

ASBESTOS CLEARANCE & SOIL CONTAMINATION ASSESSMENT



January 2020
J160879-01

NSW Land and Housing
Corporation

50 Wellington Road, Chester
Hill NSW

C107603 : JG

Document Control

Document Quality Management Details.		
Report Name:	Asbestos Clearance & Soil Contamination Assessment	
Site Details:	50 Wellington Road, Chester Hill NSW	
Project Number:	J160879-01	
Client Name:	NSW Land and Housing Corporation	
Client Number:	C107603	
Signatures:	Prepared By:  James Green Consultant - Environment NSW	Authorised By:  Matthew Barberson Team Manager - Contaminated Land Management

Issue Status

Version No.	Date	Creator	Reviewer
1	21/01/2020	James Green	Matthew Barberson

Document Circulation

No of Copies	Type	Customer Name	Position & Company
1	Electronic	Gerald Alexander	Project Manager

Statements of Limitations

All and any Services proposed by Grencap to the Client are subject to the Terms and Conditions listed on the Grencap website at: www.grencap.com.au/about-grencap/terms-and-conditions. Unless otherwise expressly agreed to in writing and signed by Grencap, Grencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services are to be carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services are to be carried out in accordance with Commonwealth, State or Territory legislation, regulations and/or guidelines. The Client will be deemed to have accepted these Terms when the Client signs the Proposal (where indicated) or when the Company commences the Services at the request (written or otherwise) of the Client.

The services are carried out for the Specific Purpose, outlined in the body of this Proposal. To the fullest extent permitted by law, Grencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledges and agrees that proposed investigations rely on information provided to Grencap by the Client or other third parties. Grencap makes no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. The Client releases and indemnifies Grencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Grencap by the Client, its employees or other third parties. Under no circumstances shall Grencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Grencap.

The Client will ensure that Grencap has access to all sites and buildings as required by or necessary for Grencap to undertake the Services. Notwithstanding any other provision in these Terms, Grencap will have no liability to the Client or any third party to the extent that the performance of the Services is not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Grencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Grencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Grencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Grencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Grencap's Terms and Conditions available at www.grencap.com.au/about-grencap/terms-and-conditions.

Asbestos Clearance & Soil Contamination Assessment

NSW Land and Housing Corporation

50 Wellington Road, Chester Hill NSW

Table of Contents

1	Introduction	1
2	Project Background	1
2.1	Sampling/Assessment Round – 18 th December 2019	1
3	Objectives/Project Scope	2
3.1	Soil Chemical Sampling	2
3.2	Soil Asbestos Sampling and Clearance Inspection	2
3.2.1	Asbestos Soil Inspection - Following Remediation	2
4	Sampling Locations	3
4.1	Test Pit Sampling	3
5	Field Observations	3
5.1	Test pit Observations	3
5.2	10L Sieve Testing for ACM	3
5.3	Asbestos Clearance Walkover Inspection - 18 th Dec 2019	3
5.3.1	Asbestos Clearance Walkover Inspection - 13 th Jan 2020	3
6	Assessment Criteria	4
6.1	Guidance and Legislation	4
6.2	Adopted Site Criteria	4
6.3	Asbestos Criteria	6
7	Soil Analytical Results	7
7.1	Laboratory Analytical Schedule	7
7.2	Chemical Analytical Results	7
7.3	Asbestos Analytical Results	7
7.4	Asbestos 10L Sieve Test Results	8
7.5	QA/QC Procedures	8
8	Asbestos in Soil Clearance Inspection	9
8.1	Removal Details	9
8.1.1	Extent	9
8.1.2	Date of Removal	9
8.1.3	Licensed Asbestos Removal Contractor (LARC)	9
8.2	Soil Clearance Inspection	9
8.2.1	Soil Inspection Date	9
8.2.2	Visual Surface Inspection	9
8.2.3	Asbestos Clearance Soil Sampling	9
9	Discussion/Conclusions	9
9.1	Soil Analytical Results Discussion/Conclusion	9
9.2	Asbestos in Soil Clearance Inspection Discussion/Conclusion	10
10	Asbestos in Soil Clearance Inspection Limitations	10
	Figures i	
	Appendix A: Photographic Gallery	ii
	Appendix B: Laboratory Transcripts	iv
	Appendix C: Results Summary Tables	v
	Appendix D: QA/QC Procedures	vi
	Appendix E: Tipping Dockets	vii

1 Introduction

Greencap Pty Ltd (Greencap) was engaged by NSW Land and Housing Corporation (the Client) to undertake an Asbestos Clearance & Soil Contamination Assessment at 50 Wellington Road, Chester Hill NSW (the site). The site boundary is identified on *Figure 1*. General site information is provided in *Table 1* below.

Table 1: Site Information		
Site Address:	50 Wellington Road, Chester Hill NSW	
Property Identification:	Lot 28 DP 23866	
Local Government Area	Canterbury Bankstown Council	
Approximate Site Area:	920m ²	
Current Site Use:	Vacant	
Surrounding Site Use:	North	Railway Line
	East	Vacant lot
	South	Wellington Road
	West	Vacant lot

2 Project Background

The client has undertaken demolition works of building sites owned by the NSW Land and Housing Corporation within the Sydney metro area.

As part of these works, Greencap has been engaged for Asbestos Hygiene Consultancy Services. For each site these services involve an inspection of the property for hazardous materials, where hazardous materials including Asbestos Containing Materials (ACM) are documented within a HazMat Survey report. Asbestos materials are then removed from the property by a Licensed Asbestos Removal Contractor (LARC). Upon completion of removal, a clearance inspection of the building is undertaken. The building is then demolished, and all demolition waste is removed from the site.

This report details the Asbestos Clearance & Soil Contamination Assessment, following completion of the above works for 50 Wellington Road, Chester Hill NSW. The following reports have been developed by Greencap for this site:

- J160879 50 Wellington Road, Chester Hill – *HazMat Survey Report* – Nov 2019; and
- J160879 50 Wellington Road, Chester Hill – *Clearance Certificate* – Dec 2019.

2.1 Sampling/Assessment Round – 18th December 2019

On 18th December 2019, Greencap attended site to undertake test pitting, soil sampling and a clearance inspection of the site. During the site assessment, any potential asbestos containing material (ACM) was not picked from the site surface. Upon completion of the inspection, no visible asbestos was identified to be remaining on the site surface or within test pits (refer to *Appendix A – Photographs 1-4*). A total of five test pits were excavated and five samples were submitted to the laboratory for analysis for both chemical and asbestos analysis (refer to *Figure 2* for TP1-5 locations). Laboratory analysis returned a positive result for asbestos in one of the five test pits (refer to *Appendix B – Laboratory Certificates*), which exceeded the adopted site criteria. Chemical analysis did not identify any Contaminants of Potential Concern (CoPC) - refer *Appendix B – Laboratory Certificates*.

Due to the positive asbestos detection, Greencap contacted the client on Monday 13th January 2020 and recommended that remediation was undertaken on the site to address asbestos contamination identified to be present within site soils.

Greencap then attended site on the 16th January 2020 to supervise remediation works undertaken by Sydney City Civil. During which, fill soils on the site were excavated to reworked clays, a depth of approximately 150mm. These works surrounded the area (TP1) which was identified to have contained asbestos exceeding the site criteria (refer to *Appendix A – Photographs 5-6*). Greencap inspected excavation works during remediation and a total of approximately 2.42 tonnes of additional contaminated topsoil was removed from the site (refer to *Appendix E* for tipping dockets). An additional round of air monitoring was undertaken during the remediation works (refer to *Appendix D*).

Following these works on the 16th January 2020, Greencap undertook a surface clearance of the excavation footprint and collected a validation composite sample for asbestos (ACM and AF/FA NEPM) analysis.

This report pertains to the additional site inspection/assessment, following completion of remediation activities undertaken on the 16th January 2020.

3 Objectives/Project Scope

The project objectives of this assessment are to inspect and sample site fill soils, following the demolition and removal of structures for assessment of Contaminants of Potential Concern (CoPC) which may remain on the site. Following the test pitting and sampling event, an asbestos clearance inspection of the site is then undertaken. In order to achieve these project objectives, the following scope was undertaken:

3.1 Soil Chemical Sampling

Soil chemical sampling was taken on an approximate grid pattern across the site, targeting the former building footprints on the site. The following was then undertaken at each test pit location:

- 10L Asbestos sieve testing for asbestos containing material (ACM) based on the requirements of the National Environment Protection (Assessment of Site Contamination) Measure 2013 (ASC NEPM 2013);
- Test pit samples targeted fill material. The fill material samples were then submitted to Eurofins Pty Ltd for the following analyses:
 - Heavy metals (As, Cd, Cr, Cu, Ni, Pb, Zn & Hg);
 - Total Recoverable hydrocarbons (TRH);
 - Benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN);
 - Organochlorine Pesticides (OCP); and
 - Polycyclic aromatic hydrocarbons (PAH).
- A field QA/QC soil sample was collected at the rate of one per 10 samples.

