Validation investigation report

197 Limekilns Road, Kelso NSW

Ref: R9609val1
Date: 5 July 2019

Envirowest Consulting Pty Ltd ABN 18 103 955 246

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Geotechnical
Asbestos
Services

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Report number:	R9609val1
Date:	5 July 2019

Summary report

Address: 197 Limekilns Road, Kelso NSW

Dates of works: Validation sampling and inspection was undertaken on 10 April 2019.

Introduction

A residential subdivision is proposed for 197 Limekilns Road, Kelso NSW. A preliminary contamination investigation of the site was undertaken by SESL Australia Pty Ltd in May 2015 (report number C4503.Q4409.B34749c). The investigation identified elevated levels of lead and dieldrin. Remediation of the impacted areas via excavation and validation were recommended.

Scope

Envirowest Consulting Pty Ltd was commissioned by Hynash Demolition and Asbestos Removal Pty Ltd to undertake a validation assessment of lead and dieldrin impacted soil at 197 Limekilns Road, Kelso NSW. The assessment included:

- Validation of the remediated areas by soil sampling in the excavated areas and site inspection.

The investigation was undertaken according to NSW EPA and NEPM guidelines including *Guidelines for consultants reporting on contaminated sites* and *National Environment Protection (Assessment of Site Contamination) Measure 1999, Revised 2013*.

Summary

Remediation of lead and dieldrin impacted soil was undertaken by excavation and removal of impacted soil to the Bathurst Regional Council Waste Management Centre. The final excavations of the impacted soil is expected to have comprised an excavation pit measuring approximately 5m by 5m to a depth of 0.3m (approximately 7.5m^3 total). The soil was grey silty clay loam. Approximately 1 to 1.3m of brown sandy clay fill material had been placed across the surface.

Validation sampling was undertaken after excavation to confirm successful remediation. Validation was conducted by soil sampling of natural topsoil to confirm the absence of contaminants.

All samples taken from the final validation sampling contained levels of lead and dieldrin were less than the adopted thresholds for residential land-use.

Waste removed

Lead and dieldrin impacted soil was removed off the site with asbestos waste from other locations on-site and disposed at Bathurst Regional Council Waste Management Council.

Recommendations

An unexpected finds protocol should be implemented if contaminants are suspected during works.

Statement if suitability

The investigation area is suitable for proposed residential land-use.

This is an accurate summary of the report titled: Validation investigation report 197 Limekilns Road, Kelso NSW (Report number R9609val1).

Produced by: Envirowest Consulting Pty Ltd Dated: 29/4/2019

Name: Gregory Madafiglio Certification details: CEnvP

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1. Introduction

A residential subdivision is proposed at 197 Limekilns Road, Kelso NSW. A due diligence contamination investigation undertaken by SESL Australia Pty Ltd and reported in May 2015 (report number C4503.Q4409.B34749c) identified lead and dieldrin impacted soil in one location. A detailed contamination investigation undertaken by Envirowest Consulting Pty Ltd determined the extent of impacted material to be approximately 5m by 5m to a depth of 0.3m. Remediation of the contaminated area was recommended.

2. Scope of work

Envirowest Consulting Pty Ltd was commissioned by Hynash Demolition and Asbestos Removal Pty Ltd to undertake a validation assessment of an area of lead and dieldrin impacted soil at 197 Limekilns Road, Kelso NSW. The assessment included:

- Validation of the remediated areas by soil sampling in the excavated areas and site inspection.

The investigation was undertaken according to NSW EPA and NEPM guidelines including *Guidelines for consultants reporting on contaminated sites* and *National Environment Protection (Assessment of Site Contamination) Measure 1999, Revised 2013*.

3. Site identification

Address	197 Limekilns Road Kelso NSW 2795
Client	Hynash Demolition and Asbestos Removal Pty Ltd
Deposited plans	Lot 5 DP847225
Locality map	Figure 1
Validation sampling locations	Figure 3
Photographs	Figure 4
Impacted area	Approximately 25m^2

4. Site description

4.1 Zoning

The lot is currently zoned R1 – General Residential and RE1 – Public Recreation under the Bathurst Local Environmental Plan (2014).

4.2 Land-use

The site is undergoing residential development. The site was previously used as an apple orchard with a packing shed and dwelling.

4.3 Summary of council records

A section 149 certificate undertaken in 2015 identified Bathurst Regional Council has not received notice under the Contaminated Land Management Act 1997

- that the land is significantly contaminated
- subject to a voluntary management order
- subject to an ongoing maintenance order

  - subject to a site audit statement.
- The land is not subject to mine subsidence under section 15 of the Mine Subsidence Compensation Act 1961
- The land is not bushfire prone land
- The site is subject to flood related development controls

Bathurst Regional Council did not have any other records on the site regarding contamination.

4.4 Sources of information

- Site inspection 20 July 2017 and 10 April 2019 by Envirowest Consulting Pty Ltd
- NSW EPA records of public notices under the CLM Act 1997
- Soil and geological maps
- Historical photographs 1964, 1974, 1984 and 1996
- NSW Planning and Environment planning viewer
- SESL Australia Pty Ltd (2015) Due Diligence Assessment (report number C4503.Q4409.B34749)
- Previous investigations undertaken by Envirowest Consulting Pty Ltd

4.5 Review of site history

4.5.1 Aerial photographs

Year	Visual observations on Site
1964	The site has a similar layout to present. The site contains orchard trees and forms part of a larger site to the west. The site contains the packing shed and a dwelling north of the packing shed in the location of the current dwelling.
1974	Four additional sheds have been added to the property which were still present on the site in 2015. The dwelling is visible in this aerial photograph. The entire site still contains orchard trees.
1984	An additional farm dam has been constructed in this aerial photograph. The entire site is still covered in orchard trees.
1996	The water storage easement in the north of the site has been constructed. Many orchard trees have been removed from the site, predominately along the western side of the site.
2003	Orchard trees continue to be removed. The buildings all appear to remain. Residential development is evident west of the site.

4.5.2 Historical land uses

Title search Lot 5 DP847225

Year	Owners	Expected Landuse
1912 to 1922	Claude Harold Crago	Unknown
1922 to 1942	Harold Keith Chapman, Orchardist and Perpetual Trustee Company Ltd	Primary Production /Apple orchard
1942 to 1961	James Adrian Reed, Fruit and Vegetable Agent	Primary Production /Apple orchard
1961 to 1997	Sunbright Pty Ltd	Primary Production /Apple orchard
1997 to 2015	P J Paull Pty Ltd	Primary Production /Apple orchard
2015 to date	Bathurst Regional Council	Residential development

4.6 Buildings and infrastructure

No buildings or infrastructure were identified within the investigation area.

4.7 Potential contaminants
Lead and dieldrin (OCP) have been identified as the contaminants of concern within this investigation area.

4.8 Relevant complaint history
None known.

4.9 Regulatory information
The site is not listed on the NSW EPA register of contaminated sites.

4.10 Neighboring land-use
North – Rural-residential
South – Rural-residential
East – Rural-residential
West – Residential

Historical and present neighboring land-uses are not expected to impact on the site.

4.11 Regulatory information
The site is not listed on the NSW EPA register of contaminated sites.

4.12 Previous investigations
4.12.1 *Due Diligence Assessment, Lot 5 DP847225 Limekilns Road, Kelso (SESL Australia Pty Ltd C4503.Q4409.B34749), June 2015*
A due diligence assessment was undertaken for Bathurst Regional Council prior to acquisition for residential development. A site history review, site walk over and inspection, sampling, soil analysis and preparation of report were undertaken.

The site was determined to be open agricultural land which contains a residential dwelling, farm dams and agricultural sheds. The analysis of soil samples indicated the results were below the adopted Health Investigation Levels and Health Screening Levels for residential land-use with the exception of the asbestos containing materials in the vicinity of some structures and the fill mound adjacent to the former processing shed and elevated OCP (dieldrin) (9.9mg/kg) and lead (310mg/kg) in sample location S7.

SESL Australia concluded that these elevations were not uncommon for sites with similar history, and minor remediation of the affected areas will be required prior to development of the proposed residential and recreational area.

4.12.2 Clearance Certificate, 197 Limekilns Road, Kelso (Envirowest Consulting Pty Ltd R8538cc), July 2017
A clearance certificate was issued to EODO Pty Ltd following removal of non-friable asbestos continuing irrigation pipes and tape stand. The removal work was under the supervision of Central Demolition and Asbestos Pty Ltd on 19, 20, 26, 27, 29, and 30 June 2017.

