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# REMEDIAL ACTION PLAN FOR REDEVELOPMENT WORKS, ARMIDALE HIGH SCHOOL

BUTLER STREET,
ARMIDALE NSW 2350

wsp

SEPTEMBER 2018

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# Remedial action plan for redevelopment works, Armidale High School Butler Street, Armidale NSW 2350

NBRS & Partners Pty Ltd

WSP
Level 3, 51-55 Bolton St
Newcastle NSW 2300
PO Box 1162
Newcastle NSW 2300

Tel: +61 2 4929 8300
Fax: +61 2 4929 8382
wsp.com

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| Prepared by: | Amy Valentine | 27/09/2018 |  |
| Reviewed by: | Imogen Powell | 27/09/2018 |  |
| Approved by: | Amy Valentine | 27/09/2018 |  |

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# ABBREVIATIONS

| | |
|---|---|
| ASRIS | Australian Soil Resource Information System |
| BTEXN | Benzene, toluene, ethylbenzene, xylene and naphthalene |
| CEMP | Construction environmental management plan |
| CRC CARE | Cooperative Research Council for Contamination Assessment and Remediation for the Environment |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| HIL | Health investigation levels |
| HSL | Health screening levels |
| LEP | Local environmental plan |
| mAHD | Metres above Australian Height Datum |
| mBGL | Metres below ground level |
| mg/kg | Milligram per kilogram (or part per million) |
| mg/L | Milligram per litre (or part per million) |
| ND (nd) | Not detected above the PQL |
| NOHSC | National Occupational Health and Safety Commission |
| NSW DECCW | NSW Department of Environment, Climate Change and Water |
| NSW DUAP | NSW Department of Urban Affairs and Planning |
| NSW EPA | NSW Environmental Protection Agency |
| PAH | Polycyclic aromatic hydrocarbon |
| POEO Act | *Protection of the Environment Operations Act 1997* |
| RAP | Remediation action plan |
| SEPP55 | State Environmental Planning Policy No 55—Remediation of Land |

# 1 INTRODUCTION

## 1.1 BACKGROUND

NBRS & Partners Pty Ltd (NBRS) commissioned WSP Australia Pty Ltd (WSP) to prepare a remedial action plan (RAP) for Armidale High School located at Butler St, Armidale, NSW 2350 (the site). A site plan is provided as Figure 1, Appendix A.

A soil assessment was undertaken by WSP in January 2018 at the site to provide information on the soil conditions and indicative waste classification prior to the redevelopment work. The assessment found contamination exceeding the health investigation levels at four locations, identified as HA1, HA11, HA12 and HA18. This RAP has been prepared to document the proposed remediation for these locations.

## 1.2 OBJECTIVE

The objective of this RAP is to document the remediation required and provide a framework for the work practices and environmental management techniques to be implemented while undertaking soil remediation at the site.

## 1.3 SCOPE OF WORKS

The RAP includes:

- a summary of the site conditions and surrounding environment
- a summary of the contamination status at the site and its surroundings
- assessment of data gaps that may require further investigation
- identification of remediation goals
- outline the validation requirements
- timing and schedule of the remedial work
- site management issues
- contingency management issues
- workplace health and safety (WHS) issues.

## 1.4 TECHNICAL FRAMEWORK

The RAP was prepared in accordance with the following guidelines:

- *Contaminated Land Management Act 1997* (NSW).
- National Occupational Health and Safety Commission (NOHSC) 1995, *Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment*.
- NSW Department of Environment, Climate Change and Water (NSW DECCW) 2009, *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*.
- NSW Department of Urban Affairs and Planning (NSW DUAP) 1998, *Managing Land Contamination. Planning Guidelines SEPP 55 – Remediation of Land*.

- NSW Environmental Protection Agency (NSW EPA) 1997, *Guidelines for Consultants Reporting on Contaminated Sites*.
- NSW EPA 2014, *Waste Classification Guidelines. Part 1: Classifying Waste*.
- *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM; as amended 2013).
- *Protection of the Environment Operations Act 1997* (POEO Act; NSW).

## 1.5 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Previous environmental investigations conducted at the site have documented in the following reports:

- GeoEnviro Consultancy Pty Ltd (GeoEnviro) in 2017, titled *Geotechnical, Salinity and Contamination Investigation Proposed Redevelopment, Armidale High School, Butler Street Armidale NSW.*
- WSP 2018, *Targeted soil contamination assessment, Armidale High School, Butler St, Armidale, NSW 2350*.

# 2 SITE CHARACTERISICS

## 2.1 SITE IDENTIFICATION AND DESCRIPTION

The site identification details are provided below in Table 2.1.