3.2 Soil Asbestos Sampling and Clearance Inspection

A visual clearance inspection of the site soils was conducted to the standard specified in 3.10 of *the Safe Work NSW Code of Practice: How to Safely Remove Asbestos (2016)*. The inspection included the following:

- A 500ml fill sample was collected from each test pit and was submitted to Greencap's North Ryde NATA accredited laboratory for the following analysis:
 - Asbestos: Asbestos Fines/Fibrous Asbestos (AF/FA).
- Visual inspection of site soils; and
- Raking of site soils to identify potential ACM fragments in the surface layer soils.

3.2.1 Asbestos Soil Inspection - Following Remediation

Following completion of remediation activities, a visual clearance inspection was conducted to the standard specified in 3.10 of *the Safe Work NSW Code of Practice: How to Safely Remove Asbestos (2016)* and a

composite validation sample was collected from the remediation excavation footprint for the analysis of Asbestos (ACM and AF/FA NEPM).

4 Sampling Locations

4.1 Test Pit Sampling

A total of five targeted test pit locations were chosen for the site (refer to *Figure 2* for sampling locations). Sampling targeted the former building footprints.

5 Field Observations

A qualified Greencap environmental consultant attended the site on the 18th December 2019 to undertake the soil assessment. Greencap then reattended the site on 16th January 2020 to supervise remediation works and conduct a visual clearance inspection/collect samples, following completion of remediation works. Photographs are provided in Appendix A.

5.1 Test pit Observations

Soil profiles encountered across the site consisted of fill material. The majority of fill material encountered across the site comprised brown sandy topsoil and orange/brown reworked clays, with minor amounts of aggregate (refer *Appendix A – Photographs 1 to 4*).

Table 2 below details material descriptions and the depth of fill which was logged during the fieldwork event.

Table 2: Test Pit Soil Description Summary		
Test Pit	Depth of Sample (m)	Material Description
TP1	0.01-0.1	Brown sandy clay fill with inclusions of concrete aggregate <10% and rootlets.
TP2	0.1-0.2	Light brown sandy clay fill with inclusions of angular rock and concrete fragments <40%.
TP3	0.01-0.1	Brown sandy clay fill with inclusions of concrete aggregate <10% and rootlets.
TP4	0.1-0.2	Brown sandy clay fill with rootlets.
TP5	0.01-0.1	Brown sandy clay fill with orange/brown clay and rootlets.

5.2 10L Sieve Testing for ACM

10L sieve testing of the bulk fill samples based on the requirements of the National Environment Protection (Assessment of Site Contamination) Measure 2013 (ASC NEPM 2013) was undertaken at each test pit location.

During the 10L sieve testing event on the 18th December, no ACM was observed in any of the test pits.

5.3 Asbestos Clearance Walkover Inspection - 18th Dec 2019

An initial walkover inspection was undertaken on the 18th December 2019 (refer to *Appendix A - Photographs 1-2*). During this inspection, ACM in the form of a fibre cement sheet fragment was emu picked and removed from the soil surface of the south-eastern portion of the site. No other potential ACM fragments were observed during this inspection.

5.3.1 Asbestos Clearance Walkover Inspection - 13th Jan 2020

Following receipt of asbestos laboratory results and the identification of asbestos in soil exceeding the adopted criteria surrounding test pit TP1 (*Figure 2*), Greencap undertook an additional walkover inspection upon completion of the remediation works on the 13th January 2020 (refer to *Appendix A - Photographs 5-6*) and collected a composite soil asbestos validation sample from the excavation surface.

6 Assessment Criteria

6.1 Guidance and Legislation

The fieldwork and preparation of this report have been undertaken in general accordance with the following documents:

- National Environmental Protection (Assessment of Site Contamination) Measure 1999 (2013 amendment);
- WA Department of Health (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*;
- NSW EPA (1995) *Sampling Design Guidelines*,
- NSW OEH (2011), *Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites*;
- *Work Health and Safety Act 2011 and Work Health and Safety Regulation 2011*;
- *NSW WorkCover (2014), Managing Asbestos in or on Soil*
- Code of practice - How to manage and control asbestos in the workplace (SafeWork NSW).

6.2 Adopted Site Criteria

Soil Investigation Levels (SILs) are used to assess the significance of the concentrations of contaminants in soil. SILs are the concentration levels above which further appropriate evaluation and/or remediation are required.

Typically for contaminant concentration to be considered acceptable for the respective land use criteria, the data set must conform to the following requirements:

- 95% upper confidence limit (UCL) of the arithmetic mean of analytical results is below the site criteria.
- Standard deviation is less than 50% of the site criteria.
- No single sample analytical result is greater than 250% of the site criteria.

Human health-based soil contamination assessment criteria are provided in the 2013 Amendment of the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (NEPM) Schedule B (1) Guideline on Investigation Levels for Soil and Groundwater. Analysis results for soil samples are compared to a set of acceptance criteria adopted from the NEPM 2013 amendment, to assess land use suitability.

The adopted criteria for soils include the health-based investigation levels (HILs) and Health Screening Levels (HSLs) for “Residential A” land use documented in Schedule B-1 of NEPM 2013. These are presented in *Table 3* below.

The methodology has been developed to protect soil processes, soil biota (flora and fauna) and terrestrial invertebrates and vertebrates. The current land use on site is residential and hence the EILs for “Residential A” have been adopted for this assessment.

The EIL is calculated from summing the ACL and the ambient background concentration (ABC) to derive the site-specific soil quality guideline (SQG) taking into account the effect caused by pH, exchangeable cations, iron and total organic carbon in soil that can affect concentration toxicity data.

No samples were analysed for cation exchange capacity (CEC) or pH, which are required to calculate site specific EIL. For this reason, conservative values have been used instead. A summary of the EILs for aged contamination in soil (>2 years) for the current land use are presented in *Table 3* below.

Table 3: Soil Assessment Criteria – NEPM 1999 (2013 Amendment)					
Analyte	Criteria (all units in mg/kg with the exception of asbestos)				
	Unit	Health investigation levels	Soil HSL for vapour intrusion	Ecological screening levels	Management limits
Total Recoverable hydrocarbons (TRH)					
C₆-C₁₀ Fraction F1	mg/kg	-	45	180	700
>C₁₀-C₁₆ Fraction F2	mg/kg	-	110	120	1000
>C₁₆-C₃₄ Fraction F3	mg/kg	-	-	300	2500
>C₃₄-C₄₀ Fraction F4	mg/kg	-	-	2800	10,000
Polycyclic Aromatic Hydrocarbons (PAH)					
BaP TEQ	mg/kg	3	-	-	-
BaP	mg/kg	-	-	0.7	-
Naphthalene	mg/kg	-	3	-	-
Total PAH	mg/kg	300	-	-	-
BTEX compounds					
Benzene	mg/kg	-	0.5	50	-
Toluene	mg/kg	-	160	85	-
Ethylbenzene	mg/kg	-	55	70	-
Xylene (total)	mg/kg	-	40	105	-
Metals and metalloids					
Arsenic	mg/kg	100	-	-	-
Cadmium	mg/kg	20	-	-	-
Chromium	mg/kg	100 (Cr VI)	-	-	-
Copper	mg/kg	6000	-	-	-
Lead	mg/kg	300	-	-	-
Mercury	mg/kg	40	-	-	-
Nickel	mg/kg	400	-	-	-
Zinc	mg/kg	7400	-	-	-
Organochlorine pesticides and Polychlorinated biphenyls					
DDT+DDE+DDD	mg/kg	240	-	-	-
Aldrin and dieldrin	mg/kg	6	-	-	-
Chlordane	mg/kg	50	-	-	-
Endosulfan	mg/kg	270	-	-	-
Endrin	mg/kg	10	-	-	-

Table 3: Soil Assessment Criteria – NEPM 1999 (2013 Amendment)					
Analyte	Criteria (all units in mg/kg with the exception of asbestos)				
	Unit	Health investigation levels	Soil HSL for vapour intrusion	Ecological screening levels	Management limits
Heptachlor	mg/kg	6	-	-	-
HCB	mg/kg	10	-	-	-
Methoxychlor	mg/kg	300	-	-	-
PCBs	mg/kg	1	-	-	-
Notes: <ol style="list-style-type: none"> Soil HSLs for sand soils at shallow depths (most conservative) * DDT only Cr HIL value is for Cr (V1), EIL is for Cr (III) 					

6.3 Asbestos Criteria

Soil Investigation Levels (SILs) are used to assess the significance of the concentrations of contaminants in soil. SILs are the concentration levels above which further appropriate evaluation and/or remediation is required.

