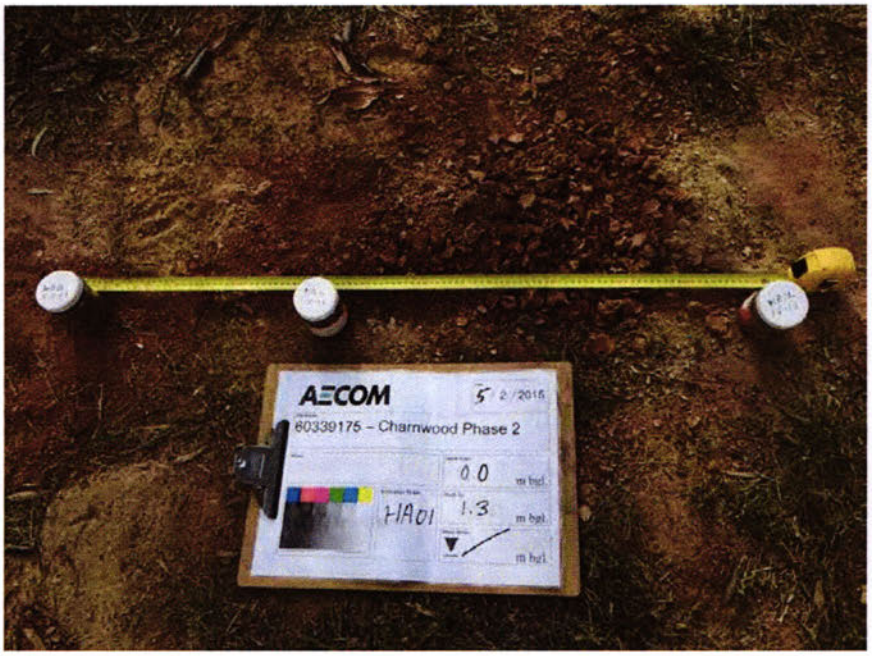


Plate No.	Date:
20	5/2/2015

Direction Photo Taken:

South-West

Description:

TP01 and TP02 reinstatement in AEC 02 (car wrecks/training).

AECOM

Plate No.	Date:
21	5/2/2015

Direction Photo Taken:

North

Description:

TP03, TP07 and TP08 reinstatement in AEC 05 (septic tank and drainage).

Plate No.	Date:
22	5/2/2015

Direction Photo Taken:

South-East

Description:

TP05 reinstatement in AEC 04 (potential uncontrolled fill).

AECOM

ATTACHMENT 5 – QAQC AND LABORATORY CERTIFICATES

Form: 1 of 4

AECOM

Chain of Custody & Analysis Request Form

AECOM - Canberra
Level 2, 60 Marcus Clarke Street
Canberra, ACT 2600
Tel: 02 6201 3000
Fax: 02 6201 3099
Email: [redacted]@aecom.com
[redacted]@aecom.com

Laboratory Details
Lab. Name: ALS Sydney
Lab. Address: Smithfield
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: EN/004/14

Project Name: Charnwood Phase 2 **Project Number:** 60339175 **Purchase Order Number:** Project 60339175, Task No. 1.1

Sample collected by: [redacted] **Sample Results to be returned to:** ALS Sydney

Specifications:	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr ____days) STANDARD	☐ Yes	☑ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☑ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☑ N/A
4. Special storage requirements?	☐ Yes	☐ No	☑ N/A
5. Preservation requirements?	☐ Yes	☐ No	☑ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☑ N/A
7. Report Format: 8. Project Manager:			tel:

Lab. ID	Sample ID	Sampling Date	Sampling Time	Matrix: soil	water	other	Preservation: filt'ed	acid	ice	other	Container (No. & type)	TPH	BTEX	LEAD	EA200 F	On Hold
1	BH01_0.0-0.1	4/2/15	12:00	✓					✓		1X Jar+Bag	✓	✓	✓	✓	
2	BH01_0.5-0.6										1X Jar+Bag					✓
3	BH01_1.0-1.1										1X Jar	✓	✓	✓	[redacted]	
4	BH01_2.0-2.1										1X Jar					✓
5	BH01_3.0-3.1										1X Jar					✓
6	BH01_4.0-4.1										1X Jar					✓
7	BH01_5.0-5.1										1X Jar					✓
8	BH01_6.0-6.1										1X Jar					✓
9	BH01_7.0-7.1										1X Jar					✓
10	BH01_7.9-8.0	↓	↓	↓					↓		1X Jar	✓	✓	✓	[redacted]	

Remarks & comments

Environmental Division Sydney
Work Order
ES1502790
Telephone : +61-2-8784 8555

Relinquished By: [redacted] Date: 04.02.2015 Time: 14:00 of: AECOM

Received by: Ben B Name: Temp = 19.9°C Date: 04 FEB 2015 Time: 17:3 of:

Received in good condition? Yes/No/NA Method of Shipment ☐ Courier ☐ Postal ☐ By Hand
Samples received chilled? Yes/No/NA Consignment Note No.
Yes/No/NA Transport Co:

Relinquished By: Name: Date: Time: of:

Received by: Name: Dan J Date: 6/2 Time: 0820 of: AS

Received in good condition? Yes/No/NA Method of Shipment ☐ Courier ☐ Postal ☐ By Hand
Samples received chilled? Yes/No/NA Consignment Note No.
Yes/No/NA Transport Co:

Form: 2 of 4

AECOM

Chain of Custody & Analysis Request Form

AECOM - Canberra
Level 2, 60 Marcus Clarke Street
Canberra, ACT 2600
Tel: 02 6201 3000
Fax: 02 6201 3099
Email: [redacted]@aecom.com
[redacted]aecom.com

Laboratory Details
Lab. Name: ALS Sydney
Lab. Address: Smithfield
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: EN/004/14

Project Name: Charnwood Phase 2 **Project Number:** 60339175 **Purchase Order Number:** Project 60339175, Task No. 1.1

Sample collected by: [redacted] **Sample Results to be returned to:** ALS Sydney

Specifications:

	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr ____days) STANDARD	☐ Yes	☑ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☑ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☑ N/A
4. Special storage requirements?	☐ Yes	☐ No	☑ N/A
5. Preservation requirements?	☐ Yes	☐ No	☑ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☑ N/A
7. Report Format: 8. Project Manager:			tel:

Lab. ID	Sample ID	Sampling Date	Sampling Time	Matrix: soil	water	other	Preservation: filt'ed	acid	ice	other	Container (No. & type)	Analysis Request: TPH	BTEX	Lead	EA200 F on HOLD	Remarks & comments
11	BH02_0.05-0.15	4/2/15	12:00	✓					✓		1x Jar+Bag	✓	✓	✓	✓	
12	BH02_0.2-0.3	↓	↓	✓					✓		1x Jar+Bag	✓	✓	✓	✓	
13	BH02_0.5-0.6			✓					✓		1x Jar	✓	✓	✓		
14	BH02_1.0-1.1			✓					✓						✓	
15	BH02_2.0-2.1			✓					✓						✓	
16	BH02_3.0-3.1			✓					✓						✓	
17	BH02_4.0-4.1			✓					✓						✓	
18	BH02_5.0-5.1			✓					✓						✓	
19	BH02_6.0-6.1			✓					✓						✓	
20	BH02_7.0-7.1	↓	↓	✓					✓		↓				✓	