Table 2.1 Site identification details

| | |
|---|---|
| **Site name** | Armidale High School |
| **Site address** | Butler Street, Armidale, NSW 2350 |
| **Legal identification** | The site is comprised of the following lots:<br>— Lot 1 in deposited plan (DP) 196298<br>— Lot 1, Section 161 in DP 758032<br>— Lot 1151 in DP 821627<br>— Lot 704 in DP 755808<br>— Lots 1 and 2, Section 49 in DP 758032<br>— Lot 7005 in DP 1052246. |
| **Local government area** | Armidale Regional Council |
| **Zoning** | R1- general residential under the *Armidale Dumaresq Local Environmental Plan 2012* (Armidale LEP) |
| **Current land use** | Secondary school |
| **Proposed site use** | Continued use as a secondary school |
| **Land size** | 18.38 ha approximately |

The site is bounded by Mann Street, which becomes Lambs Avenue, to the north, Butler Street to the east, Kentucky Street to the south and Miller, Barry and Steven Streets to the west. Low-density residential dwellings are present to the east and west. To the north is a light industrial/commercial zone with Armidale train station approximately 200 m north and residential properties beyond. To the south is Armidale Bicentennial Arboretum, which is a public recreation space, followed by suburban residential properties.

The majority of the site is grass or other vegetation. In the centre and east of the site are the school buildings, with paved car park areas along the eastern site boundary and south of the school buildings. Access roads entre the site at the north-eastern corner from Lambs Avenue and from the eastern boundary with Butler Street at Mossman Street and Hargrave Street.

## 2.2 SITE ZONING

The site is zoned R1 general residential in the Armidale LEP. The objectives of this zone are to:

- provide for residential housing needs of a variety of types and densities
- enable other land uses that provide facilities or services for residents.

# 3 SITE ENVIRONMENTAL SETTING

## 3.1 TOPOGRAPHY AND HYDROLOGY

Based on Google Earth, the site generally slopes down to the north from approximately 1,030 metres in Australian Height Datum (mAHD) to 1,000 mAHD, with steep slopes from the gymnasium down towards the main sports oval in the north of the site, and from the southern carpark and western buildings down towards the sports oval.

The nearest surface water bodies include an on-site dam located in the south-west portion of the site, a dam located in the Armidale Bicentennial Arboretum approximately 35 m south if the site and a dam located approximately 250 m north-west of the site.

## 3.2 GEOLOGY

The site is underlain by Devonian-Carboniferous sedimentary rocks, comprising quartz-rich pebbly sandstone, conglomerate units deposited in fluvial (river) systems, and siltstone, mudstone and sandstone with lithic fragments, all of which were deposited 300 to 419 million years old (Geological Survey of NSW Department of Resources and Energy – Interactive Geological Map of NSW; https://www.resourcesandenergy.nsw.gov.au/; accessed 24 January 2018).

## 3.3 HYDROGEOLOGY

A review of the Department of Primary Industries registered groundwater bore database (allwaterdata.water.nsw.gov.au) conducted on 24 January 2018 identified 80 groundwater bores registered within a 1 km radius of the site. The bores are located in three clusters; around a Telstra site at 129 Allingham Street, the industrial zone north-west of the site around the Rose Valley Steel Works on Mann Street and at the Lowes Petroleum fuel depot on McLennan Street. The majority of these wells were registered for monitoring. None of the bores was registered for domestic uses.

## 3.4 ACID SULFATE SOILS

The acid sulfate soils map for the area prepared by Commonwealth Scientific and Industrial Research Organisation (CSIRO) indicates that the site is located within an area where there is low probability of acid sulfate soils.

# 4 CONTAMINATION AND POTENTIAL HEALTH RISKS

## 4.1 SUMMARY OF PREVIOUS INVESTIGATIONS

One previous assessment report was provided by NBRS prior to WSP's assessment in 2018, undertaken by GeoEnviro in 2017. The geotechnical and contamination investigation found that the site is generally underlain by natural ground; topsoil over natural silty clay and gravelly clay overlying siltstone and sandstone. No obvious signs of foreign fill material or building debris were identified except for a thin layer of fill at two borehole locations (BH1 and BH9).

Soil samples were collected and analysed from four boreholes (BH1, BH4, BH5 and BH8) for metals, organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAHs) and asbestos. The majority of results were below laboratory reporting limits, although metals were detected at concentrations below the site criteria. PAHs were detected in two samples, from BH4 and BH8. Although they did not exceed the site criteria the result from BH8 was equal to the site criteria for benzo(a)pyrene toxicity equivalency quotient (BaP TEQ). GeoEnviro considered the PAHs to likely be due to leaching from the asphalt at the site.

WSP undertook additional soil assessment in January 2018, comprising advancement of soil bores at 18 locations using a hand auger to target depths of 0.5 to 1 metre depth. The bores targeted the proposed new building, new gym addition, new games courts and PAHs identified by GeoEnviro (2017). Samples were analysed for TRH, BTEXN, PAHs, metals and asbestos. Four composite samples were also collected and analysed for PCBs and pesticides.