The SILs adopted for this investigation were largely derived from the following resources:

- National Environmental Protection Council (NEPC) – *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (NEPM), 2013 amendment; and
- Western Australian Department of Health (DoH) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, May 2009.

Based on the current use of the site, the soil asbestos investigation criteria [SILs (NEPM 2013) or Soil Asbestos Concentrations (WA DoH 2009)] adopted for this investigation are 0.001% w/w for friable asbestos and 0.01% for bonded asbestos materials (Residential A).

Note: The current Australian Standard AS4964-2004 *Method for the qualitative identification of asbestos in bulk samples* analysis methods undertaken in Australia cannot achieve 0.001% w/w for asbestos fines and friable asbestos (AF/FA). The AS4964-2004 *Method for the qualitative identification of asbestos in bulk samples* with a non-homogenous sample reporting limit of 0.001%. Where the sampling results indicated that asbestos was not detected at the reporting limit and no asbestos containing materials were observed at that sample location or during the visual inspection, the area is considered to pose a negligible risk.

The most applicable document providing guidance on asbestos contaminated soil has been prepared by the Western Australian Department of Health *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, May 2009. This document states soil asbestos investigation criteria of 0.001% for friable asbestos and 0.01% for bonded asbestos materials such as visible asbestos fibre cement, is suitable at sites where the land use is residential A.

The National Environmental Protection Council (NEPC) – NEPM 2013 provides a framework for the assessment of site contamination in Australia. Reference is made to health-based risk assessments being conducted to assess the potential for asbestos fibres to be released due to the disturbance of the soil. Guidance for the investigation, assessment and remediation of asbestos contaminated sites in NSW in the NEPM 2013 essentially follows the advice provided in the *WA DOH Asbestos Guidelines, 2009*.

The document *Management of Asbestos in the Non-Occupational Environment, 2005*, prepared by the then Health Council, states that it is “impractical to propose that a site can be ‘free’ of asbestos fibres”, and that a risk assessment approach is required to determine if a site is fit for its proposed purpose. The results of this investigation will help establish the current human health risks posed by the asbestos contamination.

Table 4: Soil Investigation Levels for Asbestos in Soil

Form of Asbestos	Health Screening Level (w/w) Residential A
Bonded ACM	0.01%
FA and AF (friable asbestos)	0.001%
All forms of asbestos	No visible asbestos for surface soil

7 Soil Analytical Results

7.1 Laboratory Analytical Schedule

Soil samples were submitted to NATA Accredited laboratories, Eurofins Pty Ltd and Greencap's North Ryde asbestos laboratory for analysis of following Chemicals of Potential Concern (CoPC):

- Heavy metals (As, Cd, Cr, Cu, Ni, Pb, Zn & Hg);
- Total Recoverable hydrocarbons (TRH);
- Benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN);
- Organochlorine Pesticides (OCP);
- Polycyclic aromatic hydrocarbons (PAH); and
- Asbestos in soils (AF/FA) on 500ml soil samples (AF/FA).

The laboratory analysis reports for these samples are attached in *Appendix B*.

7.2 Chemical Analytical Results

All analytical results for soil samples were compared against the assessment criteria (*Section 6*) and results are presented in the results summary table in *Appendix C*.

All analysis results for all soil samples were either non-detect (ND; not detected to the Limit of reporting) or below the applicable human health criteria.

Refer to *Appendix B* for laboratory certificates of analysis.

7.3 Asbestos Analytical Results

The following calculation was employed to calculate the w/w % of soil asbestos:

$$\% \text{ Soil Asbestos} = \frac{\% \text{ Asbestos Content} \times \text{ACM (kg)}}{\text{Soil sample Volume} \times \text{Soil Density (kg/L)}}$$

Where it is assumed that the % of Asbestos Content (within asbestos cement material) was 15%. AF/FA (<2mm fraction is calculated assuming the % of Asbestos Content is 100%.

Asbestos in the form of a fibre cement fragment (ACM) was identified above the reporting limit in sample TP1. Asbestos in the form of a fibre cement fragment was identified in samples TP2 and TP4, however this result was observed below the reporting limit - returns a negative result.

All 500ml test pit soil samples collected from the site were below the adopted AF/FA asbestos site criteria as detailed in *Section 6.3* above).

A summary of the data is presented in *Table 5* below.

Table 5: Laboratory Asbestos in Soil Results						
Sample Location Test Pit	Sample Depth (m)	Weight of soil analysed at Laboratory (g)	Weight of ACM (>2mm Fraction) (g)	Concentration of ACM >2mm in Soil (%w/w)	Weight of AF/FA (<2mm Fraction) (g)	Concentration of AF/FA (%w/w)
Sample Data			ACM Concentration (>2mm Fraction)		AF/FA Concentration (<2mm Fraction)	
TP1	0.1-0.2	970.4	0.92	0.000140	0.0008	0.0000008
TP2	0.01-0.1	997	0.03	0.000005	N/A	N/A
TP3	0.2-0.3	872	ND	N/A	ND	N/A
TP4	0.01-0.1	831.7	0.04	0.000007	0.0009	0.0000011
TP5	0.1-0.2	884.8	ND	N/A	ND	N/A
Val-1	N/A	547.1	ND	N/A	ND	N/A
			Bonded ACM Health Screening Level (w/w) HIL – A (0.01%)		AF/FA Health Screening Level (w/w) HIL – A (0.001%)	
Note: Bold/Shade: Indicates exceedance of criteria ND: Non-Detect N/A: Not Applicable						

Refer to *Appendix B* for asbestos certificates of analysis.

7.4 Asbestos 10L Sieve Test Results

During the 10L field sieve screening, potential ACM was not identified at any test pit location.

A summary of the data is presented in *Table 6* below.

Table 6: Field Screening Results				
Test Pit ID	Sample Depth (m)	Weight of 10L sample (Kg)	Weight of screened ACM (g)	Concentration of Asbestos in Soil (%w/w)
TP1	0.1-0.2	14	N/D	N/A
TP2	0.01-0.1	14	N/D	N/A
TP3	0.2-0.3	12	N/D	N/A
TP4	0.01-0.1	13	N/D	N/A
TP5	0.1-0.2	12	N/D	N/A
Health Screening Level (w/w) HIL – A (0.01%)				
Note: Bold/Shade: Indicates exceedance of criteria N/D: Non-Detect N/A: Not Applicable				

7.5 QA/QC Procedures

The evaluation of the QA/QC procedures (refer to *Appendix D*) shows that the established measurement data quality objectives for this project have been met and the data set is considered to be reliable.

8 Asbestos in Soil Clearance Inspection

8.1 Removal Details

8.1.1 Extent

Refer to Greencap report: *J160879* 50 Wellington Road, Chester Hill – *Clearance Certificate – Dec 2019* for the full list of specific ACM locations. Asbestos materials were identified to extend to approximately 823m². Refer to Figure 2 for the extent of asbestos contaminated soil removed on 13th January 2020 and Appendix E for tipping dockets.

8.1.2 Date of Removal

Monday 13th December 2019 & 13th January 2020.

8.1.3 Licensed Asbestos Removal Contractor (LARC)

Sydney City Civil, a Class “B” Licensed Asbestos Removal Contractor (LARC) (AD 211631) as issued under the NSW Work Health and Safety Regulation 2017 by SafeWork NSW, conducted the asbestos removal works.

8.2 Soil Clearance Inspection

8.2.1 Soil Inspection Date

Monday, 13 January 2020

8.2.2 Visual Surface Inspection

A visual clearance inspection was undertaken by James Green of Greencap, after completion of the removal/demolition and remediation works. Refer to *Figure 2* for clearance boundary. At the time of inspection there was no visible asbestos residue remaining on the soils within the site as a result of the asbestos removal.