Relinquished By: [redacted] Date: 4/2/2015 Time: 14:00 of: AECOM

Received by: Ben B 04 FEB 2015 17:30 Name: Temp = 19.9°C Date: Time: of:

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ By Hand
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

Relinquished By: Name: Date: Time: of:

Received by: Name: Dc..l Date: 6/2 Time: 0806 of: ALS

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ By Hand
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

Form: 3 of 4

AECOM

Chain of Custody & Analysis Request Form

AECOM - Canberra
Level 2, 60 Marcus Clarke Street
Canberra, ACT 2600
Tel: 02 6201 3000
Fax: 02 6201 3099
Email: [redacted]

Laboratory Details
Lab. Name: ALS Sydney
Lab. Address: Smithfield
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: EN/004/14

Project Name: Charnwood Phase 2 **Project Number:** 60339175 **Purchase Order Number:** Project 60339175, Task No. 1.1

Sample collected by: [redacted] **Sample Results to be returned to:** ALS Sydney

Specifications:	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days) STANDARD	☐ Yes	☑ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☑ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☑ N/A
4. Special storage requirements?	☐ Yes	☐ No	☑ N/A
5. Preservation requirements?	☐ Yes	☐ No	☑ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☑ N/A
7. Report Format: 8. Project Manager:			tel:

Lab. ID	Sample ID	Sampling Date	Sampling Time	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	TPH	BTEX	Lead	EA200 F	On Hold	Remarks & comments
21	BH02_7.9-8.0	4/2/15	12:00	✓					✓		1xJar	✓	✓	✓	[redacted]		
22	BH03_0.1-0.2	↓	↓	✓					✓		1xJarTBag					✓	
23	BH03_0.2-0.3			✓					✓		1xJarTBag	✓	✓	✓	✓		
24	BH03_0.4-0.5			✓					✓		1xJar					✓	
25	BH03_1.0-1.1			✓					✓		↓					✓	
26	BH03_2.0-2.1			✓					✓							✓	
27	BH03_3.0-3.1			✓					✓							✓	
28	BH03_4.0-4.1			✓					✓							✓	
29	BH03_5.0-5.1			✓					✓							✓	
30	BH03_6.0-6.1	↓	↓	✓					✓		↓					✓	

Relinquished By: [redacted] Date: 04/02/2015 Time: 14:00 of: AECOM

Received by: [redacted] 04 FEB 2015 Name: TEMP = 19.9°C Date: 17:30 of:

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ By Hand
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

Relinquished By: Name: Date: Time: of:

Received by: Name: [redacted] Date: 6/2 Time: 0800 of: AU

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ By Hand
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

Form: 4 of 4

AECOM

Chain of Custody & Analysis Request Form

AECOM - Canberra
Level 2, 60 Marcus Clarke Street
Canberra, ACT 2600
Tel: 02 6201 3000
Fax: 02 6201 3099
Email: [redacted]@aecom.com
[redacted]@aecom.com

Laboratory Details
Lab. Name: ALS Sydney
Lab. Address: Smithfield
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: EN/004/14

Project Name: Charnwood Phase 2 **Project Number:** 60339175 **Purchase Order Number:** Project 60339175, Task No. 1.1

Sample collected by: [redacted] **Sample Results to be returned to:** ALS Sydney

Specifications:

	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days) STANDARD	☐ Yes	☑ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☑ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☑ N/A
4. Special storage requirements?	☐ Yes	☐ No	☑ N/A
5. Preservation requirements?	☐ Yes	☐ No	☑ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☑ N/A
7. Report Format: 8. Project Manager:			tel:

Lab. ID	Sample ID	Sampling Date	Sampling Time	Matrix: soil	water	other	Preservation: filtered	acid	ice	other	Container (No. & type)	Analysis Request: TPH	BTEX	Lead	EA200 F	On Hold	Please send to SGS Sydney	Remarks & comments
31	BH03_7.0-7.1	4/2/15	12:00	✓					✓		1x Jar					✓		
32	BH03_7.9-8.0	4/2/15	↓	✓					✓		1x Jar	✓	✓	✓				
33	QC100	4/2/15		✓					✓		1x Jar	✓	✓	✓				
—	QC200	4/2/15	↓	✓					✓		1x Jar+Bag	✓	✓	✓	✓	✓		* Please send to SGS Sydney

Relinquished By: [redacted] Date: 27/08/2014 Time: 14:00 of: AECOM

Received by: Ben 04 FEB 2015 17:30 Name: Temp = 19.9°C Date: Time: of:

Received in good condition? Yes/No/NA Samples received chilled? Yes/No/NA Method of Shipment ☐ Courier ☐ Postal ☐ By Hand Consignment Note No. Transport Co:

Relinquished By: Name: Date: Time: of:

Received by: Name: Paul Date: 6/2 Time: of: AU

Received in good condition? Yes/No/NA Samples received chilled? Yes/No/NA Method of Shipment ☐ Courier ☐ Postal ☐ By Hand Consignment Note No. Transport Co:

ALS Group

Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **ES1502790**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Client Services
Address	: LEVEL 2 60 MARCUS CLARKE ST CANBERRA ACT, AUSTRALIA 2600	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: [redacted]@aecom.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 6201 3017	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CHARNWOOD PHASE 2 60339175	Page	: 1 of 3
Order number	: PROJECT 60339175, TASK NO. 1.1		
C-O-C number	: ----	Quote number	: ES2014HLAENV0523 (EN/004/14)
Site	: ----		
Sampler	: RO	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 06-FEB-2015	Issue Date	: 06-FEB-2015 15:35
Client Requested Due Date	: 13-FEB-2015	Scheduled Reporting Date	: **13-FEB-2015**

Delivery Details

Mode of Delivery	: Carrier	Temperature	: 5.1'C - Ice present
No. of coolers/boxes	: 3 HARD	No. of samples received	: 33
Security Seal	: Intact.	No. of samples analysed	: 12

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Asbestos analysis will be conducted by ALS Newcastle.**
- **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).**
- **Sample QC200 to be forwarded to SGS.**
- 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.