The analytical results included the following with respect to the health and ecological criteria:

- Chrysotile and amosite asbestos was detected as present in sample HA1_0.
- BaP TEQ exceeded the health-based criteria in samples HA1_0, HA11_0 and HA12_0, as well as duplicate samples QA1 and QA1A (primary sample HA18_0) and QA2 and QA2A (primary sample HA11_0).
- Benzo(a)pyrene exceeded the ecological criteria in samples HA1_0, HA4_0, HA10_0, HA11_0 (and QA2A), HA12_0, HA16_0 and HA18_0. Nickel exceeded the ecological criteria in samples HA5_0, HA6_0.5, HA7_0.7 and HA15_0 and zinc exceeded the ecological criteria in sample HA1_0.
- No exceedances were identified in adopted health or ecological criteria for TRH/BTEXN concentrations, with most samples below the limits of reporting (LORs). All samples analysed for PCBs, OCPs and OPPs had concentrations below the LORs.

The results indicated that PAHs exceed the health criteria in some shallow soil samples, including samples taken to confirm the previous assessment's findings. Shallow impacted soils at locations HA1, HA11 and HA12 will be excavated during the proposed redevelopment work, although the soil at HA18 is not anticipated to be excavated as part of the work. Based on the results some soil around HA18 was identified as requiring excavation to natural soil or management.

No other unacceptable health risk was identified for on-site or off-site receptors, including but not limited to students, teachers and maintenance workers.

A potential risk was identified to ecological receptors due to elevated benzo(a)pyrene and metals concentrations in soil across the site. However, no stressed vegetation or evidence of ecological effects were noted.

The results indicated that the soil at the site is likely to be classified as general solid waste for the majority of the site, except for the area around HA1, which has an indicative classification of asbestos waste in a matrix of restricted solid waste. The results were indicative only; additional sampling would be required for waste classification purposes.

Historical soil results are included in Appendix B.

## 4.2 CONTAMINANTS OF POTENTIAL CONCERN

Based on the results of the previous environmental investigations, the contaminants of potential concern for the site were identified as:

- PAHs
- asbestos.

For waste classification purposes, analysis of heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) will also be required.

## 4.3 EXTENT OF CONTAMINATION

Soil investigations targeted areas where the proposed redevelopment will occur and the previously identified PAHs. Exceedances of health-based criteria that require remediation were identified in shallow fill material at HA1, in the centre of the site where the new school building will be constructed, HA11 and HA12 were the gymnasium extension will be constructed and HA18, adjacent to the southern car park. It is noted that the most recent design plans provided do not show the gymnasium extension extending as far as HA11, and some additional excavation in this area will be required.

The impacts requiring remediation comprised BaP TEQ at all locations and asbestos at HA1. The impacts were vertically delineated by samples of the underlying natural soil, present at approximately 0.2 m below ground level (mBGL).

# 5 REMEDIATION GOALS AND STRATEGIES

## 5.1 REMEDIATION OBJECTIVES

The primary objective of the remediation is to remove impacts identified in fill material and make the site suitable for ongoing use as a secondary school.

## 5.2 REMEDIATION CATEGORY UNDER SEPP 55

Based on the requirements of the State Environmental Planning Policy 55 - Remediation of land (SEPP 55), the proposed remediation works are considered to be classified as 'Category 1' remediation work, work requiring consent, due to the presence of heritage items on the site. It is understood that the remediation work will be included with the development application already being prepared for the redevelopment work.

## 5.3 REMEDIATION OPTIONS

The preferred order of options for remediation, as stated in the NEPM (2013) is:

1. On-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level.
2. Off-site treatment of excavated soil which, depending on the residual levels of contamination in the treated material is then returned to the site, removed to an approved waste disposal site or facility or used as fill or landfill.

Should it not be possible for either of these options to be implemented, then other options that are to be considered include:

1. Consolidation and isolation of the soil on-site by containment with a properly designed barrier.
2. Removal of contaminated soil to an appropriate site or facility, followed where necessary by replacement with clean fill.

The guidance also notes that if remediation is likely to have no net environmental benefit or cause a greater adverse effect on any aspect of the site or surrounds than what would occur if the site was left undisturbed, then an appropriate management strategy should be adopted.

The following broad categories of soil remediation options are considered to meet the remedial objectives:

- treatment
- removal to landfill
- physical barrier systems
- institutional controls
- no action.

The remedial options are considered in Table 5.1.

Table 5.1 Remedial options assessment

| REMEDIATION METHODOLOGY | DESCRIPTION | ASSESSMENT | RECOMMENDATION |
|---|---|---|---|
| Treatment | Treatment technologies are used to permanently and significantly reduce the toxicity, mobility or volume of contaminated wastes. Generally, treatment technologies may be targeted towards in situ or ex situ remediation and include biological, thermal and physical/chemical treatment and containment. | For the contamination identified at the site, asbestos and PAHs, treatment technologies are minimal and not considered practical. | Not recommended |
| Removal to landfill | Removal to landfill involves physically moving impacted soil to an off-site location for storage, treatment or disposal. If the chemical concentrations of the impacted soil exceed the landfill criteria stipulated within the NSW EPA (2014) *Waste Classification Guidelines*, treatment of the soil material may be required prior to disposal.<br>Excavation and disposal will remove impacted material and subsequently any ongoing liability or need for any long-term management. | Based on the soil results obtained during the soil assessments, material to be excavated from the site is likely to be a mixture of general solid waste and special waste (asbestos), with the possibility that some material may also be classified as restricted solid waste. Disposal costs can vary depending on quantity of material requiring disposal, disposal facility selection, and changes in government environmental levies. | Recommended |
| Physical barrier systems | Physical barrier systems (or capping) limit access to the impacted material, mitigate surface water infiltration through the underlying material, and control or reduce migration of the substances into the surrounding environment. This option can include creating barriers around and on top of the impacted material in place, or relocating the impacted material to a constructed encapsulation area. In addition, the barrier may also be used to control the emission of odours and gases/vapours, reduce erosion and improve aesthetics. | The impacts identified at the site are present in the surface 0.2 mBGL of soil; which makes capping impractical. The cap would need to be built on top of the existing ground surface, and would therefore be unsightly and difficult to maintain.<br>In addition, some of the impacts will be excavated as part of the redevelopment works. | Not recommended |