The visual clearance inspection conducted was to the standard specified in 3.10 of the *Safe Work NSW Code of Practice: How to Safely Remove Asbestos (2016)*. Accordingly, Greencap does not guarantee that this visual clearance inspection has confirmed, warranted or certified the location, identification and/or the removal of all asbestos material either identified by Greencap or others in any report previously provided and/or which is or may be present on the site inspected.

Refer to the photographs in *Appendix A – Photographs 1-2 & 4-6*.

8.2.3 Asbestos Clearance Soil Sampling

One 500ml soil sample was collected from each test pit, for a total of five samples within the clearance area. All samples were sent for analysis at Greencap’s NATA approved laboratory for Asbestos Fines/Fibrous Asbestos (AF/FA) in accordance with the *National Environmental Protection (Assessment of Site Contamination) Measure 1999, (2013 Amendment)*.

TP1 returned a positive result for asbestos in the form of ACM (refer *Section 7.3*) and remediation works were undertaken of the area (Refer *Section 2.1*). Following completion of the remediation works, a composite sample was collected from the excavation/remediation footprint. This sample returned a negative result for asbestos. Please refer to *Figure 2* for sample locations and *Appendix B* for laboratory certificates.

9 Discussion/Conclusions

9.1 Soil Analytical Results Discussion/Conclusion

The laboratory analysis indicates that there were no identified exceedances in the adopted site criteria (HIL-A – Residential) following completion of the removal, demolition and remediation works. Therefore, Greencap is of the opinion that the site is suitable for its intended use (residential housing).

9.2 Asbestos in Soil Clearance Inspection Discussion/Conclusion

The results of the visual clearance inspection and soil sampling indicates that the asbestos materials mentioned in *Section 8.1.1* have been removed and the area can now be accessed for general site operations.

10 Asbestos in Soil Clearance Inspection Limitations

The asbestos in soil clearance certificate relates only to the asbestos materials and removal works described in *Section 8*. Due to the nature of the material, it is never possible to guarantee every fragment of asbestos containing material has been identified. In the unlikely event that soil disturbance uncovers a fragment of an asbestos containing material, given its bonded matrix this event would not pose an unacceptable health risk to the property.

All asbestos encountered should be addressed. The Unexpected Finds Protocol in use at the site should be continually implemented for future site activities and should be used to address any minor discoveries.

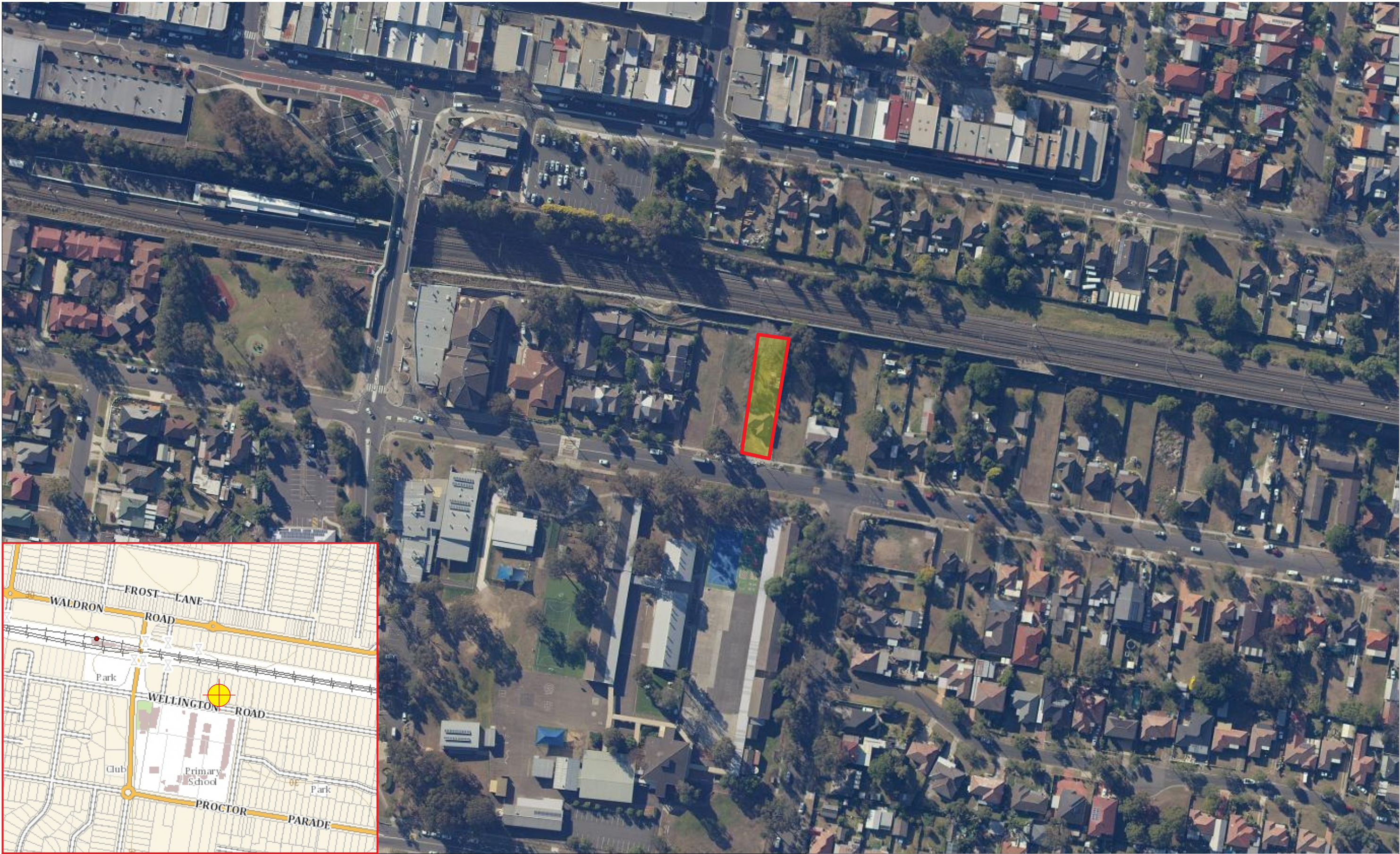
Greencap was not engaged to revise the asbestos audit/register nor prepare any scope of works or work method statements for this job. The LARC was engaged directly by the client and scope of work agreed previously with the client.

Asbestos Clearance & Soil Contamination Assessment



NSW Land and Housing Corporation

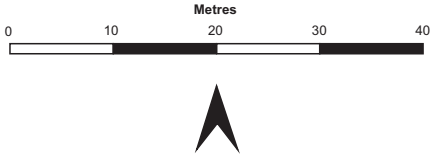
50 Wellington Road, Chester Hill NSW

Figures



Legend:

-  Site Boundary
-  Site Location



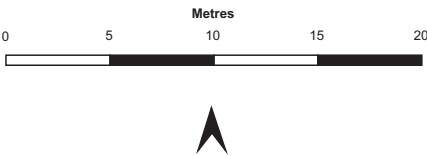
Level 2, 11-17 Khartoum Road
North Ryde, NSW 2113
Ph: 02-9889-1800
Fx: 02-9889-1811

Client Name:		Land and Housing Corporation NSW			
Client Number:		C107603			
Project Description:		Soil Assessment & Asbestos Clearance			
Address:		50 Wellington Road, Chester Hill NSW			
Prepared:	JG	Reviewed:	MB	Date:	21/01/2020
Figure 1	Site Location and Regional Context				



Legend:

- Site/Asbestos Clearance Boundary
- Test Pit Location
- Approximate Remediation Boundary



Level 2, 11-17 Khartoum Road
North Ryde, NSW 2113
Ph: 02-9889-1800
Fx: 02-9889-1811

Client Name:		Land and Housing Corporation NSW			
Client Number:		C107603			
Project Description:		Soil Assessment & Asbestos Clearance			
Address:		50 Wellington Road, Chester Hill NSW			
Prepared:	JG	Reviewed:	MB	Date:	21/01/2020
Figure 2	Test Pit, Remediation & Clearance Boundary				

Disclaimer: Greencap Pty Ltd has produced this map for the purpose of presenting a summary of relevant spatial information and gives no warranty in relation to the data (including accuracy, reliability, completeness or suitability) and accepts no liability (*including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use or reliance upon the data. Data must not be used for direct marketing or be used in breach of privacy laws. Service Layer Credits 2016 NSW Land and Property Information (Six Maps)

Asbestos Clearance & Soil Contamination Assessment

NSW Land and Housing Corporation

50 Wellington Road, Chester Hill NSW

Appendix A: Photographic Gallery



Photograph 1: West facing view of the site.