Issue Date	: 06-FEB-2015 15:35
Page	: 2 of 3
Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA200F Friable Asbestos Quantitation in Soil by WA/NEPM	SOIL - S-06 TRH/BTEXN/Pb
ES1502790-001	04-FEB-2015 12:00	BH01_0.0-0.1		✓	✓
ES1502790-002	04-FEB-2015 12:00	BH01_0.5-0.6	✓		
ES1502790-003	04-FEB-2015 12:00	BH01_1.0-1.1			✓
ES1502790-004	04-FEB-2015 12:00	BH01_2.0-2.1	✓		
ES1502790-005	04-FEB-2015 12:00	BH01_3.0-3.1	✓		
ES1502790-006	04-FEB-2015 12:00	BH01_4.0-4.1	✓		
ES1502790-007	04-FEB-2015 12:00	BH01_5.0-5.1			✓
ES1502790-008	04-FEB-2015 12:00	BH01_6.0-6.1	✓		
ES1502790-009	04-FEB-2015 12:00	BH01_7.0-7.1	✓		
ES1502790-010	04-FEB-2015 12:00	BH01_7.9-8.0			✓
ES1502790-011	04-FEB-2015 12:00	BH02_0.05-0.15	✓		
ES1502790-012	04-FEB-2015 12:00	BH02_0.2-0.3		✓	✓
ES1502790-013	04-FEB-2015 12:00	BH02_0.5-0.6			✓
ES1502790-014	04-FEB-2015 12:00	BH02_1.0-1.1	✓		
ES1502790-015	04-FEB-2015 12:00	BH02_2.0-2.1	✓		
ES1502790-016	04-FEB-2015 12:00	BH02_3.0-3.1	✓		
ES1502790-017	04-FEB-2015 12:00	BH02_4.0-4.1	✓		
ES1502790-018	04-FEB-2015 12:00	BH02_5.0-5.1			✓
ES1502790-019	04-FEB-2015 12:00	BH02_6.0-6.1	✓		
ES1502790-020	04-FEB-2015 12:00	BH02_7.0-7.1	✓		
ES1502790-021	04-FEB-2015 12:00	BH02_7.9-8.0			✓
ES1502790-022	04-FEB-2015 12:00	BH03_0.1-0.2	✓		
ES1502790-023	04-FEB-2015 12:00	BH03_0.2-0.3		✓	✓
ES1502790-024	04-FEB-2015 12:00	BH03_0.4-0.5	✓		
ES1502790-025	04-FEB-2015 12:00	BH03_1.0-1.1	✓		
ES1502790-026	04-FEB-2015 12:00	BH03_2.0-2.1	✓		
ES1502790-027	04-FEB-2015 12:00	BH03_3.0-3.1	✓		
ES1502790-028	04-FEB-2015 12:00	BH03_4.0-4.1	✓		
ES1502790-029	04-FEB-2015 12:00	BH03_5.0-5.1			✓
ES1502790-030	04-FEB-2015 12:00	BH03_6.0-6.1	✓		
ES1502790-031	04-FEB-2015 12:00	BH03_7.0-7.1	✓		
ES1502790-032	04-FEB-2015 12:00	BH03_7.9-8.0			✓
ES1502790-033	04-FEB-2015 12:00	QC100			✓

Issue Date	: 06-FEB-2015 15:35
Page	: 3 of 3
Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd

Proactive Holding Time Report

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

Requested Deliverables

APCORP PAYABLE		
- A4 - AU Tax Invoice (INV)	Email	ap_customerservice@aecom.com
MR PHIL LIMAGE		
- *AU Certificate of Analysis - NATA	Email	[redacted]@aecom.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep)	Email	[redacted]@aecom.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA	Email	[redacted]@aecom.com
- A4 - AU Sample Receipt Notification - Environmental HT	Email	[redacted]@aecom.com
- A4 - AU Tax Invoice	Email	[redacted]@aecom.com
- Chain of Custody (CoC)	Email	[redacted]@aecom.com
- EDI Format - ENMRG	Email	[redacted]@aecom.com
- EDI Format - ESDAT	Email	[redacted]@aecom.com
- EDI Format - HLAPro	Email	[redacted]@aecom.com
- EDI Format - XTab	Email	[redacted]@aecom.com
MR RYAN O LEARY		
- *AU Certificate of Analysis - NATA (COA)	Email	[redacted]@aecom.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	[redacted]@aecom.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	[redacted]@aecom.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	[redacted]@aecom.com
- A4 - AU Tax Invoice (INV)	Email	[redacted]@aecom.com
- Chain of Custody (CoC) (COC)	Email	[redacted]@aecom.com
- EDI Format - ENMRG (ENMRG)	Email	[redacted]@aecom.com
- EDI Format - ESDAT (ESDAT)	Email	[redacted]@aecom.com
- EDI Format - HLAPro (HLAPro)	Email	[redacted]@aecom.com
- EDI Format - XTab (XTAB)	Email	[redacted]@aecom.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1502790**	Page	: 1 of 9
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Client Services
Address	: LEVEL 2 60 MARCUS CLARKE ST CANBERRA ACT, AUSTRALIA 2600	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: [redacted]@aecom.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 6201 3017	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CHARNWOOD PHASE 2 60339175	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: PROJECT 60339175, TASK NO. 1.1		
C-O-C number	: ----	Date Samples Received	: 06-FEB-2015
Sampler	: RO	Issue Date	: 15-FEB-2015
Site	: ----		
		No. of samples received	: 33
Quote number	: EN/004/14	No. of samples analysed	: 12

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

NATA WORLD RECOGNISED ACCREDITATION

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*
[redacted]	[redacted]	Sydney Organics
[redacted]	[redacted]	Sydney Inorganics
[redacted]	[redacted]	Sydney Organics
[redacted]	[redacted]	Newcastle - Asbestos
[redacted]	[redacted]	Sydney Inorganics

Page	: 2 of 9
Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd
Project	: CHARNWOOD PHASE 2 60339175

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **EA200 Legend**
- **EA200 'Am' Amosite (brown asbestos)**
- **EA200 'Ch' Chrysotile (white 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: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.**
- **EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.**
- **EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.**
- **EA200N: ALS laboratory procedures and methods used for the identification and quantitation of asbestos are consistent with AS4964-2004 and the requirements of the 2013 NEPM for Assessment of Site Contamination**
- **EA200N: Asbestos weights and percentages are not covered under the Scope of NATA Accreditation.**
  Weights of Asbestos are based on extracted bulk asbestos, fibre bundles, and/or ACM and do not include respirable fibres (if present)
  The Friable Asbestos weight is calculated from the extracted Fibrous Asbestos and Asbestos Fines as an equivalent weight of 100% Asbestos
  Percentages for Asbestos content in ACM are based on the 2013 NEPM default values.
  All calculations of percentage Asbestos under this method are approximate and should be used as a guide only.