| REMEDIATION METHODOLOGY | DESCRIPTION | ASSESSMENT | RECOMMENDATION |
|---|---|---|---|
| Institutional controls | Institutional controls include measures such as land use restriction through zoning, site management and access restrictions, restrictions on intrusive works, and relocation of receptors. Although exposure can be reduced by these means, the impacted media are not directly affected or treated. Institutional controls are sometimes used in conjunction with other remedial options in order to manage potential risks from residual materials. | Changing the use of the site is not practical and would not meet the goals of the client, and therefore this strategy on its own is not considered an appropriate option. | Not recommended |
| No action | No remediation is undertaken, and soil impacts remain in place. | The elevated concentrations of contaminants present an unacceptable potential risk to human under the proposed future land use for the site. Therefore, taking no action to address the identified contamination is considered inadvisable and has not been considered in further detail. | Not recommended |

## 5.4 SUMARY OF REMEDIAL OPTIONS

The preferred remedial option identified is off-site disposal. The other potentially suitable remediation options either did not meet the client's requirements for the site or did not adequately address the identified contamination.

## 5.5 SOIL VALIDATION CRITERIA

The purpose of the remediation is to make the site suitable for continued use as a secondary school. Assessment criteria applicable for assessing validation data from the remediation is provided by the following:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM; as amended 2013), specifically Schedule B1, Investigation Levels for Soil and Groundwater.
- Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) *Technical Report No. 10 Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater, Part 2: Application Document* (Friebel and Nadebaum, 2011).

Schedule B1 of the NEPM (2013) provides health screening levels (HSLs) for the assessment of hydrocarbon impacted soil and health investigation levels (HILs) for metals and other organic substances. HSLs/HILs are scientifically based, generic assessment criteria designed to be used in the first stage (Tier 1 or 'screening') of an assessment of potential risks to human health from chronic exposure to contaminants.

HSLs have been developed for selected petroleum compounds and fractions, and are applicable to assessing human health risk via vapour intrusion and inhalation. The HSLs depend on specific soil physicochemical properties and land use scenarios, with criteria presented for sand, silt and clay soils at several depth intervals. Where there is reasonable doubt as to the appropriate soil texture to select, either a conservative selection should be made (i.e. sand) or laboratory analysis carried out to determine particle size and hence soil texture sub-class.

HILs have been developed for metals and organic substances and are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are general for all soil types and generally apply to the top 3 m of soil.

HSLs/HILs have been developed for four generic land use settings:

- HSL/HIL A: Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children's day care centres, preschools and primary schools, as well as secondary school buildings (HSL only)
- HSL/HIL B: Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats
- HSL/HIL C: Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary school playing fields and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves) which should be subject to a site-specific assessment where appropriate
- HSL/HIL D: Commercial/industrial such as shops, offices, factories and industrial sites.

For this investigation, criteria for HSL A, HSL C and HIL C have been adopted based on the current land use under the zoning as a secondary school. For HSLs, sand was adopted as the soil type for on-site soil assessment. Although on the soils on-site were predominantly silt and clay, some gravel and sand was reported in the shallow fill and reworked natural soil.

The CRC CARE Technical Report No. 10 (Friebel and Nadebaum, 2011) provides HSLs for petroleum hydrocarbons specifically for vapour inhalation for intrusive maintenance workers in shallow trenches, and for direct contact. These have also been adopted.

The HSLs and HILs for the future site users and the intrusive maintenance workers are summarised in Table 5.2.