Photograph 2: East facing view of the site.



Photograph 3: Test pit TP1 - Example of material encountered.



Photograph 4: Test pit TP5 - Example of material encountered.



Photograph 5: Remediation area - Following removal.



Photograph 6: Remediation area - Following removal.

Asbestos Clearance & Soil Contamination Assessment

NSW Land and Housing Corporation

50 Wellington Road, Chester Hill NSW

Appendix B: Laboratory Transcripts

Greencap NSW P/L
Level 2/11 Khartoum Road
North Ryde
NSW 2113



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention: Justin Onyelusi

Report 694761-S
Project name 50 WELLINGTON RD
Project ID J160879-01
Received Date Dec 19, 2019

Client Sample ID			TP1(0.1-0.2)	TP2(0.0-0.1)	TP3(0.2-0.3)	TP4(0.01-0.1)
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De28680	S19-De28681	S19-De28682	S19-De28683
Date Sampled			Dec 18, 2019	Dec 18, 2019	Dec 18, 2019	Dec 18, 2019
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	98	< 50	< 50	65
TRH C10-C36 (Total)	50	mg/kg	98	< 50	< 50	65
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	145	142	79	94
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	120	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	120	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			TP1(0.1-0.2)	TP2(0.0-0.1)	TP3(0.2-0.3)	TP4(0.01-0.1)
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De28680	S19-De28681	S19-De28682	S19-De28683
Date Sampled			Dec 18, 2019	Dec 18, 2019	Dec 18, 2019	Dec 18, 2019
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	78	81	78	77
p-Terphenyl-d14 (surr.)	1	%	90	84	98	106
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	0.1	< 0.1	0.8
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	0.14
Heptachlor epoxide	0.05	mg/kg	< 0.05	0.06	< 0.05	0.56
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.2	< 0.2	< 0.2	1.5
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.2	< 0.2	< 0.2	1.5
Dibutylchloroendate (surr.)	1	%	80	92	94	104
Tetrachloro-m-xylene (surr.)	1	%	81	73	80	88
Heavy Metals						
Arsenic	2	mg/kg	11	9.9	7.8	15
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	1.2
Chromium	5	mg/kg	24	19	20	24
Copper	5	mg/kg	28	28	24	59
Lead	5	mg/kg	43	28	56	100
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	22	19	12	19
Zinc	5	mg/kg	74	130	130	340
% Moisture	1	%	9.8	14	9.0	7.2

Client Sample ID			TP5(0.1-0.2)	FD1(18/12)
Sample Matrix			Soil	Soil
Eurofins Sample No.			S19-De28684	S19-De28685
Date Sampled			Dec 18, 2019	Dec 18, 2019
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	20	mg/kg	< 20	-
TRH C10-C14	20	mg/kg	< 20	-
TRH C15-C28	50	mg/kg	< 50	-
TRH C29-C36	50	mg/kg	84	-
TRH C10-C36 (Total)	50	mg/kg	84	-
BTEX				
Benzene	0.1	mg/kg	< 0.1	-
Toluene	0.1	mg/kg	< 0.1	-
Ethylbenzene	0.1	mg/kg	< 0.1	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	-
Xylenes - Total	0.3	mg/kg	< 0.3	-
4-Bromofluorobenzene (surr.)	1	%	78	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	-
TRH C6-C10	20	mg/kg	< 20	-
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	-
TRH >C10-C16	50	mg/kg	< 50	-
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	-
TRH >C16-C34	100	mg/kg	< 100	-
TRH >C34-C40	100	mg/kg	< 100	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	-
Polycyclic Aromatic Hydrocarbons				
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-
Acenaphthene	0.5	mg/kg	< 0.5	-
Acenaphthylene	0.5	mg/kg	< 0.5	-
Anthracene	0.5	mg/kg	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	-
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-
Chrysene	0.5	mg/kg	< 0.5	-
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	-
Fluoranthene	0.5	mg/kg	< 0.5	-
Fluorene	0.5	mg/kg	< 0.5	-
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	< 0.5	-
Naphthalene	0.5	mg/kg	< 0.5	-
Phenanthrene	0.5	mg/kg	< 0.5	-
Pyrene	0.5	mg/kg	< 0.5	-
Total PAH*	0.5	mg/kg	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	76	-
p-Terphenyl-d14 (surr.)	1	%	87	-

Client Sample ID			TP5(0.1-0.2)	FD1(18/12)
Sample Matrix			Soil	Soil
Eurofins Sample No.			S19-De28684	S19-De28685
Date Sampled			Dec 18, 2019	Dec 18, 2019
Test/Reference	LOR	Unit		
Organochlorine Pesticides				
Chlordanes - Total	0.1	mg/kg	< 0.1	-
4,4'-DDD	0.05	mg/kg	< 0.05	-
4,4'-DDE	0.05	mg/kg	< 0.05	-
4,4'-DDT	0.05	mg/kg	< 0.05	-
a-BHC	0.05	mg/kg	< 0.05	-
Aldrin	0.05	mg/kg	< 0.05	-
b-BHC	0.05	mg/kg	< 0.05	-
d-BHC	0.05	mg/kg	< 0.05	-
Dieldrin	0.05	mg/kg	< 0.05	-
Endosulfan I	0.05	mg/kg	< 0.05	-
Endosulfan II	0.05	mg/kg	< 0.05	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-
Endrin	0.05	mg/kg	< 0.05	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-
Endrin ketone	0.05	mg/kg	< 0.05	-
g-BHC (Lindane)	0.05	mg/kg	< 0.05	-
Heptachlor	0.05	mg/kg	< 0.05	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-
Methoxychlor	0.2	mg/kg	< 0.2	-
Toxaphene	1	mg/kg	< 1	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.2	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.2	-
Dibutylchlorodate (surr.)	1	%	82	-
Tetrachloro-m-xylene (surr.)	1	%	79	-
Heavy Metals				
Arsenic	2	mg/kg	10	16
Cadmium	0.4	mg/kg	1.2	< 0.4
Chromium	5	mg/kg	29	25
Copper	5	mg/kg	71	53
Lead	5	mg/kg	200	41
Mercury	0.1	mg/kg	< 0.1	< 0.1
Nickel	5	mg/kg	18	28
Zinc	5	mg/kg	500	190
% Moisture	1	%	6.0	13

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins mgt Suite B9			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Dec 20, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Dec 20, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 20, 2019	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Dec 20, 2019	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Dec 20, 2019	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Organochlorine Pesticides	Sydney	Dec 20, 2019	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Metals M8	Sydney	Dec 20, 2019	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Dec 19, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

Company Name: Greencap NSW P/L
Address: Level 2/11 Khartoum Road
North Ryde
NSW 2113

Project Name: 50 WELLINGTON RD
Project ID: J160879-01

Order No.: PO270053
Report #: 694761
Phone: 02 9889 1800
Fax: 02 9889 1811

Received: Dec 19, 2019 3:49 PM
Due: Dec 30, 2019
Priority: 5 Day
Contact Name: Justin Onyelusi

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Metals M8	Moisture Set	Eurofins mgt Suite B9
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	TP1(0.1-0.2)	Dec 18, 2019		Soil	S19-De28680		X	X
2	TP2(0.0-0.1)	Dec 18, 2019		Soil	S19-De28681		X	X
3	TP3(0.2-0.3)	Dec 18, 2019		Soil	S19-De28682		X	X
4	TP4(0.01-0.1)	Dec 18, 2019		Soil	S19-De28683		X	X
5	TP5(0.1-0.2)	Dec 18, 2019		Soil	S19-De28684		X	X
6	FD1(18/12)	Dec 18, 2019		Soil	S19-De28685	X	X	
Test Counts						1	6	5