4.12.3 Clearance Certificate and Air Monitoring, 197 Limekilns Road, Kelso (Envirowest Consulting Pty Ltd R8538cc1 and R8538m), August 2017
A clearance certificate was issued to EODO Pty Ltd following removal of a fire pit with asbestos cement fragments from east of the former fruit store shed. The removal work was under the supervision of Central Demolition and Asbestos Pty Ltd in August 2017. Air monitoring was undertaken during the removal work. Ash potentially containing asbestos remains to the north and south of the former fruit store shed.

4.12.4 Detailed contamination investigation, 197 Limekilns Road, Kelso NSW (Envirowest Consulting Pty Ltd R8593c), September 2017

A detailed contamination investigation was undertaken of three areas previously identified by SESL Australia Pty Ltd as containing elevated levels of lead and dieldrin or asbestos. SESL Australia previously identified asbestos cement fragments within investigation areas 1 and 2 and lead and dieldrin impacted material within investigation area 3.

Test pits were constructed within investigation areas 1 and 2 to identify the presence of asbestos cement fragments. Two asbestos cement fragments were identified on the surface of investigation area 1 and were removed. No additional fragments of asbestos were identified within this area or within investigation area 2. It was recommended for investigation area 1 and 2 to be managed under an unexpected find protocol during the site works.

Soil samples were collected from investigation area 3 and test pits constructed to determine the lateral and vertical extent of impacted material. The levels of lead and OCP's including dieldrin in the additional soil samples collected were below the adopted thresholds for residential land-use. One sample (S7) previously collected by SESL Australia contained levels of lead and dieldrin (OCP) above the adopted threshold for residential land-use.

Remediation and validation of lead and dieldrin impacted material was recommended to enable the site to be suitable for proposed residential land-use.

4.12.5 Remediation Action Plan, 197 Limekilns Road, Kelso NSW (Envirowest Consulting Pty Ltd R8593rap), September 2017

Excavation and off-site disposal was considered the preferred option for remediation of the lead and dieldrin impacted soil. The impacted area was determined to be approximately 5m by 5m to a depth of 0.3m.

The impacted areas were recommended to be excavated and the material transported off-site for disposal. The excavations would be extended beyond the impacted areas to ensure all contaminated material had been removed. The excavation areas would be graded to conform with the surrounding landscape. This is expected to be the most timely, technically practical and cost effective method of remediation.

The footprint of the former lead and dieldrin impacted area required to be inspected and soil samples collected from the natural topsoil of the excavated area to ensure the lead and organochlorine pesticide impacted soil had been removed.

4.12.6 Asbestos audit, 197 Limekilns Road, Kelso NSW (Envirowest Consulting Pty Ltd, R9609aa), May 2018

An asbestos audit was requested by Hynash Demolition and Asbestos Removal Pty Ltd at 197 Limekilns Road, Kelso NSW. The assessed areas of the former orchard enterprise included toilet building, former chicken shed, packing shed, office, two dwellings, granny flat, storage shed and detached toilet. The identified areas of asbestos are presented in Envirowest Consulting report R9609aa.

4.12.6 Monitoring and clearances, 197 Limekilns Road, Kelso (Envirowest Consulting Pty Ltd) June to September 2018

Air monitoring during asbestos removal was undertaken at 197 Limekilns Road, Kelso NSW between June to September 2018. Asbestos clearances were undertaken following removal of asbestos from identified areas.

4.12.7 Unexpected finds, 197 Limekilns Road, Kelso NSW (Envirowest Consulting Pty Ltd L9609asb), July 2018

An assessment of unexpected finds areas was requested to determine appropriate remediation methods. The unexpected finds included a small stockpile of asbestos cement sheeting below pine needles, soil stockpile containing broken cement pipes, material containing fly ash and a stockpile containing asbestos cement fragments.

Recommendations included removal of identified asbestos cement material (ACM) in accordance with an Asbestos Removal Control Plan. Assessments undertaken on the fly ash did not identify elevated levels of metals or PAH and the material was classified at general solid waste.

4.13 Integrity assessment

The site history was obtained from a site inspection and history review. The information is consistent with the current site condition and to the best of the assessor's knowledge is accurate.

5. Site conditions and environment

5.1 Surface cover

Surface cover on-site was bare due to recent earthworks and importation of fill.

5.2 Topography

The site is on a mid-slope with a very gently inclined slope of 1 to 3%. The site slopes from north to south.

5.3 Soils and geology

The site is within the Bathurst Soil Landscape (Kovac *et al*. 1990). The soil landscape includes non-calcic brown soils with yellow solodic soils on the lower slopes and in drainage lines. Sands and mottled yellow solodic soils also occur.

The site is underlain by Bathurst Granite. Parent rock includes medium to coarse-grained and massive granodiorites and adamellites. Parent materials comprise *in situ* and alluvial-colluvial materials from previously mentioned parent rock (Kovac *et al*. 1990).

5.4 Hydrology

5.4.1 Surface water

The soil is expected to have a moderate permeability. Surface water flows into on-site dams which flow south through a network of dams and drainage lines into Raglan Creek approximately 1.2km south of the site.

5.4.2 Groundwater

One groundwater bore is located on the property approximately 140m west of the site. The bore is licensed for irrigation and was constructed to a depth of 18.2 metres. The bore has a water bearing zone from 10.6m and standing water levels from 5.7m. No other bores are located within 500m of the investigation areas.

6. Remediation works

Remediation of lead and dieldrin impacted material was reportedly undertaken by excavation and disposal off-site.

The final excavations of the impacted area is expected to be approximately 5m by 5m and up to a depth of 0.3m (approximately 7.5m^3).

The excavated material was reportedly transported off-site to a licensed landfill with additional asbestos impacted material from additional areas of the site (Appendix 4).

The remediated area had been filled as part of engineering works for subdivision development. Up to 1.3m had been applied to the site as part of filling of a low area. The fill material used for engineering based filling was reportedly sourced from on-site.

7. Conceptual site model

7.1 Sources of contamination

The contamination source is expected to be mixing of chemicals and spills.

7.2 Contaminants of concern

The contaminants of concern have been identified as:

- Lead
- Dieldrin

7.3 Potential receptors

The proposed land-use of the investigation area is a residential subdivision. Surface water is expected to flow into the dams and drainage line located east of the investigation area.

Human receptors include

- On-site works during site development
- Residents
- On-site workers
- Intrusive maintenance workers

Ecological receptors include

- Vegetation on the site and adjacent the site
- Aquatic flora and fauna

7.4 Exposure pathways

Pathways for exposure to contaminants are:

- Dermal contact following soil disturbance
- Ingestion after soil disturbance
- Inhalation of dust after soil disturbance
- Surface water and sediment runoff into nearby waterways
- Leaching of contaminants into the groundwater
- Direct contact of flora and fauna with the soil

7.5 Source receptor linkages

Potential source pathway receptor linkages are identified to enable evaluation of any adverse impact on human health or ecology.

The investigation area is currently being developed as residential subdivision and human receptors to the investigation area are possible. Proposed users of the site may have a risk of exposure if the contaminants are present and the soil is disturbed. Intrusive maintenance workers may also have an increased risk of exposure to contaminants during soil disturbance.

Source/contaminants	Transport	Potential exposure pathways	Receptors
■Lead and dieldrin	□Volatilisation □Surface water □Groundwater ■Wind	■Direct contact (ingestion and absorption) ■Inhalation	■On-site workers ■Residents ■Construction workers □Ecosystem

■Potential, □unknown/unlikely

8. Data quality objectives (DQO)

The development of data quality objectives is recommended by EPA NSW to provide a systematic framework for site validation. All validation and sampling shall be carried out in accordance with NSW EPA guidelines: *Contaminated Sites – Sampling Design Guidelines* and *Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites*.

8.1 State the problem

Elevated levels of lead and dieldrin in soil were identified in the south eastern section of the site and expected to be associated with chemicals spills and mixing (Figure 2). The extent of the impacted soil was estimated to be 25m^2 and to a depth of 0.3m.

The remediation method was to excavate the lead and dieldrin impacted material and dispose off-site at a licensed landfill. Validation sampling is required to determine the success of the remediation.

8.2 Identify the decision

The primary inputs for assessing the decision are outlined in the following sections. Methods of collecting samples were in accordance with NEPM (1999) and described in the following sections. The soil samples were analysed for potential soil contaminants as listed in following sections.

The proposed land-use for the site is residential development and the most appropriate threshold is residential. The levels of contaminants following remediation should be less than the relevant thresholds. The decision problem is; *Is the site suitable for the proposed land-use?*

The samples were analysed in NATA accredited laboratories using EPA approved methods and levels of detection. Individual levels of each analyte evaluated were compared with the adopted investigation levels to determine suitability for the most sensitive land-use on-site of residential.