Table 5.2 Soil criteria for commercial/industrial land use settings

| ANALYTE | HSL A[1] SAND, 0 m to <1 m (mg/kg) | HSL C[2] SAND, 0 m to <1 m (mg/kg) | HIL C[3] (mg/kg) | INTRUSIVE WORKERS[4] (mg/kg) | DIRECT CONTACT[5] (mg/kg) |
|---|---|---|---|---|---|
| TRH $C_6$–$C_{10}$ less BTEX (F1) | 45 | NL | - | NL | 5,100 |
| TRH >$C_{10}$–$C_{16}$ less naphthalene (F2) | 110 | NL | - | NL | 3,800 |
| TRH >$C_{16}$-$C_{34}$ | - | - | - | - | 5,300 |
| TRH >$C_{34}$-$C_{40}$ | - | - | - | - | 7,400 |
| Benzene | 0.5 | NL | - | 77 | 120 |
| Toluene | 160 | NL | - | NL | 18,000 |
| Ethylbenzene | 55 | NL | - | NL | 5,300 |
| Xylene (total) | 40 | NL | - | NL | 15,000 |
| Naphthalene | 3 | NL | - | NL | 1,900 |
| Carcinogenic PAHs (as BaP TEQ) | - | - | 3 | - | - |
| Total PAHs | - | - | 300 | - | - |
| Arsenic | - | - | 300 | - | - |
| Cadmium | - | - | 100 | - | - |
| Chromium | - | - | 300 | - | - |
| Copper | - | - | 17,000 | - | - |
| Lead | - | - | 600 | - | - |
| Mercury | - | - | 80 | - | - |
| Nickel | - | - | 1,200 | - | - |
| Zinc | - | - | 30,000 | - | - |
| Bonded asbestos[6] | 0.02% | | - | - | - |
| Asbestos fines and friable asbestos[6] | 0.001% | | - | - | - |
| Surficial asbestos (all forms)[6] | None visible | | - | - | - |

– No assessment criteria available.

NL Non-limiting due to maximum vapour concentrations being below the acceptable health risk level.

(1) NEPM (2013) Schedule B-1 Investigation Levels for Soil and Groundwater – Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low – high density residential (mg/kg).

(2) NEPM (2013) Schedule B-1 Investigation Levels for Soil and Groundwater – Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space (mg/kg).

(3) NEPM (2013) Schedule B-1 Investigation Levels for Soil and Groundwater – Table 1A(1) HILs for soil contaminants – Recreational C (mg/kg).

(4) CRC CARE technical report no. 10. – Table B3 Soil health screening levels for vapour intrusion (mg/kg).

(5) CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg).

(6) NEPM (2013) Schedule B1 Health Screening Levels for Asbestos Contamination in Soil – Table 7.

## 5.6 WASTE CLASSIFICATION CRITERIA

Prior to the transportation of soils off-site for disposal, the excavated soils will be analysed and in accordance with the NSW EPA 2014, *Waste Classification Guidelines – Part 1: Classifying Waste*. The guidelines provide the criteria for classifying waste and follow a step-by-step process to classify wastes into groups that pose similar risks to the environment and human health, enabling their management and appropriate disposal.

For solid waste the waste may be classified as general solid waste (putrescible or non-putrescible), restricted solid waste or hazardous waste. Any waste that contains asbestos must be classified as asbestos waste. Asbestos is the fibrous form of mineral silicates within the serpentine or amphibole groups of rock-forming minerals.

The soil is assessed initially using the contaminant threshold (CT). Where the concentrations exceed the CT values it is assessed using the specific contaminant concentration (SCC) values and the leachable concentration using toxicity characteristics leaching procedure (TCLP) values.

A summary of the waste acceptance criteria is included in Table 5.3.

Table 5.3 Waste classification criteria

| **CHEMICALS** | **CT (WITHOUT TCLP)[1]** | | **SCC (WITH TCLP)[2]** | | | |
|---|---|---|---|---|---|---|
| | GENERAL SOLID (CT1) | RESTRICTED SOLID (CT2) | GENERAL SOLID | | RESTRICTED SOLID | |
| | | | TCLP1 | SCC1 | TCLP2 | SCC2 |
| | (mg/kg) | (mg/kg) | (mg/L) | (mg/kg) | (mg/L) | (mg/kg) |
| TRH $C_6$-$C_9$ | 650[3] | 2,600[3] | NA | 650 | NA | 2,600 |
| TRH $C_{10}$-$C_{36}$ | 10,000[3] | 40,000[3] | NA | 10,000 | NA | 40,000 |
| Benzene | 10 | 40 | 0.5 | 18 | 2 | 72 |
| Toluene | 288 | 1,152 | 14.4 | 518 | 57.6 | 2,073 |
| Ethylbenzene | 600 | 2,400 | 30 | 1,080 | 120 | 4,320 |
| Total xylene | 1,000 | 4,000 | 50 | 1,800 | 200 | 7,200 |
| Benzo(a)pyrene | 0.8 | 3.2 | 0.04 | 10 | 0.16 | 23 |
| Total PAHs | 200[3] | 800[3] | NA | 200 | NA | 800 |
| Arsenic | 100 | 400 | 5 | 500 | 20 | 2,000 |
| Cadmium | 20 | 80 | 1 | 100 | 4 | 400 |
| Chromium (VI) | 100 | 400 | 5 | 1,900 | 20 | 7,600 |
| Lead | 100 | 400 | 5 | 1,500 | 20 | 6,000 |
| Mercury | 4 | 16 | 0.2 | 50 | 0.8 | 200 |
| Nickel | 40 | 160 | 2 | 1,050 | 8 | 4,200 |

NA Not applicable

(1) Extracted from Table 1 in Waste Classification Guidelines. Part 1: Classifying Waste (NSW EPA, 2014).