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NC	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
- Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
- Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
- Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
- For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4,4'-DDD	mg/kg	< 0.05			0.05	Pass	
4,4'-DDE	mg/kg	< 0.05			0.05	Pass	
4,4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.2			0.2	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	126			70-130	Pass	
TRH C10-C14	%	92			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	127			70-130	Pass	
Toluene	%	124			70-130	Pass	
Ethylbenzene	%	129			70-130	Pass	
m&p-Xylenes	%	123			70-130	Pass	
o-Xylene	%	122			70-130	Pass	
Xylenes - Total	%	123			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	129			70-130	Pass	
TRH C6-C10	%	124			70-130	Pass	
TRH >C10-C16	%	90			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	98			70-130	Pass	
Acenaphthylene	%	94			70-130	Pass	
Anthracene	%	105			70-130	Pass	
Benz(a)anthracene	%	99			70-130	Pass	
Benzo(a)pyrene	%	109			70-130	Pass	
Benzo(b&j)fluoranthene	%	105			70-130	Pass	
Benzo(g,h,i)perylene	%	74			70-130	Pass	
Benzo(k)fluoranthene	%	117			70-130	Pass	
Chrysene	%	92			70-130	Pass	
Dibenz(a,h)anthracene	%	70			70-130	Pass	
Fluoranthene	%	90			70-130	Pass	
Fluorene	%	96			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	71			70-130	Pass	
Naphthalene	%	92			70-130	Pass	
Phenanthrene	%	98			70-130	Pass	

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Pyrene				%	99			70-130	Pass	
LCS - % Recovery										
Organochlorine Pesticides										
Chlordanes - Total				%	96			70-130	Pass	
4,4'-DDD				%	91			70-130	Pass	
4,4'-DDE				%	98			70-130	Pass	
4,4'-DDT				%	97			70-130	Pass	
a-BHC				%	101			70-130	Pass	
Aldrin				%	97			70-130	Pass	
b-BHC				%	92			70-130	Pass	
d-BHC				%	99			70-130	Pass	
Dieldrin				%	102			70-130	Pass	
Endosulfan I				%	96			70-130	Pass	
Endosulfan II				%	85			70-130	Pass	
Endosulfan sulphate				%	80			70-130	Pass	
Endrin				%	75			70-130	Pass	
Endrin aldehyde				%	90			70-130	Pass	
Endrin ketone				%	104			70-130	Pass	
g-BHC (Lindane)				%	104			70-130	Pass	
Heptachlor				%	100			70-130	Pass	
Heptachlor epoxide				%	96			70-130	Pass	
Hexachlorobenzene				%	96			70-130	Pass	
Methoxychlor				%	76			70-130	Pass	
LCS - % Recovery										
Heavy Metals										
Arsenic				%	107			70-130	Pass	
Cadmium				%	108			70-130	Pass	
Chromium				%	104			70-130	Pass	
Copper				%	102			70-130	Pass	
Lead				%	102			70-130	Pass	
Mercury				%	91			70-130	Pass	
Nickel				%	102			70-130	Pass	
Zinc				%	106			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					Result 1					
TRH C10-C14	S19-De28173	NCP	%	88				70-130	Pass	
Spike - % Recovery										
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					Result 1					
TRH >C10-C16	S19-De28173	NCP	%	87				70-130	Pass	
Spike - % Recovery										
Polycyclic Aromatic Hydrocarbons					Result 1					
Acenaphthene	S19-De28173	NCP	%	106				70-130	Pass	
Acenaphthylene	S19-De28173	NCP	%	101				70-130	Pass	
Anthracene	S19-De28173	NCP	%	101				70-130	Pass	
Benz(a)anthracene	S19-De28173	NCP	%	113				70-130	Pass	
Benzo(a)pyrene	S19-De28173	NCP	%	109				70-130	Pass	
Benzo(b&j)fluoranthene	S19-De28173	NCP	%	108				70-130	Pass	
Benzo(g,h,i)perylene	S19-De28173	NCP	%	93				70-130	Pass	
Benzo(k)fluoranthene	S19-De28173	NCP	%	101				70-130	Pass	
Chrysene	S19-De28173	NCP	%	99				70-130	Pass	
Dibenz(a,h)anthracene	S19-De28173	NCP	%	91				70-130	Pass	
Fluoranthene	S19-De28173	NCP	%	102				70-130	Pass	
Fluorene	S19-De28173	NCP	%	98				70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1,2,3-cd)pyrene	S19-De28173	NCP	%	111			70-130	Pass	
Naphthalene	S19-De28173	NCP	%	101			70-130	Pass	
Phenanthrene	S19-De28173	NCP	%	100			70-130	Pass	
Pyrene	S19-De28173	NCP	%	112			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S19-De28173	NCP	%	101			70-130	Pass	
4,4'-DDD	S19-De28173	NCP	%	116			70-130	Pass	
4,4'-DDE	S19-De28173	NCP	%	95			70-130	Pass	
4,4'-DDT	S19-De28173	NCP	%	81			70-130	Pass	
a-BHC	S19-De28173	NCP	%	91			70-130	Pass	
Aldrin	S19-De28173	NCP	%	99			70-130	Pass	
b-BHC	S19-De28173	NCP	%	89			70-130	Pass	
d-BHC	S19-De28173	NCP	%	100			70-130	Pass	
Dieldrin	S19-De28173	NCP	%	105			70-130	Pass	
Endosulfan I	S19-De28173	NCP	%	87			70-130	Pass	
Endosulfan II	S19-De28173	NCP	%	98			70-130	Pass	
Endosulfan sulphate	S19-De28173	NCP	%	92			70-130	Pass	
Endrin	S19-De28173	NCP	%	88			70-130	Pass	
Endrin aldehyde	S19-De28173	NCP	%	86			70-130	Pass	
Endrin ketone	S19-De28173	NCP	%	124			70-130	Pass	
g-BHC (Lindane)	S19-De28173	NCP	%	93			70-130	Pass	
Heptachlor	S19-De28173	NCP	%	95			70-130	Pass	
Heptachlor epoxide	S19-De28173	NCP	%	91			70-130	Pass	
Hexachlorobenzene	S19-De28173	NCP	%	90			70-130	Pass	
Methoxychlor	S19-De23211	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S19-De28635	NCP	%	123			70-130	Pass	
Cadmium	S19-De28635	NCP	%	122			70-130	Pass	
Chromium	S19-De28635	NCP	%	127			70-130	Pass	
Copper	S19-De28635	NCP	%	121			70-130	Pass	
Lead	S19-De28635	NCP	%	118			70-130	Pass	
Mercury	S19-De28635	NCP	%	121			70-130	Pass	
Nickel	S19-De28635	NCP	%	121			70-130	Pass	
Zinc	S19-De28635	NCP	%	124			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S19-De29238	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S19-De28170	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S19-De28170	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S19-De28170	NCP	mg/kg	79	58	30	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S19-De29238	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S19-De29238	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S19-De29238	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S19-De29238	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S19-De29238	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S19-De29238	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	

Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	S19-De29238	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
TRH C6-C10	S19-De29238	NCP	mg/kg	< 20	< 20	<1	30%	Pass
TRH >C10-C16	S19-De28170	NCP	mg/kg	< 50	< 50	<1	30%	Pass
TRH >C16-C34	S19-De28170	NCP	mg/kg	< 100	< 100	<1	30%	Pass
TRH >C34-C40	S19-De28170	NCP	mg/kg	< 100	< 100	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Acenaphthylene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Anthracene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benz(a)anthracene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(a)pyrene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(b&j)fluoranthene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(g,h,i)perylene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(k)fluoranthene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chrysene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dibenz(a,h)anthracene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluoranthene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluorene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Naphthalene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Phenanthrene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Pyrene	S19-De28680	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Chlordanes - Total	S19-De28680	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
4,4'-DDD	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
4,4'-DDE	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
4,4'-DDT	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
a-BHC	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Aldrin	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
b-BHC	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
d-BHC	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Dieldrin	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan I	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan II	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan sulphate	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin aldehyde	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin ketone	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
g-BHC (Lindane)	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Heptachlor	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Heptachlor epoxide	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Hexachlorobenzene	S19-De28680	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Methoxychlor	S19-De28680	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S19-De28483	NCP	mg/kg	13	9.0	36	30%	Fail
Cadmium	S19-De28483	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
Chromium	S19-De28483	NCP	mg/kg	22	17	22	30%	Pass
Copper	S19-De28483	NCP	mg/kg	34	28	20	30%	Pass
Lead	S19-De28483	NCP	mg/kg	20	17	17	30%	Pass
Mercury	S19-De28483	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Nickel	S19-De28483	NCP	mg/kg	9.7	8.1	17	30%	Pass
Zinc	S19-De28483	NCP	mg/kg	59	45	28	30%	Pass

Duplicate								
				Result 1	Result 2	RPD		
% Moisture	S19-De28634	NCP	%	18	18	3.0	30%	Pass

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Ursula Long	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)



Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.



CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☒ Sydney Laboratory

Unit F3 Bld F, 16 Mars Rd, Lane Cove West, NSW 2096
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory

Unit 1, 21 Smallwood Pl, Murarie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory

Unit 2, 91 Leach Highway, Kewdale, WA 5105
08 9251 9500 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory

2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company		Greencap		Project No		J160879-01		Project Manager		Justin Onyelu		Sampler(s)		James Green			
Address		Level 2/11 Kharbun Road, North Ryde NSW 2113		Project Name		50 Wellington Rd		EDD Format (ESdat, EQUIS, Custom)		Spider Cell		Handed over by		"			
Contact Name		James Green		Analyses (Note: Where matrix is requested, please specify (Topsoil or "Flower") (Bulb) code must be added to project SUITE coding)										Email for Invoice			
Phone No		0437 646 386												James.green@greencap.com.au			
Special Directions		N/A												Email for Results		"	
Purchase Order		P0270053															
Quote ID No																	
No	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))														
1	TP1(0.1-0.2)	18/12/19	S	B9	M8												
2	TP2(0.0-0.1)																
3	TP3(0.2-0.3)																
4	TP4(0.01-0.1)																
5	TP5(0.1-0.2)																
6	FD1(18/12)																
7																	
8																	
9																	
10																	
Total Counts				5	1												
Method of Shipment		<input checked="" type="checkbox"/> Courier (#) <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal		Name		Signature		Date		Time		Temperature		Report No			
Eurofins mgt Laboratory Use Only		Received By		Gina Maxwell		SYD BNE MEL PER ADL NTL DRW		Signature		Date		Time		Temperature			
		Received By				SYD BNE MEL PER ADL NTL DRW		Signature		Date		Time		Report No			

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request.

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins | mgt

Report Date: Monday, 13/01/2020

Our ref: C107603:J160879-01

Gerald Alexander
NSW Land and Housing Corporation
Level 2, 31-99 Macquarie Street
PARRAMATTA NSW 2150

Dear Gerald,

Re: Asbestos Identification Analysis - 50 Wellington Road, Chester Hill NSW 2162

This letter presents the results of asbestos fibre identification analysis performed on 5 soil samples collected by James Green of Greencap on Wednesday, 18 December 2019. The samples were collected from 50 Wellington Road, Chester Hill NSW 2162.

All sample analysis was performed using polarised light microscopy, including dispersion staining in our Sydney Laboratory by the method of Australian Standard AS4964-2004 and supplementary work instruction in house method LAB04 Asbestos Identification by PLM. Any and all services carried out by Greencap for the Client are subject to the Terms and Conditions listed on the Greencap website at <https://www.greencap.com.au/terms-conditions> and are governed by our statements of limitation available at <https://www.greencap.com.au/statements-limitation>.

The analysis was completed on Monday, 13 January 2020.

The samples will be kept for three months and then disposed of, unless otherwise directed.

The results of the asbestos identification analysis are presented in the appended table. Accreditation covers testing activities only, sampling activity is outside the scope of ISO 17025 accreditation. Results relate only to the items tested and are for the sole use by the client.

Should you require further information please contact our project manager Justin Onyelusi.

Yours sincerely,

Greencap



Amanda Chui : Approved Identifier



Amanda Chui : Approved Signatory



This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025 - Testing.
Accreditation No. 5450, Site No. 3402 Sydney Laboratory.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/National standards.



Report Date: Monday, 13/01/2020

Our ref: C107603:J160879-01

Site Location:		50 Wellington Road, Chester Hill NSW 2162	
	Sample ID	Sample Location/Description/Weight or Size	Analysis Result
1	J160879-01 - 001	TP1 (0.1-0.2) Brown non-homogenous fine-grained soil & rocks, including fibre cement fragments of approximately 0.9g (>7mm fraction), 0.02g (<7mm & >2mm fraction) and 0.0008g (<2mm fraction). This is estimated to be above the reporting limit of 0.1g/kg (0.03% w/w*) ~ 970.4g	Chrysotile (white asbestos) Amosite (brown asbestos) Organic Fibres NOTE 1 & 2
2	J160879-01 - 002	TP2 (0.0-0.1) Brown non-homogenous fine-grained soil & rocks, including fibre cement fragments with white asbestos of approximately 0.03g (<7mm & >2mm fraction). This is estimated to be below the reporting limit of 0.1g/kg ~ 997g	No Asbestos Detected At or Above Reporting Limit Organic Fibres NOTE 1 & 2
3	J160879-01 - 003	TP3 (0.2-0.3) Brown non-homogenous fine-grained soil & rocks ~ 872g	No Asbestos Detected At or Above Reporting Limit Organic Fibres NOTE 1 & 2
4	J160879-01 - 004	TP4 (0.01-0.1) Brown non-homogenous fine-grained soil & rocks, including fibre cement fragments with white asbestos of approximately 0.04g (<7mm & >2mm fraction) and 0.0009g (<2mm fraction). This is estimated to be below the reporting limit of 0.1g/kg ~ 831.7g	No Asbestos Detected At or Above Reporting Limit Organic Fibres NOTE 1 & 2
5	J160879-01 - 005	TP5 (0.1-0.2) Brown non-homogenous fine-grained soil & rocks ~ 884.8g	No Asbestos Detected At or Above Reporting Limit Organic Fibres NOTE 1 & 2

* Shaded row with bolded text indicates sample contains a positive Analysis Result for asbestos.

If Synthetic Mineral Fibre and Organic Fibre are not stated in Analysis Results, it implies not detected.

NOTE 1 The reporting limit for this analysis is 0.1g/kg (0.01%) by application of polarised light microscopy, dispersion staining and trace analysis techniques. The above result can be interpreted that the sample contains no detectable 'respirable' asbestos fibres (AS4964-2004 Clause 9.5).

NOTE 2 Soil analysis conducted in accordance with WA Guidelines for the assessment, remediation and management of asbestos-contaminated sites (May 2009), Recommended procedures for laboratory analysis of asbestos in soil (June 2011) and NEPM Schedule B1: Guideline on investigation levels for soil & groundwater, Schedule B2: Guideline on site characterisation.
Results denoted with * is outside our scope of accreditation

Report Date: Friday, 17/01/2020

Our ref: C107603:J160879-01

Gerald Alexander
NSW Land and Housing Corporation
Level 2, 31-99 Macquarie Street
PARRAMATTA NSW 2150

Dear Gerald,

Re: Asbestos Identification Analysis - 50 Wellington Road, Chester Hill NSW 2162

This letter presents the results of asbestos fibre identification analysis performed on 1 soil sample collected by James Green of Greencap on Thursday, 16 January 2020. The samples were collected from 50 Wellington Road, Chester Hill NSW 2162.

All sample analysis was performed using polarised light microscopy, including dispersion staining in our Sydney Laboratory by the method of Australian Standard AS4964-2004 and supplementary work instruction in house method LAB04 Asbestos Identification by PLM. Any and all services carried out by Greencap for the Client are subject to the Terms and Conditions listed on the Greencap website at <https://www.greencap.com.au/terms-conditions> and are governed by our statements of limitation available at <https://www.greencap.com.au/statements-limitation>.

The analysis was completed on Friday, 17 January 2020.

The sample will be kept for three months and then disposed of, unless otherwise directed.

The results of the asbestos identification analysis are presented in the appended table. Accreditation covers testing activities only, sampling activity is outside the scope of ISO 17025 accreditation. Results relate only to the items tested and are for the sole use by the client.

Should you require further information please contact our project manager Justin Onyelusi.

Yours sincerely,

Greencap



Amanda Chui : Approved Identifier



Amanda Chui : Approved Signatory



This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025 - Testing.
Accreditation No. 5450, Site No. 3402 Sydney Laboratory.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/National standards.



Report Date: Friday, 17/01/2020

Our ref: C107603:J160879-01

Site Location:		50 Wellington Road, Chester Hill NSW 2162	
	Sample ID	Sample Location/Description/Weight or Size	Analysis Result
1	J160879-01	Val-1	No Asbestos Detected At or Above Reporting Limit Organic Fibres NOTE 1 & 2
	- 001	Brown non-homogenous fine-grained soil & rocks	
		~ 547.1g	

NOTE 1 The reporting limit for this analysis is 0.1g/kg (0.01%) by application of polarised light microscopy, dispersion staining and trace analysis techniques. The above result can be interpreted that the sample contains no detectable 'respirable' asbestos fibres (AS4964-2004 Clause 9.5).

NOTE 2 Soil analysis conducted in accordance with WA Guidelines for the assessment, remediation and management of asbestos-contaminated sites (May 2009), Recommended procedures for laboratory analysis of asbestos in soil (June 2011) and NEPM Schedule B1: Guideline on investigation levels for soil & groundwater, Schedule B2: Guideline on site characterisation.