8.3 Identify the inputs decision

The sampling design for the impacted area, is a systematic pattern on a minimum of 5m grid pattern. The sampling density is sufficient to detect a potential hot spot with a radius of 3m at a 95% confidence interval.

Investigations and inspections of the soil in the excavation pit are required to validate the level of potential contaminants. The soil samples were analysed for the contaminants of concern. The laboratory results were assessed against residential land-use thresholds.

8.4 Define the boundaries of the study

The investigation areas are those areas which have been remediated through excavation. The size of this area was determined by validation sampling and analysis. The size of the remediated area was increased if further contamination was discovered during the validation investigation.

8.5 Develop a decision rule

The decision rule for remediation is based on the thresholds listed in Schedule D of the NEPM (1999) Guideline on Investigation Levels for Soil and Groundwater. Laboratory results were assessed against the residential thresholds (NEPC 1999).

8.6 Specify acceptable limits on the decision errors.

The 95% upper confidence limit of samples collected are less than the threshold levels.

8.7 Optimize the design for obtaining data

Soil sampling was undertaken as described in the following sections which is based on the EPA sampling guidelines.

Data quality indicators are described in Appendix 2

9. Validation assessment

9.1 Sampling plan

The excavation pits were sampled using systematic sampling on an approximate grid of 5m with samples collected from the natural topsoil. The sampling density can detect a potential hot spot with a radius of 3m at a 95% level of confidence.

The excavation was shallow and backfilling with imported material was not undertaken. The remediation action plan (Envirowest Consulting Pty Ltd report number R8596rap) specified that sampling of backfill material was only required for imported fill.

9.2 Sampling locations

Soil samples were collected from natural topsoil in the location of the remediated impacted material on an approximate 5m grid. The remediation location was determined based on GPS coordinates and remaining surface features.

9.3 Analytes

Soil samples were analysed for lead and organochlorine pesticides (OCP).

9.4 Sampling methods

Five test pits were constructed at the location of the walls and base to enable sampling of the natural soil in the remediation pit. Soil samples were collected from freshly excavated material using a stainless steel trowel. The soil was transferred to a solvent rinsed glass jar with a teflon lid. Discrete samples were collected. Tools were decontaminated between sampling locations to prevent cross contamination by: brushing to remove caked or encrusted material, washing in detergent and tap water.

All sample containers were placed immediately into a cooler containing ice. A chain of custody form accompanied the transport of samples. Details of sampling procedures are presented in Appendix 1 and sampling log in Appendix 3.

10. Quality assurance and quality control

10.1 Sampling design

A systematic sampling pattern is required to validate the remediated area. The excavation pit was sampled on an approximate grid pattern of 5m with samples collected from the natural topsoil. The location and density of samples collected is in accordance with the recommended sampling guidelines (EPA 1995).

The number of locations tested is thought to provide an adequate assurance that the soils sampled are representative of the area sampled.

Data quality objectives are presented in Section 8 and data quality indicators are presented in Appendix 2.

10.2 Field procedures

The collection of samples was undertaken in accordance with accepted standard protocols (NEPC, 1999). Samples from the excavation pit were analysed for heavy metals and organochlorine pesticides (OCP). The details of the samples collected are presented in Table 1.

Table 1. Schedule of samples and analyse

Laboratory sample ID	Sample date	Depth below current surface (m)	Location (Figure 3)	Analysis undertaken
9609-1	10/04/2019	1.3	Northern extent	Lead (Pb), organochlorine pesticides (OCP)
9609-2	10/04/2019	1.3	Eastern extent	Pb, OCP
9609-3	10/04/2019	1.4	Southern extent	Pb, OCP
9609-4	10/04/2019	1.4	Base	Pb, OCP
9609-5	10/04/2019	1.4	Western extent	Pb, OCP

Sampling equipment was decontaminated between each sampling event. Samples were stored and transported under refrigeration in insulated containers. Appropriate storage duration was observed. A chain of custody form tracked the samples to the laboratory.

A single sampler was used to collect the samples using standard methods. Soil collected from the pit was a fresh sample from a hand shovel. After collection the samples were immediately placed in new glass sampling jars and placed in a cooler. Sample jars were filled to minimise headspace and maintain sample integrity.

10.3 Laboratory

Chemical analyses were conducted in the laboratories of SGS, Alexandria, NSW which is NATA registered for the tests undertaken. The laboratory has quality assurance and quality control programs. The quality control program for analysis of samples in each laboratory batch was greater than the recommended frequency of 5%. The laboratory reports including quality control evaluations are presented in the Appendix 4.

10.4 Data evaluation

The laboratory quality control report indicates the data variability is within acceptable industry limits. The data is considered representative and usable for the purposes of the investigation. Data quality indicators are presented in Appendix 2.

11. Assessment criteria

The proposed land-use of the site is a residential subdivision. The most applicable land-use category for the site is considered residential with access to soil (HIL A).

The health-based and ecological investigation levels of contaminants in the soil for residential sites, for the substances for which criteria are available, are listed in Table 2, as recommended in the NEPM (1999). Ecological investigation levels (EIL) have been developed for the protection of terrestrial ecosystems for selected metals and organic substances in the soil in the guideline (NEPC 1999). The EILs for lead are generic.

Table 2. Soil assessment criteria (mg/kg)

Analyte	HIL – Residential land-use with access to soil threshold	EIL – Urban residential and public open space
Lead	300	1,100
OCP – Aldrin and Dieldrin	6	-
OCP – DD's	240	180

HIL – Health investigation levels, EIL – Ecological investigation levels

12. Results and discussion

The location of the remediation pit had been filled at the time of validation assessment as part of the engineering works for the subdivision (Figure 4). Test pits were constructed to enable assessment of the remediation pit and collection of validation samples. The test pits indicated that up to 1.3m of fill material had been applied to the site to obtain final design levels. Material used to fill low areas were reportedly sourced from on-site. No fill was reportedly imported to the site. The fill material identified in the sampling pits was used to fill a low area as part of subdivision development. The appearance of the material was similar to that in other areas of the site. Contamination assessments previously undertaken at the Sunnybright Orchard site recommended the site suitable for residential land-use with the exception of the area remediated in 2019 and the subject of the current assessment.

The final excavations of the impacted soil area reportedly comprised an excavation pit measuring approximately 5m by 5m to a depth of 0.3m (approximately 7.5m^3 total). Up to 1.3m of fill material comprising brown sandy clay with a clear change to natural soil comprising dark brownish grey silty clay loam was identified in the test pits (Appendix 5). No soil staining or odour was observed in the natural topsoil. The soil profile in the test pits were uniform. A photograph of a representative test pit is provided in Figure 4.

The excavated material was disposed at the Bathurst Regional Council Waste Management Centre with asbestos waste material excavated from additional areas across the site (Appendix 6).

The soil samples collected contained heavy metals and organochlorine pesticides at levels less than the adopted thresholds (Table 3).

Table 3. Soil analysis for results

Sample id.	Location (Figure 3)	Depth (m)	Lead	OCP – Aldrin and Dieldrin	OCP – DD's
9609-1	Northern extent	0.1	34	ND	0.3
9609-2	Eastern extent	0.1	36	ND	0.2
9609-3	Southern extent	0.1	16	ND	0.2
9609-4	Base	0.1	12	ND	ND
9609-5	Western extent	0.1	30	ND	ND
HIL – Residential			300	6	240
EIL – Residential			1,100	-	180

ND – not detected, NL – not limiting, EIL – ecological investigation level

13. Site characterisation

13.1 Environmental contamination

No contamination was identified in the validation sampling.

13.2 Chemical degradation production

No contamination was identified in the validation sampling.

13.3 Exposed population

No contamination was identified in the validation sampling.

14. Conclusions

14.1 Summary

Remediation of lead and dieldrin impacted soil was reportedly undertaken by excavation and removal of impacted soil to Bathurst Regional Council Waste Management Centre. The final excavations of the impacted soil is expected to have comprised an excavation pit measuring approximately 5m by 5m to a depth of 0.3m (approximately 7.5m^3 total). Fill material had been placed across the site prior to a site inspection. The fill material was excavated within the previously identified impacted area to collect natural topsoil samples. No soil staining or odour was observed in the natural topsoil.

Validation sampling was undertaken after excavation to confirm successful remediation. Validation was conducted by soil sampling of the natural topsoil to confirm the absence of contaminants.

All validation samples contained levels of lead and organochlorine pesticides including dieldrin less than the adopted thresholds for residential land-use.

14.2 Assumptions used in reaching the conclusions

It is assumed the site history is accurate and no significant undetected contamination is located in areas not investigated on the site.