(2) Extracted from Table 2 in Waste Classification Guidelines. Part 1: Classifying Waste (NSW EPA, 2014).

(3) These chemicals are assessed using SCC values only, except for nickel and benzo(a)pyrene that were assessed using TCLP values.

# 6 REMEDIATION STRATEGY

## 6.1 PRELIMINARIES

Prior to commencement of remedial works at the site, the following activities would need to be completed:

- receipt of all relevant regulatory approvals for the use of the chosen remediation technology
- preparation of a health, environmental and safety plan (HESP) prior to commencement of site works
- induction of all site personnel to ensure that they are aware of the health, safety and environmental management requirements relating to the excavation of potentially contaminated soils
- confirmation that the contractor conducting the excavation has adequate safety equipment (for example, adequate fencing, barrier boards, barricades and warning signage) to secure the work area and minimise the danger to contractor personnel and the public for the duration of the tank replacement works.

## 6.2 APPROVAL AND LICENCES

All works will be undertaken in accordance with the following regulations and guidelines:

- Department of Planning 1998, *Managing Contaminated Land Planning Guidelines – SEPP55 Remediation of Land*.
- NSW EPA 2014, *Waste Classification Guidelines*.
- *Protection of the Environment Operations Act 1997* (NSW).
- *Protection of the Environment Operations (Waste) Regulation 2005* (NSW).
- *Protection of the Environment Legislation Amendment Act 2011* (NSW).
- *Work Health & Safety Act 2011* and *Work Health and Safety Regulations 2011* (NSW).
- WorkCover NSW requirements, guidelines and codes of practice.

All excavation works should be undertaken by licensed contractors, experienced in the remediation of contaminated soils.

Due to asbestos being identified in the fill, statutory notification will be required to be provided to WorkCover prior to removal. Transporters of contaminated waste are required to be licensed and receiving facilities are required to be licensed for the category of waste they are scheduled to receive. For all asbestos removal works, a licensed asbestos removal contractor must be engaged.

## 6.3 SITE PREPARATION

Table 6.1 summarises the measures that should be implemented prior to remediation works at the site.

Table 6.1 Site preparation measures

| ITEM | DESCRIPTION |
|---|---|
| Access | Access to the redevelopment area of the site will be controlled by the lead contractor performing the works and the site will be off limits to all non-essential personnel. The public will not have access to this area of the site. |

| ITEM | DESCRIPTION |
|---|---|
| Signage | Signage will be installed on the site, with direction to key areas (including to the site offices, decontamination units, wash down areas, exits, etc.) and traffic restrictions. Signage at the main access points will include after-hours contact details. |
| Fencing/hoarding | Perimeter security fencing will be maintained around the redevelopment area where physical barriers (such as walls, buildings and existing fences) are not already in place.<br>Shade cloth will be installed on fences and hoardings. Additional fencing will be erected where required to secure work areas and exclusion zones. Regular maintenance and repair of all retained fences and hoardings within and surrounding the site will be undertaken during the period of the remediation work. |
| Haul roads/parking areas and traffic management | The contractor will need to transport impacted soils off-site and potentially clean fill material on-site. Transport to and from site will need to consider traffic management options which take into account any access restrictions to the site. At the site, parking for private, pick-up and delivery and site vehicles is already in place. Additional designated areas may need to be marked as appropriate. |
| Decontamination facilities | A wheel washing facility may have to be installed for all vehicles leaving the redevelopment area of the site, either for waste disposal or other activities. This will minimise spread of dust and dirt in residential streets. |
| Supply of utilities | The installation and commissioning of all temporary site services (e.g. electricity, water, sewerage and telecommunications) required for the duration of the works should be installed to the requirements of the appropriate regulatory authorities. All approvals in respect to the installation, operation and eventual removal of temporary services shall be obtained. |
| Contractor's facilities | All site accommodation and facilities required for the remediation works will be established in conformance with relevant regulations and authority's requirements. Existing site infrastructure may be utilised for this purpose. Licensed persons in accordance with statutory requirements will carry out all connections. The following facilities may need to be established at the site:<br>— site offices<br>— amenities<br>— work sheds (including decontamination facilities) and changing areas for the use of the remediation contractor, all subcontractors and consultants<br>— temporary site sheds<br>— bins for rubbish generated by personnel. |

# 6.4 EXCAVATION AND DISPOSAL OF IMPACTED SOIL

## *6.4.1 EXCAVATION OF IMPACTED SOIL*

Fill material in the vicinity of locations HA1, HA11, HA12 and HA18 should be excavated to the depth of natural soil at a minimum (approximately 0.2 mBGL). The soil at HA1 and HA12 is anticipated to be excavated as part of the redevelopment work. The excavation for the gymnasium extension should be extended at the south-eastern corner to extend approximately 2 m beyond location HA11. The soil at location HA18 should be excavated to natural soil and a lateral extent of the edge of the asphalt car park to the east, to the west approximately 4 m from the edge of the car park

and an approximate 2 m extent to the north and 2 m to the south from HA18. The impacts at HA18 are considered a hotspot, and the excavation extent will need to be confirmed by validation sampling before backfilling.