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Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd
Project	: CHARNWOOD PHASE 2 60339175

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID	BH01_0.0-0.1	BH01_1.0-1.1	BH01_5.0-5.1	BH01_7.9-8.0	BH02_0.2-0.3
				Client sampling date / time	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00
					ES1502790-001	ES1502790-003	ES1502790-007	ES1502790-010	ES1502790-012
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		7.6	9.3	13.5	3.9	12.4
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos Detected	1332-21-4	0.1	g/kg		No	----	----	----	No
Asbestos Type	1332-21-4	-	-		-	----	----	----	-
Sample weight (dry)	----	0.01	g		1090	----	----	----	551
APPROVED IDENTIFIER:	----	-	-		S.SPOONER	----	----	----	S.SPOONER
EA200F: Friable Asbestos in Soil (non-NATA)									
Friable Asbestos	1332-21-4	0.0004	g		<0.0004	----	----	----	<0.0004
Free Fibres	----	5	Fibres		No	----	----	----	No
Friable Asbestos (as Asbestos in Soil)	1332-21-4	0.001	%		<0.001	----	----	----	<0.001
Weight Used for % Calculation	----	0.0001	kg		1.09	----	----	----	0.551
EG005T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg		14	16	10	8	<5
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	m		<0.5	<0.5	<0.5	<0.5	<0.5

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Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd
Project	: CHARNWOOD PHASE 2 60339175

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID	BH01_0.0-0.1	BH01_1.0-1.1	BH01_5.0-5.1	BH01_7.9-8.0	BH02_0.2-0.3
				Client sampling date / time	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00
					ES1502790-001	ES1502790-003	ES1502790-007	ES1502790-010	ES1502790-012
EP080: BTEXN - Continued									
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		**82.4**	**84.2**	**79.3**	**89.9**	**93.7**
Toluene-D8	2037-26-5	0.1	%		**87.5**	**88.5**	**87.4**	**94.0**	**99.0**
4-Bromofluorobenzene	460-00-4	0.1	%		**90.5**	**89.6**	**88.1**	**93.9**	**96.9**

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Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd
Project	: CHARNWOOD PHASE 2 60339175

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID	BH02_0.5-0.6	BH02_5.0-5.1	BH02_7.9-8.0	BH03_0.2-0.3	BH03_5.0-5.1
				Client sampling date / time	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00
					ES1502790-013	ES1502790-018	ES1502790-021	ES1502790-023	ES1502790-029
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		9.4	10.3	6.9	7.4	5.7
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos Detected	1332-21-4	0.1	g/kg		----	----	----	No	----
Asbestos Type	1332-21-4	-	--		----	----	----	-	----
Sample weight (dry)	----	0.01	g		----	----	----	713	----
APPROVED IDENTIFIER:	----	-	--		----	----	----	S.SPOONER	----
EA200F: Friable Asbestos in Soil (non-NATA)									
Friable Asbestos	1332-21-4	0.0004	g		----	----	----	<0.0004	----
Free Fibres	----	5	Fibres		----	----	----	No	----
Friable Asbestos (as Asbestos in Soil)	1332-21-4	0.001	%		----	----	----	<0.001	----
Weight Used for % Calculation	----	0.0001	kg		----	----	----	0.713	----
EG005T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg		<5	7	8	<5	8
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

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Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd
Project	: CHARNWOOD PHASE 2 60339175

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID	BH02_0.5-0.6	BH02_5.0-5.1	BH02_7.9-8.0	BH03_0.2-0.3	BH03_5.0-5.1
				Client sampling date / time	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00	04-FEB-2015 12:00
					ES1502790-013	ES1502790-018	ES1502790-021	ES1502790-023	ES1502790-029
EP080: BTEXN - Continued									
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	0.5	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		86.8	101	92.9	96.6	80.2
Toluene-D8	2037-26-5	0.1	%		92.7	99.5	98.2	111	85.2
4-Bromofluorobenzene	460-00-4	0.1	%		89.8	101	97.9	105	84.5

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Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd
Project	: CHARNWOOD PHASE 2 60339175

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH03_7.9-8.0	QC100	----	----	----
				Client sampling date / time	04-FEB-2015 12:00	04-FEB-2015 12:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1502790-032	ES1502790-033	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		6.2	5.3	----	----	----
EG005T: Total Metals by ICP-AES									
Lead	7439-92-1	5	mg/kg		8	<5	----	----	----
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	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		80.3	85.3	----	----	----
Toluene-D8	2037-26-5	0.1	%		83.0	98.7	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		86.8	91.2	----	----	----

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Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd
Project	: CHARNWOOD PHASE 2 60339175

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 bulk samples		
EA200: Description	BH01_0.0-0.1 - 04-FEB-2015 12:00	Mid brown clay soil with grey and orange rocks.
EA200: Description	BH02_0.2-0.3 - 04-FEB-2015 12:00	Mid brown clay soil with grey rocks and concrete debris.
EA200: Description	BH03_0.2-0.3 - 04-FEB-2015 12:00	Mid brown clay soil with grey rocks and concrete debris.

Surrogate Control Limits

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1502790**	Page	: 1 of 7
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Client Services
Address	: LEVEL 2 60 MARCUS CLARKE ST CANBERRA ACT, AUSTRALIA 2600	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: [redacted]@aecom.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 [redacted]	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CHARNWOOD PHASE 2 60339175	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 06-FEB-2015
Sampler	: RO	Issue Date	: 15-FEB-2015
Order number	: PROJECT 60339175, TASK NO. 1.1		
		No. of samples received	: 33
Quote number	: EN/004/14	No. of samples analysed	: 12

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

This Quality Control Report contains the following information:

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

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Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd
Project	: CHARNWOOD PHASE 2 60339175

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

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
[redacted]	[redacted] - Organics	Sydney Organics
		Sydney Inorganics
		Sydney Organics
[redacted]	[redacted]	Newcastle - Asbestos
[redacted]	[redacted]	Sydney Organics

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Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (QC Lot: 3817833)									
ES1502788-021	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	17.4	18.1	3.9	0% - 50%
ES1502790-013	BH02_0.5-0.6	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	9.4	9.2	3.0	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 3820342)									
ES1502790-001	BH01_0.0-0.1	EG005T: Lead	7439-92-1	5	mg/kg	14	15	0.0	No Limit
ES1502790-032	BH03_7.9-8.0	EG005T: Lead	7439-92-1	5	mg/kg	8	8	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3815328)									
ES1502788-021	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES1502790-007	BH01_5.0-5.1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3815345)									
ES1502688-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	560	540	3.1	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	380	380	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES1502790-007	BH01_5.0-5.1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3815328)									
ES1502788-021	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES1502790-007	BH01_5.0-5.1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3815345)									
ES1502688-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	840	780	6.9	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	200	210	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.0	No Limit
ES1502790-007	BH01_5.0-5.1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 3815328)									
ES1502788-021	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES1502790-007	BH01_5.0-5.1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

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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: 3815328) - continued									
ES1502790-007	BH01_5.0-5.1	EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

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

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 3820342)								
EG005T: Lead	7439-92-1	5	mg/kg	<5	40.0 mg/kg	106	86	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3815328)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	88.8	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3815345)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	124	71	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	123	74	138
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	109	64	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3815328)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	87.6	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3815345)								
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	117	70	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	123	74	138
EP071: >C34 - C40 Fraction	----	50	mg/kg	<100	150 mg/kg	70.2	63	131
EP080: BTEXN (QCLot: 3815328)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	77.3	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	77.8	62	128
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	75.2	58	118
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	77.9	60	120
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	82.1	60	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	82.9	62	138

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 3820342)							
ES1502790-001	BH01_0.0-0.1	EG005T: Lead	7439-92-1	250 mg/kg	101	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3815328)							