14.3 Extent of uncertainties in the results

Soil sampling was designed to detect residual elevated concentrations of contaminants in the soil around the excavation.

14.4 Suitability of proposed use

The site is suitable for proposed residential land-use.

14.5 Limitations and constraints on the use of the site

Nil.

14.6 Recommendation for further work

An unexpected finds protocol (Appendix 7) should be implemented if contaminants are suspected during works.

15. Report limitations and intellectual property

This report has been prepared for the use of the client to achieve the objectives given the client requirements and cost constraints. The level of confidence of the conclusion reached is governed by the scope of the investigation and the availability and quality of existing data. Where limitations or uncertainties are known, they are identified in the report. No liability can be accepted for failure to identify conditions or issues which arise in the future and which could not reasonably have been predicted using the scope of the investigation and the information obtained.

The investigation identifies the actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists who then render an opinion about overall subsurface conditions, the nature and extent of the contamination, its likely impact on the proposed development and appropriate remediation measures. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, and no sub surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock or time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. It is thus import to understand the limitations of the investigation and recognise that we are not responsible for these limitations.

16. References

DEC (2008) *Guidelines for Implementing the Protection of the Environment Operations* (Underground Petroleum Storage Systems Regulation 2008)

EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste* (Department of Environment and Climate Change, Sydney)

EPA (2017) *Contaminated Sites: Guidelines for the NSW Site Auditors Scheme* (NSW Environment Protection Authority, Chatswood)

EPA (1995) *Contaminated sites: Sampling Design Guidelines* (NSW Environment Protection Authority, Chatswood)

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NEPM (1999) *National Environment Protection (Assessment of Site Contamination) Measure 1999 Revised 2013* (National Environment Protection Council Service Corporation, Adelaide)

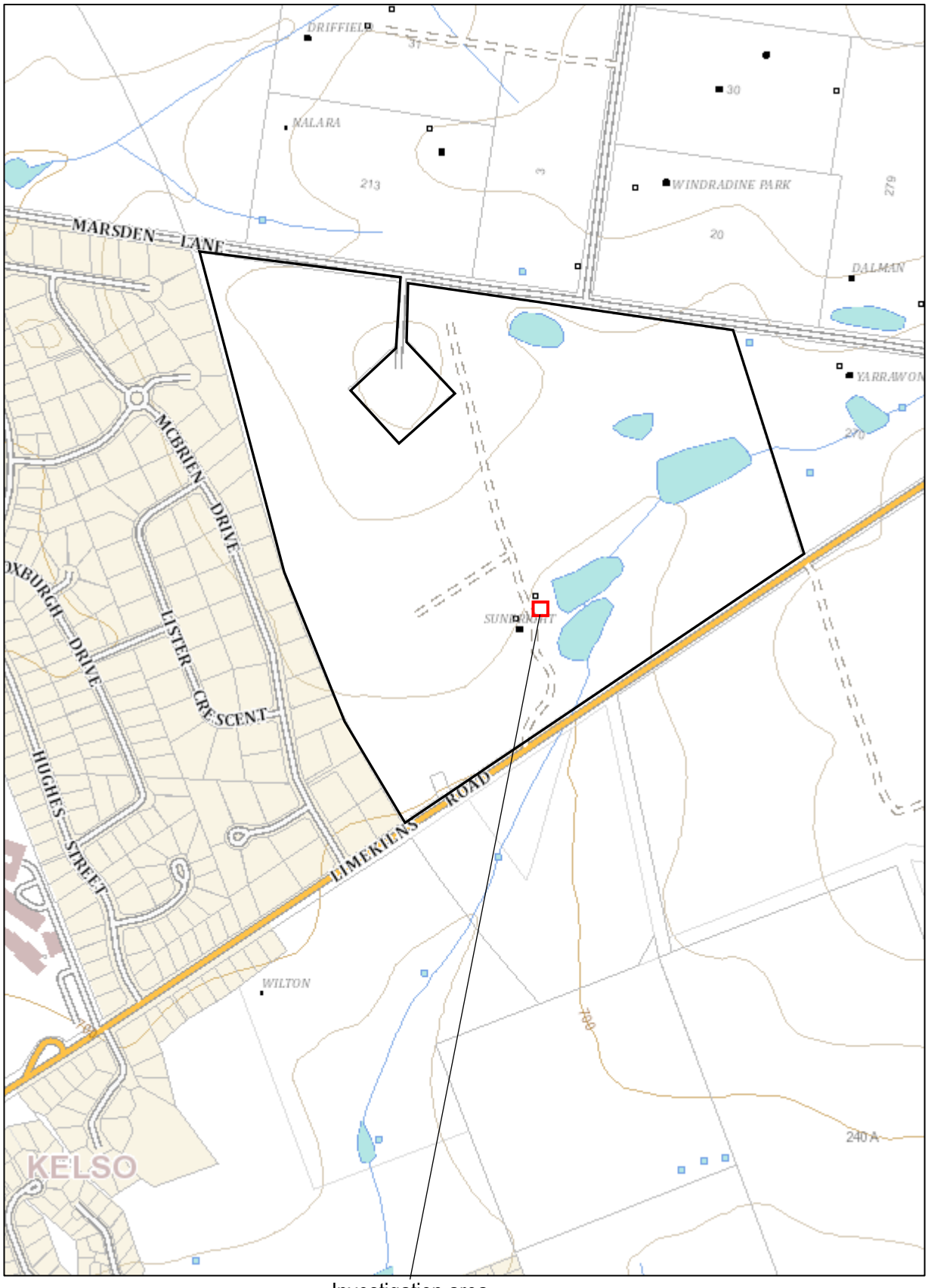


Figure 1. Site locality	
Lot 5 DP847225, 197 Limekilns Road, Kelso NSW	
	Envirowest Consulting Pty Ltd
Job: R9609val1	Date: 16/4/2019

North

SESL Australia
Lead 310mg/kg
Dieldrin 9.9mg/kg

Legend

Area remediated

⊗ Elevated sample location

Slope

Approximate Scale 1: 400

0 4 8 16m

Figure 2. Aerial photograph (2011) and areas remediated		
Lot 5 DP847225, 197 Limekilns Road, Kelso NSW		
	Envirowest Consulting Pty Ltd	
Job: R9609val1	Drawn by: AA	Date: 16/4/2019

North

Legend

Excavation pit

Sample location

Slope

Approximate Scale 1: 400

0 4 8 16m

Figure 3. Excavated areas and validation sampling locations		
Lot 5 DP847225, 197 Limekilns Road, Kelso NSW		
	Envirowest Consulting Pty Ltd	
Job: R9609val1	Drawn by: AA	Date: 16/4/2019

Figure 4. Photographs of the site

Pit created to collected sample

Site at time of validation assessment

Appendix 1. Sampling protocol

1. Sampling

The samples will be collected from the auger tip, mattock, hand spade, hand auger or excavator bucket immediately on withdrawal.

The time between retrieval of the sample and sealing of the sample container was kept to a minimum.

The material was collected using single use disposal gloves or a stainless steel spade which represented material which had not been exposed to the atmosphere prior to sampling.

All sampling jars were filled as close to the top as possible to minimise the available airspace within the jar.

2. Handling, containment and transport

Daily sampling activities will be recorded including sampling locations, numbers, observations, measurements, sampler, date and time and weather condition.

The sampling jars will be new sterile glass jars fitted with plastic lid and airtight Teflon seals, supplied by the laboratories for the purpose of collecting soil samples for analysis. Sample containers will be marked indelibly with the sample ID code to waterproof labels affixed to the body of the container.

All samples will be removed from direct sunlight as soon as possible after sampling and placed in insulated containers. Samples were stored in a refrigerator at 4°C prior to transportation to the laboratory in insulated containers with ice bricks in accordance with AS4482.1.

Handling and transportation to the laboratory will be accompanied with a chain of custody form to demonstrate the specimens are properly received, documents, processed and stored.

Maximum holding time for extraction (AS4482.1) are:

Analyte	Maximum holding time
Metals	6 months
Mercury	28 days
Sulfate	7 days
Organic carbon	7 days
OCP, OPP, PCB	14 days
TRH, BTEXN, PAH, phenols	14 days

3. Decontamination of sampling equipment

Sampling tools will be decontaminated between sampling locations by

- Removing soil adhering to the sampling equipment by scraping, brushing or wiping
- Washing with a phosphate-free detergent
- Rinsing thoroughly with clean water
- Repeating if necessary
- Dry equipment with disposable towels or air

Appendix 2. Quality control and quality assurance report

1. Data quality indicators (DQI) requirements

1.1 Completeness

A measure of the amount of usable data for a data collection activity. Greater than 95% of the data must be reliable based on the quality objectives. Where greater than two quality objectives have less reliability than the acceptance criterion the data may be considered with uncertainty.