Asbestos Clearance & Soil Contamination Assessment

NSW Land and Housing Corporation

50 Wellington Road, Chester Hill NSW

Appendix C: Results Summary Tables

				Field ID	FD1(18/12)	TP1(0.1-0.2)	TP2(0.0-0.1)	TP3(0.2-0.3)	TP4(0.01-0.1)	TP5(0.1-0.2)	
				Lab Report Number	694761	694761	694761	694761	694761	694761	
				Sample Date	18/12/2019	18/12/2019	18/12/2019	18/12/2019	18/12/2019	18/12/2019	
				Human Health Investigation Level (HIL A)	ESL/EILs - Areas of Ecological Significance						
Method Type	Chemical Name	Unit	EQL								
Metals	Arsenic	mg/kg	2	100	40	16	11	9.9	7.8	15	10
	Cadmium	mg/kg	0.4	20		<0.4	<0.4	<0.4	<0.4	1.2	1.2
	Chromium (III+VI)	mg/kg	5			25	24	19	20	24	29
	Copper	mg/kg	5	6000		53	28	28	24	59	71
	Lead	mg/kg	5	300	470	41	43	28	56	100	200
	Mercury	mg/kg	0.1	40		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Nickel	mg/kg	5	400		28	22	19	12	19	18
	Zinc	mg/kg	5	7400		190	74	130	130	340	500
Physical Parameters	Moisture Content (dried @ 103°C)	%	1			13	9.8	14	9	7.2	6
Pesticides	4,4-DDE	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	a-BHC	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	Aldrin	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	Aldrin + Dieldrin	mg/kg	0.05	6		-	<0.05	<0.05	<0.05	<0.05	<0.05
	b-BHC	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	chlordane	mg/kg	0.1	50		-	<0.1	0.1	<0.1	0.8	<0.1
	d-BHC	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	DDD	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	DDT	mg/kg	0.05		3	-	<0.05	<0.05	<0.05	<0.05	<0.05
	DDT+DDE+DDD	mg/kg	0.05	240		-	<0.05	<0.05	<0.05	<0.05	<0.05
	Dieldrin	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan I	mg/kg	0.05	270		-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan II	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan sulphate	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endrin	mg/kg	0.05	10		-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endrin aldehyde	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endrin ketone	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	g-BHC (Lindane)	mg/kg	0.05			-	<0.05	<0.05	<0.05	<0.05	<0.05
	Heptachlor	mg/kg	0.05	6		-	<0.05	<0.05	<0.05	0.14	<0.05
	Heptachlor epoxide	mg/kg	0.05			-	<0.05	0.06	<0.05	0.56	<0.05
	Hexachlorobenzene	mg/kg	0.05	10		-	<0.05	<0.05	<0.05	<0.05	<0.05
	Methoxychlor	mg/kg	0.2	300		-	<0.2	<0.2	<0.2	<0.2	<0.2
	Organochlorine pesticides	mg/kg	0.1			-	<0.2	<0.2	<0.2	1.5	<0.2
	Other organochlorine pesticides	mg/kg	0.1			-	<0.2	<0.2	<0.2	1.5	<0.2
	Toxaphene	mg/kg	1	20		-	<1	<1	<1	<1	<1
PAH	Benz(a)anthracene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a) pyrene	mg/kg	0.5		0.7	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	mg/kg	0.5	3		-	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	mg/kg	0.5	3		-	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	mg/kg	0.5	3		-	1.2	1.2	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
SVOCs	Acenaphthene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene PAH	mg/kg	0.5		10	-	<0.5	<0.5	<0.5	<0.5	<0.5
	PAHs (Sum of total)	mg/kg	0.5	300		-	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5			-	<0.5	<0.5	<0.5	<0.5	<0.5
TPH	C10 - C14	mg/kg	20			-	<20	<20	<20	<20	<20
	C10 - C36 (Sum of total)	mg/kg	50			-	98	<50	<50	65	84
	C10 - C40 (Sum of total)	mg/kg	100			-	120	<100	<100	<100	<100
	C15 - C28	mg/kg	50			-	<50	<50	<50	<50	<50
	C29 - C36	mg/kg	50			-	98	<50	<50	65	84
	C6 - C9	mg/kg	20			-	<20	<20	<20	<20	<20
TRH	C6-C10	mg/kg	20			-	<20	<20	<20	<20	<20
	C6-C10 less BTEX (F1)	mg/kg	20		125	-	<20	<20	<20	<20	<20
	TRH >C10-C16	mg/kg	50			-	<50	<50	<50	<50	<50
	TRH >C10-C16 less Naphthalene (F2)	mg/kg	50		25	-	<50	<50	<50	<50	<50
	TRH >C16-C34 (F3)	mg/kg	100			-	120	<100	<100	<100	<100
	TRH >C34-C40 (F4)	mg/kg	100			-	<100	<100	<100	<100	<100
BTEX	Benzene	mg/kg	0.1		10	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1		1.5	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1		10	-	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2		10	-	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1			-	<0.1	<0.1	<0.1	<0.1	<0.1

				Field ID	FD1(18/12)	TP1(0.1-0.2)	TP2(0.0-0.1)	TP3(0.2-0.3)	TP4(0.01-0.1)	TP5(0.1-0.2)
				Lab Report Number	694761	694761	694761	694761	694761	694761
				Sample Date	18/12/2019	18/12/2019	18/12/2019	18/12/2019	18/12/2019	18/12/2019
				Human Health Investigation Level (HIL A)	ESL/EILs - Areas of Ecological Significance					
Method Type	Chemical Name	Unit	EQL							
	Xylene Total	mg/kg	0.3			-	<0.3	<0.3	<0.3	<0.3
VOCs	Naphthalene MAH	mg/kg	0.5		10	-	<0.5	<0.5	<0.5	<0.5

Asbestos Clearance & Soil Contamination Assessment

NSW Land and Housing Corporation

50 Wellington Road, Chester Hill NSW

Appendix D: QA/QC Procedures

J160879-01
Field Duplicate RPD
Soil Assessment - 50 Wellington Rd



Our Label			TP2(0.0-0.1)	FD1	FD1
Laboratory Label			S19-De28681	S19-Oc31542	RPD Primary vs Duplicate
Sample Date			18/12/2019	21/10/2019	
Sample Type			PS	FD	
Analyte	Units	LOR	Result		
Heavy Metals					
Arsenic	mg/kg	2	11	9.9	11%
Cadmium	mg/kg	0.4	< 0.4	< 0.4	N/A
Chromium	mg/kg	5	24	19	23%
Copper	mg/kg	5	28	28	0%
Lead	mg/kg	5	43	28	42%
Mercury	mg/kg	0.1	< 0.1	< 0.1	N/A
Nickel	mg/kg	5	22	19	15%
Zinc	mg/kg	5	74	130	55%

-: Not analysed
PS: Primary Sample
FD: Field Duplicate
IL: Inter-Laboratory Duplicate
N/A: Not Applicable (RPDs not calculated where one or more result <PQL)

Acceptable RPDs:	<5 x LOR	Any RPD acceptable
	<10 x LOR	<50% RPD acceptable
	>10 x LOR	<50% RPD acceptable

Acceptable RPD limits reached

Asbestos Clearance & Soil Contamination Assessment

NSW Land and Housing Corporation

50 Wellington Road, Chester Hill NSW

Appendix E: Tipping Dockets



SUEZ Recycling & Recovery Pty Ltd

Elizabeth Drive Waste Management
Centre
1725 Elizabeth Drive
Kemps Creek NSW 2178

Phone: 1300 651 116
ABN: 70 002 902 650

Delivery Docket

Ticket No: ED450024275.0
Time In: 16/01/2020 9:37:05 AM
Time Out: 16/01/2020 9:55:09 AM
Vehicle Rego: BX57LZ

701623 - SYDNEY CITY CIVIL
AUSTRALIA P/L
Cust ref: K10

Contaminated Asbestos Soil - 8032

2.42t@
Source: External
Dest: Elizabeth Drive General Waste
GROSS 18.48t
TARE 16.06t
NET Weight: 2.42t

Chargeable Weight: 2.42t
Each Item Weight: 0.00t

Total (ex GST):
GST :

Total Price:

----- Payment Details-----

Temporary Acc:
=====

Total Price:
=====

Total Amount Tendered:
Change Given:

Operator: WOJJW

.....