### 6.4.2 STOCKPILING

Stockpile management procedures, soil erosion and sedimentation controls and procedures to manage contamination will be applied to all wastes prior to removal off-site for disposal. The location of the stockpiles will be selected to fit with the expected stages of the project. Stockpiles will be located in accordance with the following general requirements:

- stockpiles will only be placed at approved locations
- stockpiles will be strategically located to mitigate environmental impacts while facilitating material handling requirements
- contaminated materials will only be stockpiled in non-remediated areas of the site or at locations that do not pose any risk of environmental impairment of the stockpile area or surrounding areas (i.e. sealed surfaces such as sealed concrete, asphalt, plastic sheeting or a mixture of these)
- stockpiles will only be constructed in areas of the site that have been located and prepared in accordance with the requirements of this RAP. All such preparatory works will be undertaken prior to the placement of material in the stockpile
- access routes will be established around the material stockpiles to enable access from adjoining haul roads.

### 6.4.3 WASTE CLASSIFICATION

Impacted materials will require sampling and analysis for suspected contaminants to enable classification in accordance with the NSW EPA (2014) *Waste Classification Guidelines*. Samples for waste classification should be collected at a density of:

- for volumes of up to 200 $m^3$, one sample per 25 $m^3$ of soil
- for volumes from 200 $m^3$ to 3,000 $m^3$, 10 samples
- for volumes greater than 3,000 $m^3$, one sample per 250 $m^3$.

Contaminated fill material removed from the site will be disposed of off-site to a NSW EPA licenced waste facility approved to accept the class of waste to be disposed of. Prior to the disposal of fill material, the contractor will seek approval from the facility to accept the waste.

### 6.4.4 MATERIAL TRACKING

Materials excavated from the site and relocated on-site or disposed of off-site should be tracked in order to provide detail and accurate information about the location and quantity of all materials both on- and off site from the time of their excavation until their encapsulation or disposal. Asbestos waste must be tracked using the NSW EPA's WasteLocate system from pickup to disposal.

The location of disposal locations will be determined by the remediation contractor. For any truck moving contaminated material on-site or off-site, the following information would be recorded:

- origin of material
- material type
- approximate volume
- final destination
- truck registration number (for off-site disposal only).

This information, along with the landfill docket number for materials disposed of to an off-site facility, will be provided in the validation report.

## 6.5 REINSTATEMENT OF EXCAVATIONS

Following validation, excavations will be backfilled where necessary, depending on the final ground level required for the development. Backfilling is expected to be required in the vicinity of HA11 and HA18.

Backfill may be accomplished with material excavated during the construction from non-contaminated areas of the site. Site soil proposed to be used for reinstatement must be sampled to confirm it is suitable. Sampling requirements are detailed in Section 6.6.3.

Where sufficient suitable material is not available from the site, virgin excavated natural material (VENM) or excavated natural material (ENM) will be imported for use as backfill. Sampling requirements for imported backfill material are detailed in Section 6.6.4.

## 6.6 VALIDATION STRATEGY

Systematic planning is critical to successful implementation of a validation assessment and is used to define the type, quantity and quality of data needed to inform decisions. The United States Environmental Protection Agency has defined a process for establishing data quality objectives (DQOs), which has been referenced in the NEPM (2013) Schedule B2 – Guideline on Site Characterisation.

DQOs ensure that:

- the study objectives are set
- appropriate types of data are collected (based on contemporary land use and contaminants of concern)
- the tolerance levels are set for potential decision making errors.

The DQO process is a seven-step iterative planning approach. The outputs of the DQO process are qualitative and quantitative statements which are developed in the first six steps. They define the purpose of the data collection effort, clarify what the data should represent to satisfy this purpose and specify the performance requirements for the quality of information to be obtained from the data. The output from the first six steps is then used in the seventh step to develop the data collection design that meets all performance criteria and other design requirements and constraints. The DQO process adopted for the validation assessment is outlined in Table 6.2.

Table 6.2 DQO process

| STEP | DESCRIPTION | OUTCOMES |
|---|---|---|
| 1 | State the problem | Surficial soils in specific areas of the site are impacted with PAHs and asbestos at concentrations that pose a potential risk to human health (from dermal contact, inhalation and ingestion) for the proposed future land use. |
| 2 | Identify the decisions | The decisions to be made are as follows:<br>— Has the identified and potential soil contamination at the site been remediated and/or managed to a level suitable for the respective land uses that would pose no unacceptable risk to human health or the environment?<br>— Is all imported material validated as suitable for the proposed land uses? |