1.1.1 Field

Consideration	Requirement
Locations and depths to be sampled	Described in the sampling plan. The acceptance criterion is 95% data retrieved compared with proposed. Acceptance criterion is 100% in crucial areas.
SOP appropriate and compiled	Described in the sampling plan.
Experienced sampler	Sampler or supervisor
Documentation correct	Sampling log and chain of custody completed

1.1.2 Laboratory

Consideration	Requirement
Samples analysed	Number according to sampling and quality plan
Analytes	Number according to sampling and quality plan
Methods	EPA or other recognised methods with suitable PQL
Sample documentation	Complete including chain of custody and sample description
Sample holding times	Metals 6 months, OCP, PAH, TRH, PCB 14 days

1.2 Comparability

The confidence that data may be considered to be equivalent for each sampling and analytical event. The data must show little or no inconsistencies with results and field observations.

1.2.1 Field

Consideration	Requirement
SOP	Same sampling procedures to be used
Experienced sampler	Sampler or supervisor
Climatic conditions	Described as may influence results
Samples collected	Sample medium, size, preparation, storage, transport

1.2.2 Laboratory

Consideration	Requirement
Analytical methods	Same methods, approved methods
PQL	Same
Same laboratory	Justify if different
Same units	Justify if different

1.3 Representativeness

The confidence (expressed qualitatively) that data are representative of each media present on the site.

1.3.1 Field

Consideration	Requirement
Appropriate media sampled	Sampled according to sampling and quality plan or in accordance with the EPA (1995) sampling guidelines.
All media identified	Sampling media identified in the sampling and quality plan.

1.3.2 Laboratory

Consideration	Requirement
Samples analysed	Blanks

1.4 Precision

A quantitative measure of the variability (or reproduced of the data). Is measured by standard deviation or relative percent difference (RPD). A RPD analysis is calculated and compared to the practical quantitation limit (PQL) or absolute difference AD.

- Levels greater than 10 times the PQL the RPD is 50%
- Levels between 5 and 10 times the PQL the RPD is 75%
- Levels between 2 and 5 times the PQL the RPD is 100%
- Levels less than 2 times the PQL, the AD is less than 2.5 times the PQL

Data not conforming to the acceptance criterion will be examined for determination of suitability for the purpose of site characterisation.

1.4.1 Field

Consideration	Requirement
Field duplicates	Frequency of 5%, results to be within RPD or discussion required indicate the appropriateness of SOP

1.4.2 Laboratory

Consideration	Requirement
Laboratory and inter lab duplicates	Frequency of 5%, results to be within RPD or discussion required. Inter laboratory duplicates will be one sample per batch.
Field duplicates	Frequency of 5%, results to be within RPD or discussion required
Laboratory prepared volatile trip spikes	One per sampling batch, results to be within RPD or discussion required

1.5 Accuracy

A quantitative measure of the closeness of the reported data to the true value.

Recovery data (surrogates, laboratory control samples and matrix spikes) data subject to the following control limits:

- 60 to 140% acceptable data
- 20-60% discussion required, may be considered acceptable
- 10-20% data should considered as estimates
- 10% data should be rejected

1.5.1 Field

Consideration	Requirement
SOP	Complied
Inter laboratory duplicates	Frequency of 5%. Analysis criterion 60% RPD for levels greater than 10 times the PQL 85% RPD for levels between 5 to 10 times the PQL 100% RPD at levels between 2 to 5 times the PQL Absolute difference, 3.5 times the PQL where levels are, 2 times PQL
Field blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Rinsate blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted

1.5.2 Laboratory

Consideration	Requirement
Method blanks	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Matrix spikes	Frequency of 5%, results to be within +/-40% or discussion required
Matrix duplicates	Sample injected with a known concentration of contaminants with tested. Frequency of 5%, results to be within +/-40% or discussion required
Surrogate spikes	QC monitoring spikes to be added to samples at the extraction process in the laboratory where applicable. Surrogates are closely related to the organic target analyte and not normally found in the natural environment. Frequency of 5%, results to be within +/-40% or discussion required
Laboratory control samples	Externally prepared reference material containing representative analytes under investigation. These will be undertaken at one per batch. It's to be within +/-40% or discussion required
Laboratory prepared spikes	Frequency of 5%, results to be within +/-40% or discussion required

2. Laboratory analysis summary

One analysis batch was undertaken over the investigation program. A total of five soil samples were submitted for analytical testing for the validation sampling. The samples were collected in the field by Envirowest Consulting Pty Ltd, placed into laboratory prepared receptacles as recommended in NEPM (1999). The samples preservation and storage was undertaken using standard industry practices (NEPC 1999). A chain of custody form accompanied transport of the samples to the laboratory.

The samples were analysed at the laboratories of SGS, Alexandria, NSW which is National Association of Testing Authorities (NATA) accredited for the tests undertaken. The analyses undertaken, number of samples tested and methods are presented in the following tables:

Laboratory analysis schedule for final validation sampling

Sample id. (sampling location)	Number of samples	Duplicate	Analyses	Date collected	Substrate	Laboratory report
9609-1, 9609-2, 9609-3, 9609-4, 9609-5	5	1	Pb and OCP	10/4/2019	Soil	SE191499

Analytical methods

Analyte	Laboratory methods
Metals	APHA USEPA SW846-6010
Leachable metals	APHA USEPA SW846-6010
Mercury	APHA 3112
TRH(C6-C9)	USPEA SW 846-8260B
TRH(C10-C36)	USEPA SW 846-8270B
OC/OP Pesticides, PAH, PCB	USEPA SW 846-8270B
BTEXN	USEPA SW 846-8260B

3. Field quality assurance and quality control

One intra laboratory duplicate sample was collected for the investigation. The frequency was greater than the recommended frequency of 5%. Table A5.1 outlines the samples collected and differences in replicate analyses. Relative differences were deemed to pass if they were within the acceptance limits of +/- 40% for replicate analyses or less than 5 times the detection limit.

Field duplicate frequency

Sample id.	Number of samples	Duplicate	Frequency (%)	Date collected	Substrate	Laboratory report
9609-1, 9609-2, 9609-3, 9609-4, 9609-5	5	1	20	10/4/2019	Soil	SE191499

Table A5.1. Relative differences for intra laboratory duplicates

	9609-5, 9609-A	
	Relative difference (%)	Pass/Fail
Lead	11	Pass
OCP	NA	-

NA – relative difference unable to be calculated as results are less than laboratory detection limit.

No trip blanks or spikes were submitted for analysis. This is not considered to create significant uncertainty in the analysis results because of the following rationale:

- The fieldwork was completed within a short time period and consistent methods were used for soil sampling.
- Soil samples were placed in insulated cooled containers after sampling to ensure preservation during transport and storage.
- The samples were placed in single use jars using clean sampling tools and disposable gloves from material not in contact with other samples. This reduces the likelihood of cross contamination.
- Samples in the analysis batch contain analytes below the level of detection. It is considered unlikely that contamination has occurred as a result of transport and handling.
- Target samples were non-volatile

4. Laboratory quality assurance and quality control

Sample holding times are recommended in NEPM (1999). The time between collection and extraction for all samples was less than the criteria listed below:

Analyte	Maximum holding time
Metals, cyanide, nitrogen, phosphorus	6 months
OCP, OPP, TRH, PCB, BTEXN, PAH	14 days

The laboratory interpretative reports are presented with individual laboratory report. Assessment is made of holding time, frequency of control samples and quality control samples. No significant outliers or non-conformities were identified. The laboratory report also contains a detailed description of preparation methods and analytical methods.

The results, quality report, interpretative report and chain of custody are presented in the attached appendices. The quality report contains the laboratory duplicates, spikes, laboratory control samples, blanks and where appropriate matrix spike recovery (surrogate).

5. Data quality indicators (DQI) analysis

5.1 Completeness

A measure of the amount of usable data for a data collection activity (total to be greater than 95%).

The data set was found to be complete based on the scope of work. No critical areas of contamination were omitted from the data set.