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Recovery Limits (%) Low	Matrix Spike (MS) Report: Recovery Limits (%) High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3815328) - continued							
ES1502788-021	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	105	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3815345)							
ES1502688-001	Anonymous	EP071: C10 - C14 Fraction	----	560 mg/kg	104	73	137
		EP071: C15 - C28 Fraction	----	2370 mg/kg	87.0	53	131
		EP071: C29 - C36 Fraction	----	1695 mg/kg	87.9	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3815328)							
ES1502788-021	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	96.8	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3815345)							
ES1502688-001	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	902 mg/kg	99.8	73	137
		EP071: >C16 - C34 Fraction	----	3190 mg/kg	89.2	53	131
		EP071: >C34 - C40 Fraction	----	1087 mg/kg	82.1	52	132
EP080: BTEXN (QCLot: 3815328)							
ES1502788-021	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	82.4	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	84.6	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	86.1	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	87.4	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	87.2	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	74.2	70	130

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

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%) MS	Spike Recovery (%) MSD	Recovery Limits (%) Low	Recovery Limits (%) High	RPDs (%) Value	RPDs (%) Control Limit
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3815328)										
ES1502788-021	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	105	----	70	130	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3815328)										
ES1502788-021	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	96.8	----	70	130	----	----
EP080: BTEXN (QCLot: 3815328)										
ES1502788-021	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	82.4	----	70	130	----	----
		EP080: Toluene	108-88-3	2.5 mg/kg	84.6	----	70	130	----	----
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	86.1	----	70	130	----	----

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Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080: BTEXN (QCLot: 3815328) - continued										
ES1502788-021	Anonymous	EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	87.4	----	70	130	----	----
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	87.2	----	70	130	----	----
		EP080: Naphthalene	91-20-3	2.5 mg/kg	74.2	----	70	130	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3815345)										
ES1502688-001	Anonymous	EP071: C10 - C14 Fraction	----	560 mg/kg	104	----	73	137	----	----
		EP071: C15 - C28 Fraction	----	2370 mg/kg	87.0	----	53	131	----	----
		EP071: C29 - C36 Fraction	----	1695 mg/kg	87.9	----	52	132	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3815345)										
ES1502688-001	Anonymous	EP071: >C10 - C16 Fraction	>C10_C16	902 mg/kg	99.8	----	73	137	----	----
		EP071: >C16 - C34 Fraction	----	3190 mg/kg	89.2	----	53	131	----	----
		EP071: >C34 - C40 Fraction	----	1087 mg/kg	82.1	----	52	132	----	----
EG005T: Total Metals by ICP-AES (QCLot: 3820342)										
ES1502790-001	BH01_0.0-0.1	EG005T: Lead	7439-92-1	250 mg/kg	101	----	70	130	----	----

ALS Environmental

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1502790**	Page	: 1 of 6
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Client Services
Address	: LEVEL 2 60 MARCUS CLARKE ST CANBERRA ACT, AUSTRALIA 2600	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: [redacted]@aecom.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 [redacted]	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CHARNWOOD PHASE 2 60339175	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 06-FEB-2015
Sampler	: RO	Issue Date	: 15-FEB-2015
Order number	: PROJECT 60339175, TASK NO. 1.1		
		No. of samples received	: 33
Quote number	: EN/004/14	No. of samples analysed	: 12

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

This Interpretive Quality Control Report contains the following information:

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

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Work Order	: ES1502790
Client	: AECOM Australia Pty Ltd
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Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103)								
BH01_0.0-0.1,	BH01_1.0-1.1,	**04-FEB-2015**	----	----	----	**10-FEB-2015**	18-FEB-2015	✓
BH01_5.0-5.1,	BH01_7.9-8.0,							
BH02_0.2-0.3,	BH02_0.5-0.6,							
BH02_5.0-5.1,	BH02_7.9-8.0,							
BH03_0.2-0.3,	BH03_5.0-5.1,							
BH03_7.9-8.0,	QC100							
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Snap Lock Bag - Separate bag received (EA200)								
BH01_0.0-0.1,	BH02_0.2-0.3,	**04-FEB-2015**	---	03-AUG-2015	----	**12-FEB-2015**	03-AUG-2015	✓
BH03_0.2-0.3								
EA200F: Friable Asbestos in Soil (non-NATA)								
Snap Lock Bag - Separate bag received (EA200N)								
BH01_0.0-0.1,	BH02_0.2-0.3,	**04-FEB-2015**	---	03-AUG-2015	----	**12-FEB-2015**	11-AUG-2015	✓
BH03_0.2-0.3								
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
BH01_0.0-0.1,	BH01_1.0-1.1,	**04-FEB-2015**	**12-FEB-2015**	03-AUG-2015	✓	**12-FEB-2015**	03-AUG-2015	✓
BH01_5.0-5.1,	BH01_7.9-8.0,							
BH02_0.2-0.3,	BH02_0.5-0.6,							
BH02_5.0-5.1,	BH02_7.9-8.0,							
BH03_0.2-0.3,	BH03_5.0-5.1,							
BH03_7.9-8.0,	QC100							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Soil Glass Jar - Unpreserved (EP071)								
BH01_0.0-0.1,	BH01_1.0-1.1,	**04-FEB-2015**	**11-FEB-2015**	18-FEB-2015	✓	**13-FEB-2015**	23-MAR-2015	✓
BH01_5.0-5.1,	BH01_7.9-8.0,							
BH02_0.2-0.3,	BH02_0.5-0.6,							
BH02_5.0-5.1,	BH02_7.9-8.0,							
BH03_0.2-0.3,	BH03_5.0-5.1,							
BH03_7.9-8.0,	QC100							

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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: BTEXN								
Soil Glass Jar - Unpreserved (EP080)								
BH01_0.0-0.1,	BH01_1.0-1.1,	**04-FEB-2015**	**09-FEB-2015**	18-FEB-2015	✓	**12-FEB-2015**	18-FEB-2015	✓
BH01_5.0-5.1,	BH01_7.9-8.0,							
BH02_0.2-0.3,	BH02_0.5-0.6,							
BH02_5.0-5.1,	BH02_7.9-8.0,							
BH03_0.2-0.3,	BH03_5.0-5.1,							
BH03_7.9-8.0,	QC100							
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080)								
BH01_0.0-0.1,	BH01_1.0-1.1,	**04-FEB-2015**	**09-FEB-2015**	18-FEB-2015	✓	**12-FEB-2015**	18-FEB-2015	✓
BH01_5.0-5.1,	BH01_7.9-8.0,							
BH02_0.2-0.3,	BH02_0.5-0.6,							
BH02_5.0-5.1,	BH02_7.9-8.0,							
BH03_0.2-0.3,	BH03_5.0-5.1,							
BH03_7.9-8.0,	QC100							

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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	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Total Metals by ICP-AES	EG005T	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Total Metals by ICP-AES	EG005T	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Total Metals by ICP-AES	EG005T	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH - Semivolatile Fraction	EP071	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TRH Volatiles/BTEX	EP080	1	20	**5.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	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 bulk solids	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Asbestos Classification and Quantitation per NEPM 2013	* EA200N	SOIL	Asbestos Classification and Quantitation per NEPM 2013 with Confirmation of Identification by AS 4964 - 2004 Gravimetric determination of Asbestos Containing Material, Friable Asbestos and sample weight and calculation of percentage concentrations per NEPM protocols. Friable Asbestos is reported as the equivalent weight in the sample received after accounting for sub-sampling (where applicable for the <7mm and/or <2mm fractions).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 21st ed., 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
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.