5.1.1 Field

Consideration	Accepted	Comment
Locations to be sampled	Yes	In accordance with sampling methodology, described in the report. Sampling locations described in figures.
Depth to be sampled	Yes	In accordance with sampling methodology
SOP appropriate and compiled	Yes	In accordance with sampling methodology Sampled with stainless steel spade into lab prepared containers, decontamination between samples, latex gloves worn by sampler
Experienced sampler	Yes	Same soil sampler, environmental scientist
Documentation correct	Yes	Sampling log completed Chain of custody completed

5.1.2 Laboratory

Consideration	Accepted	Comment
Samples analysed	Yes	All critical samples analysed in accordance with chain of custody and analysis plan. Additional soil samples were collected and reported separately in L10506c1
Analytes	Yes	All analytes in accordance with chain of custody and analysis plan
Methods	Yes	Analysed in NATA accredited laboratory with recognised methods and suitable PQL
Sample documentation	Yes	Completed including chain of custody and sample results and quality results report for each batch
Sample holding times	Yes	Metals less than 6 months, OCP, TRH, PCB, BTEXN, PAH less than 14 days

5.2 Comparability

The confidence that data may be considered to be equivalent for each sampling and analytical event. The data sets were found to be acceptable.

5.2.1 Field

Consideration	Accepted	Comment
SOP	Yes	Same sampling procedures used and sampled on one date
Experienced sampler	Yes	Experienced scientist
Climatic conditions	Yes	Sampling log
Samples collected	Yes	Suitable size, storage and transport

5.2.2 Laboratory

Consideration	Accepted	Comment
Analytical methods	Yes	Same methods all samples, in accordance with NEPM(1999) or USEPA
PQL	Yes	Suitable for analytes
Same laboratory	Yes	SGS Environmental is NATA accredited for the test
Same units	Yes	-

5.3 Representativeness

The confidence (expressed qualitatively) that data are representative of each media present on the site.

The data sets were found to be acceptable.

5.3.1 Field

Consideration	Accepted	Comment
Appropriate media sampled	Yes	Sampled according to sampling and quality plan
All media identified	Yes	Soil sampling media identified in the sampling and quality plan

5.3.2 Laboratory

Consideration	Accepted	Comment
Samples analysed	Yes	Undertaken in NATA accredited laboratory.

5.4 Precision

A quantitative measure of the variability (or reproduced of the data).

The data sets were found to be acceptable.

5.4.1 Field

Consideration	Accepted	Comment
SOP	Yes	Complied
Field duplicates	Yes	Collected

5.4.2 Laboratory

Consideration	Accepted	Comment
Laboratory and inter lab duplicates	Yes	Frequency of >5%, results to be within +/-40% or discussion required.
Field duplicates	Yes	Frequency of >5%, results to be within +/-40% or discussion required.
Laboratory prepared volatile trip spikes	N/A	No trip spikes analysed

5.5 Accuracy

A quantitative measure of the closeness of the reported data to the true value. The data sets were found to be acceptable.

5.5.1 Field

Consideration	Accepted	Comment
SOP	Yes	Complied
Field blanks	NA	Not taken due to small number of samples collected

5.5.2 Laboratory

Consideration	Accepted	Comment
Method blanks	Yes	Frequency of 5%, <5 times the PQL, PQL may be adjusted
Matrix spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required.
Matrix duplicates	Yes	Frequency of 5%, results to be within +/-40% or discussion required. RPD failed acceptance criteria due to sample heterogeneity.
Surrogate spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Laboratory control samples	Yes	Frequency of 5%, results to be within +/-40% or discussion required
Laboratory prepared spikes	Yes	Frequency of 5%, results to be within +/-40% or discussion required

No trip blanks or trip spikes were submitted for analysis. This is not considered to create significant uncertainty in the analysis results because of the following rationale:

- The fieldwork methods used for soil sampling were consistent throughout the project with all in situ samples collected from material which had not been subject to exposure.
- The fieldwork was completed within a short time period and consistent methods were used for soil sampling.

- Soil samples were placed in insulated cooled containers as quickly as possible, with the containers filled to minimize headspace. The sample containers were sealed immediately after the sample was collected and chilled in an esky containing ice.
- The samples were stored in a refrigerator and transported with ice bricks to ensure preservation during transport and storage.
- The samples were placed in single use jars using clean sampling tools and disposable gloves from material not in contact with other samples. This reduces the likelihood of cross contamination.
- Samples in the analysis batches contained analytes below the level of detection. It is considered unlikely that contamination has occurred as a result of transport and handling.

6. Conclusion

All media appropriate to the objectives of this investigation have been adequately analysed and no area of significant uncertainty exist.

It is concluded the data is usable for the purposes of the investigation.

Appendix 3. Sampling log

Sampling log

Client	Hynash Demolition and Asbestos Removal Pty Ltd
Contact	-
Job number	9609-1
Location	197 Limekilns Road, Kelso
Date	10 April 2019
Investigator(s)	Leah Desborough
Weather conditions	Fine

Sample I.D	Matrix	Date	Analysis required	Observations/comments
9609-1	Soil	10/4/2019	Lead (Pb), organochlorine pesticides (OCP)	Dark brownish grey silty clay loam, organic odour
9609-2	Soil	10/4/2019	Pb, OCP	Dark brownish grey silty clay loam, organic odour
9609-3	Soil	10/4/2019	Pb, OCP	Dark brownish grey silty clay loam, organic odour
9609-4	Soil	10/4/2019	Pb, OCP	Dark brownish grey silty clay loam, organic odour
9609-5	Soil	10/4/2019	Pb, OCP	Dark brownish grey silty clay loam
9609-A	Soil	10/4/2019	Pb, OCP	Duplicate of 9609-5

Appendix 4. SGS Laboratory report and chain of custody form

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Leah Desborough
Client	ENVIROWEST CONSULTING PTY LIMITED
Address	PO BOX 8158 ORANGE NSW 2800
Telephone	61 2 63614954
Facsimile	(Not specified)
Email	leah@envirowest.net.au
Project	**9609-1**
Order Number	**9609-1**
Samples	6

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE191499 R0**
Date Received	11/4/2019
Date Reported	18/4/2019

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

OC Pesticides in Soil [AN420] Tested: 16/4/2019

PARAMETER	UOM	LOR	9609-1 SOIL - 10/4/2019 SE191499.001	9609-2 SOIL - 10/4/2019 SE191499.002	9609-3 SOIL - 10/4/2019 SE191499.003	9609-4 SOIL - 10/4/2019 SE191499.004	9609-5 SOIL - 10/4/2019 SE191499.005
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	**0.3**	**0.2**	**0.2**	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 16/4/2019 (continued)

PARAMETER	UOM	LOR	9609-A SOIL - 10/4/2019 SE191499.006
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1
Lindane	mg/kg	0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1
Aldrin	mg/kg	0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1
p,p'-DDE	mg/kg	0.1	**0.1**
Dieldrin	mg/kg	0.2	<0.2
Endrin	mg/kg	0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1
Isodrin	mg/kg	0.1	<0.1
Mirex	mg/kg	0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 16/4/2019

PARAMETER	UOM	LOR	9609-1 SOIL - 10/4/2019 SE191499.001	9609-2 SOIL - 10/4/2019 SE191499.002	9609-3 SOIL - 10/4/2019 SE191499.003	9609-4 SOIL - 10/4/2019 SE191499.004	9609-5 SOIL - 10/4/2019 SE191499.005
Lead, Pb	mg/kg	1	34	36	16	12	30

PARAMETER	UOM	LOR	9609-A SOIL - 10/4/2019 SE191499.006
Lead, Pb	mg/kg	1	27

Moisture Content [AN002] Tested: 16/4/2019

PARAMETER	UOM	LOR	9609-1 SOIL - 10/4/2019 SE191499.001	9609-2 SOIL - 10/4/2019 SE191499.002	9609-3 SOIL - 10/4/2019 SE191499.003	9609-4 SOIL - 10/4/2019 SE191499.004	9609-5 SOIL - 10/4/2019 SE191499.005
% Moisture	%w/w	0.5	**8.7**	**10.2**	**16.0**	**15.8**	**12.9**

PARAMETER	UOM	LOR	9609-A SOIL - 10/4/2019 SE191499.006
% Moisture	%w/w	0.5	**9.4**

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been perfomed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au.pv.sgsvr/en-gb/environment.

STATEMENT OF QA/QC PERFORMANCE

SE191499 R0

CLIENT DETAILS

Contact	Leah Desborough
Client	ENVIROWEST CONSULTING PTY LIMITED
Address	PO BOX 8158 ORANGE NSW 2800
Telephone	61 2 63614954
Facsimile	(Not specified)
Email	leah@envirowest.net.au
Project	**9609-1**
Order Number	**9609-1**
Samples	6

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE191499 R0**
Date Received	11 Apr 2019
Date Reported	18 Apr 2019

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

HOLDING TIME SUMMARY

SE191499 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
9609-1	SE191499.001	LB171675	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	21 Apr 2019	18 Apr 2019
9609-2	SE191499.002	LB171675	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	21 Apr 2019	18 Apr 2019
9609-3	SE191499.003	LB171675	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	21 Apr 2019	18 Apr 2019
9609-4	SE191499.004	LB171675	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	21 Apr 2019	18 Apr 2019
9609-5	SE191499.005	LB171675	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	21 Apr 2019	18 Apr 2019
9609-A	SE191499.006	LB171675	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	21 Apr 2019	18 Apr 2019

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
9609-1	SE191499.001	LB171585	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	26 May 2019	18 Apr 2019
9609-2	SE191499.002	LB171585	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	26 May 2019	18 Apr 2019
9609-3	SE191499.003	LB171585	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	26 May 2019	18 Apr 2019
9609-4	SE191499.004	LB171585	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	26 May 2019	18 Apr 2019
9609-5	SE191499.005	LB171585	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	26 May 2019	18 Apr 2019
9609-A	SE191499.006	LB171585	10 Apr 2019	11 Apr 2019	24 Apr 2019	16 Apr 2019	26 May 2019	18 Apr 2019

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
9609-1	SE191499.001	LB171673	10 Apr 2019	11 Apr 2019	07 Oct 2019	16 Apr 2019	07 Oct 2019	18 Apr 2019
9609-2	SE191499.002	LB171673	10 Apr 2019	11 Apr 2019	07 Oct 2019	16 Apr 2019	07 Oct 2019	18 Apr 2019
9609-3	SE191499.003	LB171673	10 Apr 2019	11 Apr 2019	07 Oct 2019	16 Apr 2019	07 Oct 2019	18 Apr 2019
9609-4	SE191499.004	LB171673	10 Apr 2019	11 Apr 2019	07 Oct 2019	16 Apr 2019	07 Oct 2019	18 Apr 2019
9609-5	SE191499.005	LB171673	10 Apr 2019	11 Apr 2019	07 Oct 2019	16 Apr 2019	07 Oct 2019	18 Apr 2019
9609-A	SE191499.006	LB171673	10 Apr 2019	11 Apr 2019	07 Oct 2019	16 Apr 2019	07 Oct 2019	18 Apr 2019

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil — **Method: ME-(AU)-[ENV]AN420**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	9609-1	SE191499.001	%	60 - 130%	92
	9609-2	SE191499.002	%	60 - 130%	97
	9609-3	SE191499.003	%	60 - 130%	100
	9609-4	SE191499.004	%	60 - 130%	89
	9609-5	SE191499.005	%	60 - 130%	99
	9609-A	SE191499.006	%	60 - 130%	103

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB171585.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	111

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB171673.001	Lead, Pb	mg/kg	1	<1

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE191571.004	LB171675.011	% Moisture	%w/w	0.5	4.26716141006	.0552092609	49	35

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE191639.002	LB171585.027		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	0	200	0
			Alpha BHC	mg/kg	0.1	<0.1	0	200	0
			Lindane	mg/kg	0.1	<0.1	0	200	0
			Heptachlor	mg/kg	0.1	<0.1	0	200	0
			Aldrin	mg/kg	0.1	<0.1	0	200	0
			Beta BHC	mg/kg	0.1	<0.1	0	200	0
			Delta BHC	mg/kg	0.1	<0.1	0	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	0.009	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	0	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	0.026	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	0.012	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	0.008	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	0.008	200	0
			Dieldrin	mg/kg	0.2	<0.2	0.052	200	0
			Endrin	mg/kg	0.2	<0.2	0	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	0	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	0.016	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	0	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	0	200	0
			Methoxychlor	mg/kg	0.1	<0.1	0	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	0	200	0
			Isodrin	mg/kg	0.1	<0.1	0	200	0
			Mirex	mg/kg	0.1	<0.1	0	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.17	0.164	30	1

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE191508.032	LB171673.024	Lead, Pb	mg/kg	1	19.0486161363	5.0624726845	36	23
SE191571.004	LB171673.014	Lead, Pb	mg/kg	1	11.8249000726	8.8313953488	40	29

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB171585.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	120
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	114
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	110
		Dieldrin	mg/kg	0.2	0.2	0.2	60 - 140	108
		Endrin	mg/kg	0.2	0.2	0.2	60 - 140	119
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	105
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.17	0.15	40 - 130	113

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB171673.002	Lead, Pb	mg/kg	1	93	107.87	79 - 120	86

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Original	Spike	Recovery%
SE191638.002	LB171585.028		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	<0.1	0.2	114
			Aldrin	mg/kg	0.1	<0.1	0.2	108
			Beta BHC	mg/kg	0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	<0.1	0.2	103
			Heptachlor epoxide	mg/kg	0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	-	-
			Dieldrin	mg/kg	0.2	<0.2	0.2	92
			Endrin	mg/kg	0.2	<0.2	0.2	103
			o,p'-DDD	mg/kg	0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	-	-
			p,p'-DDT	mg/kg	0.1	<0.1	0.2	93
			Endosulfan sulphate	mg/kg	0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	-	-
			Total CLP OC Pesticides	mg/kg	1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.17	-	112

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE191499.001	LB171673.004	Lead, Pb	mg/kg	1	84	34	50	99

MATRIX SPIKE DUPLICATES

SE191499 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

Chain of Custody Form – Ref 9609-1

Ref: 9609-1
Investigator: Envirowest Consulting
9 Cameron Place
PO Box 8158
ORANGE NSW 2800
Telephone: (02) 6361 4954
Facsimile: (02) 6360 3960
Email: leah@envirowest.net.au
Contact Person: Leah Desborough
Invoice: accounts@envirowest.net.au

Laboratory: SGS SYDNEY
16/33 Maddox Street
ALEXANDRIA NSW 2015

Sample ID	Container*	Sampling Date/Time	Sample matrix: Water	Soil	Sludge	Sample preservation: Cool	HNO3/HCl	Unpreserved	Analysis (SGS Method Code): Lead	OC Pesticides
9609-1	A	10/4/2019		X		X		X	X	X
9609-2	A	10/4/2019		X		X		X	X	X
9609-3	A	10/4/2019		X		X		X	X	X
9609-4	A	10/4/2019		X		X		X	X	X
9609-5	A	10/4/2019		X		X		X	X	X
9609-A	A	10/4/2019		X		X		X	X	X

SGS EHS Alexandria Laboratory

SE191499 COC
Received: 11 – Apr – 2019

Investigator: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: Leah Desborough
Date : 10/4/2019 Time: 14:00

Relinquished by: (print and signature) Leah Desborough Date 10/4/2019 Time 16:30

Received by: (print and signature) Date 11/04/19 Time @ 10:50

Please return completed form to Envirowest Consulting, *A = Solvent rinsed glass jar with Teflon lined lid

Appendix 5. Test pit logs

Test Pit Log Sheet

Job: 9609 Client: Hynash Demolition and Asbestos Removal Pty Ltd Site: 197 Limekilns Road Kelso NSW		Pit No: 1 Location: Northern extent	Sampling method: Backhoe Logged by: LD Date: 10/4/2019

Depth (m)	Graphic Log	SOIL DESCRIPTION Soil type/rock, grain size, structure, colour, minor components	Unified symbol	Samples	COMMENTS
0.5		FILL, sandy clay, brown			
1.0		SILTY CLAY LOAM, dark brownish grey		X	Organic odour
1.5		End of pit			

Slope/nature of surface: Flat *Ground water:* No free water identified in soil profile	*Remarks* (fill, odour, root holes): Fill identified to 1m.

Envirowest Consulting Pty Ltd, 9 Cameron Place, Orange NSW

Test Pit Log Sheet

Job: 9609 Client: Hynash Demolition and Asbestos Removal Pty Ltd Site: 197 Limekilns Road Kelso NSW		Pit No: 2 Location: Eastern extent	Sampling method: Backhoe Logged by: LD Date: 10/4/2019

Depth (m)	Graphic Log	SOIL DESCRIPTION Soil type/rock, grain size, structure, colour, minor components	Unified symbol	Samples	COMMENTS
0.5		FILL, sandy clay, brown			
1.0		SILTY CLAY LOAM, dark brownish grey		X	Organic odour
1.5		End of pit			

Slope/nature of surface: Flat *Ground water:* No free water identified in soil profile	*Remarks* (fill, odour, root holes): Fill identified to 1m.

Envirowest Consulting Pty Ltd, 9 Cameron Place, Orange NSW

Test Pit Log Sheet

Job: 9609 Client: Hynash Demolition and Asbestos Removal Pty Ltd Site: 197 Limekilns Road Kelso NSW		Pit No: 3 Location: Southern extent	Sampling method: Backhoe Logged by: LD Date: 10/4/2019

Depth (m)	Graphic Log	SOIL DESCRIPTION Soil type/rock, grain size, structure, colour, minor components	Unified symbol	Samples	COMMENTS
0.5		FILL, sandy clay, brown			
1.0					
1.5		SILTY CLAY LOAM, dark brownish grey		X	Organic odour
		End of pit			

Slope/nature of surface: Flat *Ground water:* No free water identified in soil profile	*Remarks* (fill, odour, root holes): Fill identified to 1.3m.