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.

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Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

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

Regular Sample Surrogates

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

Outliers : Analysis Holding Time Compliance

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

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

Outliers : Frequency of Quality Control Samples

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

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

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AECOM

Chain of Custody & Analysis Request Form

AECOM - Canberra
Level 2, 60 Marcus Clarke Street
Canberra, ACT 2600
Tel: 02 6201 3000
Fax: 02 6201 3099
Email: [redacted]@aecom.com
[redacted]@aecom.com

Laboratory Details
Lab. Name: ALS Sydney
Lab. Address: Smithfield
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: EN/004/14

Project Name: Charnwood Phase 2 **Project Number:** 60339175 **Purchase Order Number:** Project 60339175, Task No. 1.1

Sample collected by: [redacted] **Sample Results to be returned to:** ALS Sydney

Specifications:	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days) STANDARD	☐ Yes	☑ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☑ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☑ N/A
4. Special storage requirements?	☐ Yes	☐ No	☑ N/A
5. Preservation requirements?	☐ Yes	☐ No	☑ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☑ N/A
7. Report Format: 8. Project Manager:			tel:

Lab. ID	Sample ID	Sampling Date	Sampling Time	Matrix: soil	water	other	Preservation: filtered	acid	ice	other	Container (No. & type)	TPH	BTEX	PAH	PCB	OCP	OPP	AE200F	On Hold	Remarks & comments
12	TP01_0.0-0.1	5/02/2015		√					√		1 x Jar & Bag								√	
1	TP01_0.2-0.3	5/02/2015		√					√		1 x Jar & Bag	√	√	√	√			√		
13	TP01_0.4-0.5	5/02/2015		√					√		1 x Jar								√	
14	TP01_1.0-1.1	5/02/2015		√					√		1 x Jar								√	
1 2	TP02_0.2-0.3	5/02/2015		√					√		1 x Jar & Bag	√	√	√	√			√		
15	TP02_0.4-0.5	5/02/2015		√					√		1 x Jar								√	
16	TP02_1.3-1.4	5/02/2015		√					√		1 x Jar								√	
3	TP03_0.2--0.3	5/02/2015		√					√		1 x Jar & Bag	√	√	√	√	√	√	√		
17	TP03_0.4--0.5	5/02/2015		√					√		1 x Jar								√	
18	TP03_1.2-1.3	5/02/2015		√					√		1 x Jar								√	

Environmental Division Sydney
Work Order
ES1503068
Telephone : +61-2-8784 8555

Relinquished By: [redacted]
Date: 06/02/2015 Time: 14:00
of: AECOM

Received by: Ben B
Name: ALS
Date: 06 FEB 2015 Time: 14:00
of:

Received in good condition? Yes/No/NA
Samples received chilled? Yes/No/NA
Yes/No/NA
Method of Shipment ☐ Courier ☐ Postal ☐ By Hand
Consignment Note No.
Transport Co:

Relinquished By:
Name: Date:
of: Time:

Received by:
Name: [redacted]
Date: 10/2
of: AM
Time: 0830

Received in good condition? Yes/No/NA
Samples received chilled? Yes/No/NA
Yes/No/NA
Method of Shipment ☐ Courier ☐ Posta ☐ By Hand
Consignment Note No.
Transport Co:

Printed copies of this document are uncontrolled

Revision: Oct 09
BMS-PM-DV-F046

Environment

Temp = 9.6°C

Form: 2 of 4

AECOM

Chain of Custody & Analysis Request Form

AECOM - Canberra
Level 2, 60 Marcus Clarke Street
Canberra, ACT 2600
Tel: 02 6201 3000
Fax: 02 6201 3099
[redacted]@aecom.com
[redacted]@aecom.com

Laboratory Details
Lab. Name: ALS Sydney
Lab. Address: Smithfield
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: EN/004/14

Project Name: Charnwood Phase 2 **Project Number:** 60339175 **Purchase Order Number:** Project 60339175, Task No. 1.1

Sample collected by: [redacted] **Sample Results to be returned to:** ALS Sydney

Specifications:

	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days) STANDARD	☐ Yes	☑ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☑ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☑ N/A
4. Special storage requirements?	☐ Yes	☐ No	☑ N/A
5. Preservation requirements?	☐ Yes	☐ No	☑ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☑ N/A

7. Report Format: 8. Project Manager: tel:

Lab. ID	Sample ID	Sampling Date	Sampling Time	Matrix: soil	water	other	Preservation: filt'ed	acid	ice	other	Container (No. & type)	TPH	BTEX	PAH	OCP	OPP	PCB	EA200F	On Hold	Remarks & comments
4	TP04_0.0-0.1	5/02/2015		√					√		1 x Jar & Bag	√	√	√	√	√	√	√		
19	TP04_0.4-0.5	5/02/2015		√					√		1 x Jar								√	
20	TP04_0.9-1.0	5/02/2015		√					√		1 x Jar								√	
5	TP05_0.0-0.1	5/02/2015		√					√		1 x Jar & Bag	√	√	√	√	√	√	√		
21	TP05_0.4-0.5	5/02/2015		√					√		1 x Jar								√	
22	TP05_1.0-1.1	5/02/2015		√					√		1 x Jar								√	
6	TP06_0.0-0.1	5/02/2015		√					√		1 x Jar & Bag	√	√	√	√	√	√	√		
23	TP06_0.4-0.5	5/02/2015		√					√		1 x Jar								√	
24	TP06_1.2-1.3	5/02/2015		√					√		1 x Jar								√	
28	TP07_0.2-0.3	5/02/2015		√					√		1 x Jar								√	

Relinquished By: [redacted] Date: 06/02/2015 Time: 14:00 of: AECOM

Received by: Ben B Date: 06 FEB 2015 Time: 14:00 Name: of: ALS

Relinquished By: Name: Date: Time: of:

Received by: Name: Daud Date: 10/2 Time: 0830 of: AU

Received in good condition? Yes/No/NA Method of Shipment ☐ Courier ☐ Postal ☐ By Hand
Samples received chilled? Yes/No/NA Consignment Note No.
Yes/No/NA Transport Co:

Received in good condition? Yes/No/NA Method of Shipment ☐ Courier ☐ Posta ☐ By Hand
Samples received chilled? Yes/No/NA Consignment Note No.
Yes/No/NA Transport Co:

Temp = 9.6oc

Form: 3 of 4

AECOM

Chain of Custody & Analysis Request Form

AECOM - Canberra
Level 2, 60 Marcus Clarke Street
Canberra, ACT 2600
Tel: 02 6201 3000
Fax: 02 6201 3099
Email: [redacted]

Laboratory Details
Lab. Name: ALS Sydney
Lab. Address: Smithfield
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: EN/004/14

Project Name: Charnwood Phase 2 **Project Number:** 60339175 **Purchase Order Number:** Project 60339175, Task No. 1.1