Envirowest Consulting Pty Ltd, 9 Cameron Place, Orange NSW

Test Pit Log Sheet

Job: 9609 Client: Hynash Demolition and Asbestos Removal Pty Ltd Site: 197 Limekilns Road Kelso NSW		Pit No: 4 Location: Base	Sampling method: Backhoe Logged by: LD Date: 10/4/2019

Depth (m)	Graphic Log	SOIL DESCRIPTION Soil type/rock, grain size, structure, colour, minor components	Unified symbol	Samples	COMMENTS
0.5		FILL, sandy clay, brown			
1.0					
1.5		SILTY CLAY LOAM, dark brownish grey		X	Organic odour
		End of pit			

Slope/nature of surface: Flat *Ground water:* No free water identified in soil profile	*Remarks* (fill, odour, root holes): Fill identified to 1.3m.

Envirowest Consulting Pty Ltd, 9 Cameron Place, Orange NSW

Test Pit Log Sheet

Job: 9609 Client: Hynash Demolition and Asbestos Removal Pty Ltd Site: 197 Limekilns Road Kelso NSW	Pit No: 5 Location: Western extent	Sampling method: Backhoe Logged by: LD Date: 10/4/2019

Depth (m)	Graphic Log	SOIL DESCRIPTION Soil type/rock, grain size, structure, colour, minor components	Unified symbol	Samples	COMMENTS
0.5		FILL, sandy clay, brown			
1.0					
1.5		SILTY CLAY LOAM, dark brownish grey		X	
		End of pit			

Slope/nature of surface: Flat *Ground water:* No free water identified in soil profile	*Remarks* (fill, odour, root holes): Fill identified to 1.3m.

Envirowest Consulting Pty Ltd, 9 Cameron Place, Orange NSW

Appendix 6. Disposal docket

?:Site Systems Sydney, Australia

Bathurst Regional Council

ABN: 42 173 522 302
College Rd, Bathurst EPA Lic 5902
Ph: 02 6333 6111

Docket (Original)

Client Name
Hynash Demolition & Asbestos removal

Site:	Primary Site
Transaction:	723929
Docket:	723929
Date:	27/11/2018 3:22:02 PM
Operator:	Simon
Product:	Asbestos
Rego:	HYN034
Job #:	3161

	Weights
Entry:	44.32 t
Exit:	18.38 t
Volume:	0.00 t
Nett:	25.94 t

Due (ex GST)	$9,196.91
GST	$919.69
Due	$10,116.60

Hours ('ion
Mon-Fri 7: ')pm
Sat : Sun ι ·om
Prices in.

Pr 27/11/2018 3:35:45 PM

Appendix 7. Unexpected finds protocol

1. Introduction

Investigations have been undertaken including soil sampling and analysis to evaluate the contamination status of 197 Limekilns Road, Kelso NSW.

A procedure is required describing the actions if potential contamination or hazards are encountered during excavation/construction activities.

2. Scope

Prepare a procedure to enable the identification and management of unexpected hazards identified during excavation works and/or construction activities.

3. Site identification

197 Limekilns Road, Kelso NSW.

4. Responsible person

The landowner is responsible for implementation of the unexpected finds protocol. The land owner will appoint an environmental scientist to induct and provide information on hazard identification and responses to earthwork supervisors and personnel which may uncover unexpected hazards.

5. Identification of unexpected hazards

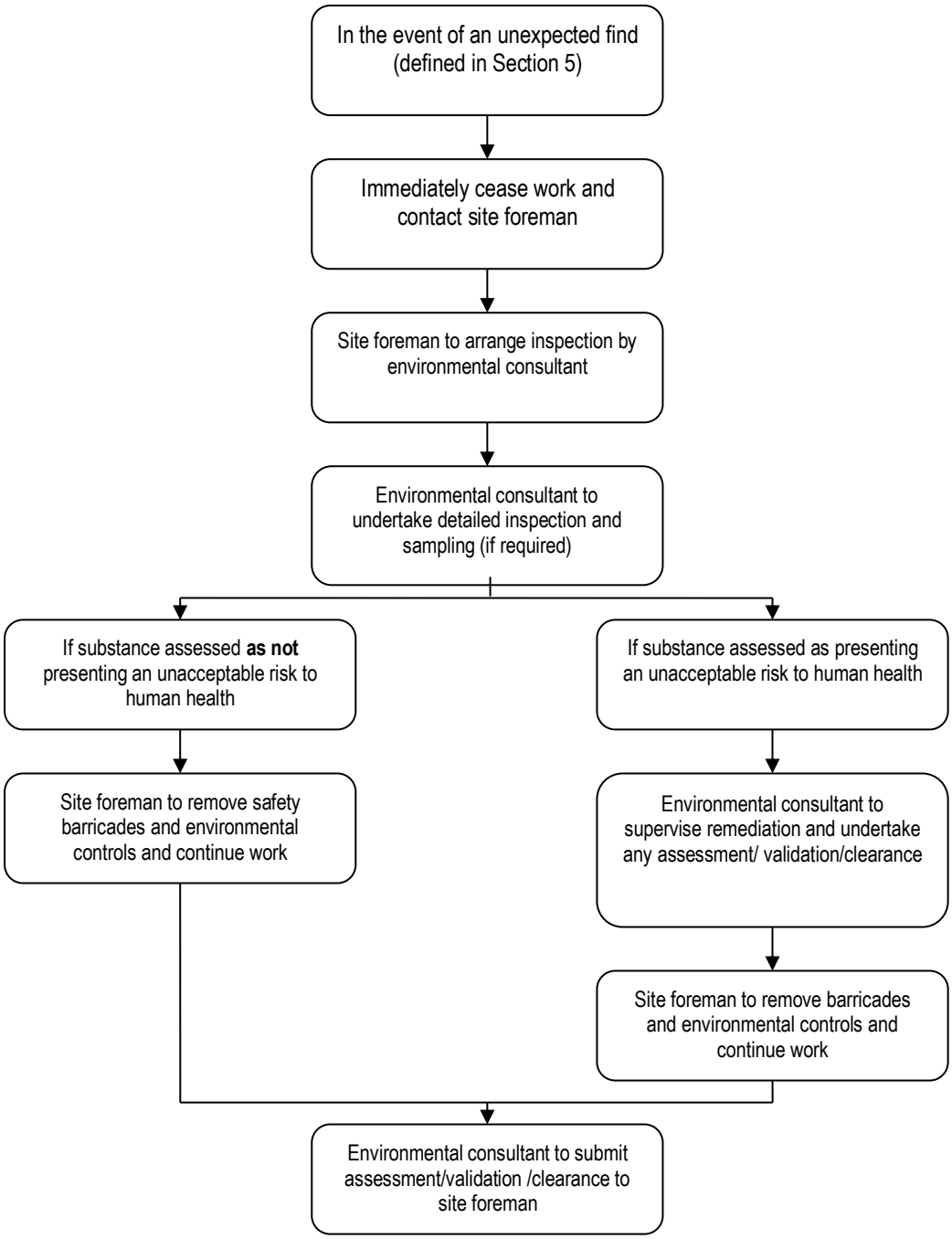
Potential hazards will be identified by appearance and odour and include:

- A filled pit or gully
- Demolition waste
- Discoloured soil
- Oil/diesel/tar
- Sheens on water
- An offensive odour
- Asbestos cement sheeting
- Ash or slag
- Underground storage tank

6. Training and induction

All excavation/construction personnel are to be inducted on the identification of potential hazards. The induction can be undertaken at the time of general site induction and toolbox meetings. The training will include display of the poster below to alert worker of potential hazards.

7. Procedure



8. Recommencement of works

The potential hazards will be assessed by the environmental scientist and a report prepared describing:

- Preliminary assessment of the contamination and need for cleanup
- Preparation of a remediation action plan
- All works to be undertaken in accordance with contaminated site regulations and guidelines
- Remediation works
- Validation of the remediation
- Works can commence on the potentially hazardous area after the environmental scientist has provided a clearance.

BE AWARE

UNEXPECTED HAZARDS MAY BE PRESENT

drums

asbestos

chemical bottles

blood stains

odour

ash / slag

demolition waste

if you <u>SEE</u> or <u>SMELL</u> anything unusual

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<u>STOP WORK</u> & contact the Site Foreman

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do not restart working before the area has been investigated and cleared by an Environmental Consultant