Sample collected by: [redacted] **Sample Results to be returned to:** ALS Sydney

Specifications:	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days) STANDARD	☐ Yes	☑ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☑ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☑ N/A
4. Special storage requirements?	☐ Yes	☐ No	☑ N/A
5. Preservation requirements?	☐ Yes	☐ No	☑ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☑ N/A
7. Report Format:	8. Project Manager:		tel:

Lab. ID	Sample ID	Sampling Date	Sampling Time	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: Ice	Preservation: other	Container (No. & type)	TPH	BTEX	PAH	OCP	OPP	PCB	E. coli	Faecal coliforms	Asbestos	On Hold	Remarks & comments
26	TP07_0.4-0.5	5/02/2015		√					√		1 x Jar & Bag										√	
27	TP07_1.0-1.1	5/02/2015		√					√		1 x Jar										√	
7	TP08_0.2-0.3	5/02/2015		√					√		1 x Jar & Bag	√	√	√	√	√	√	√	√	√		
28	TP08_0.4-0.5	5/02/2015		√					√		1 x Jar										√	
29	TP08_1.1-1.2	5/02/2015		√					√		1 x Jar										√	
8	TP09_0.0-0.1	5/02/2015		√					√		1 x Jar & Bag	√	√	√	√	√	√	√	√	√		
30	TP09_0.4-0.5	5/02/2015		√					√		1 x Jar										√	
9	HA01_0.0-0.1	5/02/2015		√					√		1 x Jar & Bag	√	√	√	√	√	√	√	√	√		
31	HA01_0.4-0.5	5/02/2015		√					√		1 x Jar										√	
32	HA01_1.0-1.1	5/02/2015		√					√		1 x Jar										√	

Relinquished By:
[redacted]
Date: 06/02/2015
Time: 14:00
of: AECOM

Received by: Ben B
Date: 06 FEB 2015
Name:
Time: 14:30
of: ALS

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ By Hand
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

Relinquished By:
Name:
Date:
Time:
of:

Received by:
Name: David
Date: 10/2
Time: 0830
of: ALS

Received in good condition?	Yes/No/NA	Method of Shipment	☐ Courier ☐ Postal ☐ By Hand
Samples received chilled?	Yes/No/NA	Consignment Note No.	
	Yes/No/NA	Transport Co:	

Environment Temp = 9.6°C

AECOM

Form: 4 of 4

Chain of Custody & Analysis Request Form

AECOM - Canberra
Level 2, 60 Marcus Clarke Street
Canberra, ACT 2600
Tel: 02 6201 3000
Fax: 02 6201 3099
Email: [redacted]

Laboratory Details
Lab. Name: ALS Sydney
Lab. Address: Smithfield
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: EN/004/14

Project Name: Charnwood Phase 2 **Project Number:** 60339175 **Purchase Order Number:** Project 60339175, Task No. 1.1

Sample collected by: [redacted] **Sample Results to be returned to:** ALS Sydney

Specifications:	(Tick)		
1. Urgent TAT required? (please circle: 24hr 48hr _____days) STANDARD	☐ Yes	☑ No	☐ N/A
2. Fast TAT Guarantee Required?	☐ Yes	☑ No	☐ N/A
3. Is any sediment layer present in waters to be excluded from extractions?	☐ Yes	☐ No	☑ N/A
4. Special storage requirements?	☐ Yes	☐ No	☑ N/A
5. Preservation requirements?	☐ Yes	☐ No	☑ N/A
6. Other requirements? ☐ Fax ☐ Hard copy ☑ Email	☐ Yes	☐ No	☑ N/A
7. Report Format: 8. Project Manager:			tel:

Lab. ID	Sample ID	Sampling Date	Sampling Time	Matrix: soil	Matrix: water	Matrix: other	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	TPH	BTEX	PAH	E. coli	Faecal coliforms	Asbestos	Remarks & comments
10	QC101	5/02/2015		√					√		1 x Jar & Bag	√	√	√	√	√		
11	QC201	5/02/2015		√					√		1 x Jar	√	√	√	√	√	√	

Relinquished By: [redacted] Date: 06/02/2015 Time: 14:00 of: AECOM

Received by: Name: [redacted] Date: 06 FEB 2015 Time: 14:00 of: ALS

Received in good condition? Yes/No/NA
Samples received chilled? Yes/No/NA
Method of Shipment: ☐ Courier ☐ Postal ☐ By Hand
Consignment Note No.
Transport Co:

Relinquished By: Name: Date: Time: of:

Received by: Name: [redacted] Date: 6/2 Time: 0832 of: ALS

Received in good condition? Yes/No/NA
Samples received chilled? Yes/No/NA
Method of Shipment: ☐ Courier ☐ Postal ☐ By Hand
Consignment Note No.
Transport Co:

Temp = 9.6 oc

ALS Group

Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **ES1503068**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Client Services
Address	: LEVEL 2 60 MARCUS CLARKE ST CANBERRA ACT, AUSTRALIA 2600	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: [redacted]@aecom.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 [redacted]	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 60339175 CHARNWOOD PHASE 2	Page	: 1 of 3
Order number	: 60339175, TASK NO.1.1		
C-O-C number	: ----	Quote number	: ES2014HLAENV0523 (EN/004/14)
Site	: ----		
Sampler	: RO	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 10-FEB-2015	Issue Date	: 11-FEB-2015 14:02
Client Requested Due Date	: 19-FEB-2015	Scheduled Reporting Date	: **19-FEB-2015**

Delivery Details

Mode of Delivery	: Carrier	Temperature	: 22.1'C - Ice bricks present
No. of coolers/boxes	: 3 ESKYS	No. of samples received	: 32
Security Seal	: Intact.	No. of samples analysed	: 11

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Asbestos analysis will be conducted by ALS Newcastle.**
- **Micro analysis will be conducted by ALS Scoresby.**
- **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).**
- **Sample TP05_1.0-1.1 was received labelled as TP05_1.3-1.4 on the jar, lab will use sample id on the jar for analysis.**
- 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.

Issue Date	: 11-FEB-2015 14:02
Page	: 2 of 3
Work Order	: ES1503068
Client	: AECOM Australia Pty Ltd

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA200F Friable Asbestos Quantitation in Soil by WA/NEPM	SOIL - EP066 (solids) Polychlorinated Biphenyls by GCMS	SOIL - MM616 (FC & EC) (Subcontracted) Faecal Coliforms & E.Coli MPN in Soil	SOIL - MM616 (FC) (Subcontracted) Faecal Coliforms MPN in Soil	SOIL - S-07 TRH/BTEX/PAH (SIM)	SOIL - S-13 OC/OP/PCB
ES1503068-001	05-FEB-2015 15:00	TP01_0.2-0.3		✓	✓			✓	
ES1503068-002	05-FEB-2015 15:00	TP02_0.2-0.3		✓	✓			✓	
ES1503068-003	05-FEB-2015 15:00	TP03_0.2-0.3		✓				✓	✓
ES1503068-004	05-FEB-2015 15:00	TP04_0.0-0.1		✓				✓	✓
ES1503068-005	05-FEB-2015 15:00	TP05_0.0-0.1		✓				✓	✓
ES1503068-006	05-FEB-2015 15:00	TP06_0.0-0.1		✓				✓	✓
ES1503068-007	05-FEB-2015 15:00	TP08_0.2-0.3		✓		✓		✓	✓
ES1503068-008	05-FEB-2015 15:00	TP09_0.0-0.1		✓		✓		✓	✓
ES1503068-009	05-FEB-2015 15:00	HA01_0.0-0.1		✓		✓		✓	✓
ES1503068-010	05-FEB-2015 15:00	QC101					✓	✓	
ES1503068-011	05-FEB-2015 15:00	QC201		✓			✓	✓	
ES1503068-012	05-FEB-2015 15:00	TP01_0.0-0.1	✓						
ES1503068-013	05-FEB-2015 15:00	TP01_0.4-0.5	✓						
ES1503068-014	05-FEB-2015 15:00	TP01_1.0-1.1	✓						
ES1503068-015	05-FEB-2015 15:00	TP02_0.4-0.5	✓						
ES1503068-016	05-FEB-2015 15:00	TP02_1.3-1.4	✓						
ES1503068-017	05-FEB-2015 15:00	TP03_0.4-0.5	✓						
ES1503068-018	05-FEB-2015 15:00	TP03_1.2-1.3	✓						
ES1503068-019	05-FEB-2015 15:00	TP04_0.4-0.5	✓						
ES1503068-020	05-FEB-2015 15:00	TP04_0.9-1.0	✓						
ES1503068-021	05-FEB-2015 15:00	TP05_0.4-0.5	✓						
ES1503068-022	05-FEB-2015 15:00	TP05_1.3-1.4	✓						
ES1503068-023	05-FEB-2015 15:00	TP06_0.4-0.5	✓						
ES1503068-024	05-FEB-2015 15:00	TP06_1.2-1.3	✓						
ES1503068-025	05-FEB-2015 15:00	TP07_0.2-0.3	✓						
ES1503068-026	05-FEB-2015 15:00	TP07_0.4-0.5	✓						
ES1503068-027	05-FEB-2015 15:00	TP07_1.0-1.1	✓						
ES1503068-028	05-FEB-2015 15:00	TP08_0.4-0.5	✓						
ES1503068-029	05-FEB-2015 15:00	TP08_1.1-1.2	✓						
ES1503068-030	05-FEB-2015 15:00	TP09_0.4-0.5	✓						
ES1503068-031	05-FEB-2015 15:00	HA01_0.4-0.5	✓						
ES1503068-032	05-FEB-2015 15:00	HA01_1.0-1.1	✓						

Proactive Holding Time Report

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

Issue Date	: 11-FEB-2015 14:02
Page	: 3 of 3
Work Order	: ES1503068
Client	: AECOM Australia Pty Ltd

Requested Deliverables

APCORP PAYABLE

- A4 - AU Tax Invoice (INV)	Email	ap_customerservice@aecom.com

[redacted]

- *AU Certificate of Analysis - NATA	Email	[redacted]@aecom.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep)	Email	[redacted]@aecom.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA	Email	[redacted]@aecom.com
- A4 - AU Sample Receipt Notification - Environmental HT	Email	[redacted]@aecom.com
- A4 - AU Tax Invoice	Email	[redacted]@aecom.com
- Chain of Custody (CoC)	Email	[redacted]@aecom.com
- EDI Format - ENMRG	Email	[redacted]@aecom.com
- EDI Format - ESDAT	Email	[redacted]@aecom.com
- EDI Format - HLAPro	Email	[redacted]@aecom.com
- EDI Format - XTab	Email	[redacted]@aecom.com

[redacted]

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1503068**	Page	: 1 of 16
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: [redacted]	Contact	: Client Services
Address	: LEVEL 2 60 MARCUS CLARKE ST CANBERRA ACT, AUSTRALIA 2600	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: [redacted]@aecom.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 [redacted]	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 60339175 CHARNWOOD PHASE 2	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 60339175, TASK NO.1.1		
C-O-C number	: ----	Date Samples Received	: 10-FEB-2015
Sampler	: RO	Issue Date	: 19-FEB-2015
Site	: ----		
		No. of samples received	: 32
Quote number	: EN/004/14	No. of samples analysed	: 12

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

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*
[redacted]	[redacted]	Sydney Inorganics
[redacted]a	[redacted]	Sydney Organics
[redacted]	[redacted]	Newcastle - Asbestos
[redacted]	[redacted]	WRG Subcontracting

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.**
- **EA200 Legend**
- **EA200 'Am' Amosite (brown asbestos)**
- **EA200 'Ch' Chrysotile (white 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: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.**
- **EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.**
- **EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.**
- **EA200N: ALS laboratory procedures and methods used for the identification and quantitation of asbestos are consistent with AS4964-2004 and the requirements of the 2013 NEPM for Assessment of Site Contamination**
- **EA200N: Asbestos weights and percentages are not covered under the Scope of NATA Accreditation.**
  Weights of Asbestos are based on extracted bulk asbestos, fibre bundles, and/or ACM and do not include respirable fibres (if present)
  The Friable Asbestos weight is calculated from the extracted Fibrous Asbestos and Asbestos Fines as an equivalent weight of 100% Asbestos
  Percentages for Asbestos content in ACM are based on the 2013 NEPM default values.
  All calculations of percentage Asbestos under this method are approximate and should be used as a guide only.
- **Faecal Coliforms by MPN (MM616) is conducted by ALS Scoresby NATA accreditation no. 992, site no. 989. NATA accreditation does not cover performance of this method.**

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Work Order	: ES1503068
Client	: AECOM Australia Pty Ltd
Project	: 60339175 CHARNWOOD PHASE 2

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID	TP01_0.2-0.3	TP02_0.2-0.3	TP03_0.2-0.3	TP04_0.0-0.1	TP05_0.0-0.1
				Client sampling date / time	05-FEB-2015 15:00	05-FEB-2015 15:00	05-FEB-2015 15:00	05-FEB-2015 15:00	05-FEB-2015 15:00
					ES1503068-001	ES1503068-002	ES1503068-003	ES1503068-004	ES1503068-005
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%		6.5	6.8	6.5	6.4	49.9
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos Detected	1332-21-4	0.1	g/kg		No	No	No	No	No
Asbestos Type	1332-21-4	-	--		-	-	-	-	-
Sample weight (dry)	----	0.01	g		2010	2610	1140	1330	819
APPROVED IDENTIFIER:	----	-	--		G.MORGAN	C.OWLER	S.SPOONER	G.MORGAN	S.SPOONER
EA200F: Friable Asbestos in Soil (non-NATA)									
Friable Asbestos	1332-21-4	0.0004	g		<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Free Fibres	----	5	Fibres		No	No	No	No	No
Friable Asbestos (as Asbestos in Soil)	1332-21-4	0.001	%		<0.001	<0.001	<0.001	<0.001	<0.001
Weight Used for % Calculation	----	0.0001	kg		2.01	2.61	1.14	1.33	0.819
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		----	----	<0.05	<0.05	<0.05