| STEP | DESCRIPTION | OUTCOMES |
|---|---|---|
| 3 | Identify the inputs to the decision | The inputs required to make the above decisions are as follows:<br>— Previous investigations.<br>— RAP outlining the nature and extent of impacted soils requiring remediation.<br>— National and NSW EPA endorsed or approved methodologies and technical requirements. |
| 4 | Define the study boundaries/ constraints on data | The boundaries of the remedial and validation works have been identified as follows:<br>Spatial boundaries: The spatial boundary of the site and the remediation areas is shown on Figure 1. The vertical boundary is the depth of impacted material, approximately 0.2 mBGL.<br>Temporal boundaries: As the data and information obtained from the previous investigation has been relied upon, then the temporal boundary will be from the date of assessment to the date of acquisition of the final validation laboratory results.<br>Constraints within the study boundary: No constraints have been identified. |
| 5 | Develop a decision rule | The purpose of this step is to define the parameter of interest, specify the action level and combine the outputs of the previous DQO steps into an 'if…then…' decision rule that defines the conditions that would cause the decision maker to choose alternative actions.<br>If validation samples indicate concentrations remain in soil above the validation criteria, then further remediation or management may be required. |
| 6 | Specify limits on decision errors | The acceptable limits on decision errors to be applied in the investigation and the manner of addressing possible decision errors have been developed based on the data quality indicators (DQIs) of precision, accuracy, representativeness, comparability and completeness and are presented in Table 6.3 and Table 6.4.<br>A probability that 95% of data will satisfy the DQIs has been assumed, therefore the limit on the decision error that a conclusive statement may be incorrect is 5%. The potential for significant decision errors are to be minimised by completing a robust quality assurance/quality control (QA/QC) program and by completing a validation program that has an appropriate sampling and analytical density for the purposes of the assessment and that representative sampling is undertaken. |
| 7 | Optimise the design for obtaining data | The purpose of this step is to identify a resource-effective data collection design for generating data that satisfies the DQOs. This assessment has been designed considering the information and data from the previous assessment.<br>To ensure the design satisfies the DQOs, DQIs (for accuracy, comparability, completeness, precision and reproducibility) have been established to set acceptance limits on field methodologies and laboratory data collected. Compliances and non-compliances to the DQIs are to be assessed. |

### *6.6.1 DATA QUALITY INDICATORS*

DQIs for sampling techniques and laboratory analyses of collected representative soil samples are defined as the acceptable level of error required for this validation assessment. The adopted field methodologies and data obtained will be assessed by reference to DQIs as follows:

- Precision: a quantitative measure of the variability (or reproducibility) of data.
- Accuracy: a quantitative measure of the closeness of reported data to the true value.

- Representativeness: the confidence (expressed qualitatively) that data are representative of each media present on the site.
- Comparability: a qualitative parameter expressing the confidence with which one data set can be compared with another.
- Completeness: a measure of the amount of useable data (expressed as a percentage) from a data collection activity.

A summary of the field and laboratory DQIs for the validation assessment are provided in Table 6.3 and Table 6.4.

Table 6.3 DQIs – field techniques

| DQI |
|---|
| **ACCURACY** |
| Standard operating procedures (SOPs) appropriate and complied with |
| Collection of rinsate blanks |
| **COMPARABILITY** |
| Same SOPs used on each occasion |
| Experienced sampler |
| Climatic conditions (temperature, rainfall, wind) |
| Same types of samples collected |
| **COMPLETENESS** |
| SOPs appropriate and complied with |
| All required samples collected |
| **REPRESENTATIVENESS** |
| Appropriate media sampled according to RAP |
| **PRECISION** |
| SOPs appropriate and complied with |
| Collection of inter-laboratory and intra-laboratory duplicates |

Table 6.4 DQIs - laboratory

| DQI | ACCEPTABLE LIMITS |
|---|---|
| **ACCURACY** | |
| Analysis of laboratory prepared trip blanks (one per day per batch) | Below practical quantitation limits (PQLs) for contaminants analysed |
| Analysis of rinsate blanks (one per day of sampling) | Below PQLs for contaminants analysed |
| Analysis of method blanks | Below PQLs for contaminants analysed |
| Analysis of matrix and surrogate spikes and laboratory control samples | Laboratory specific |
| Analysis of matrix spike duplicates | Laboratory specific |

| DQI | ACCEPTABLE LIMITS |
|---|---|
| Analysis of reference materials | Laboratory specific |
| Analysis of reagent blanks | Below PQLs for contaminants analysed |
| **COMPARABILITY** | |
| Sample analytical methods | As per NEPM (2013) |
| Same units | Justify/quantify if different |
| Same laboratories | Justify/quantify if different |
| Sample PQLs | Less than nominated criteria |
| **COMPLETENESS** | |
| All critical samples analysed | As per RAP |
| All required analytes analysed | As per RAP |
| Appropriate methods and PQLs | As per NEPM (2013) |
| Sample documentation complete | As per NEPM (2013) |
| Sample holding times complied with | As per NEPM (2013) |
| **REPRESENTATIVENESS** | |
| All required samples analysed | As per RAP |
| **PRECISION** | |
| Analysis of intra-laboratory and inter-laboratory duplicates for contaminants of concern at rate of 1:20 primary samples for the same analysis of primary samples | Relative per cent differences (RPDs) <30%, justify/quantify if exceedances |
| Analysis of laboratory duplicates | Laboratory specific |
| Analysis of laboratory prepared trip spikes (one per day per batch of volatiles) | Recovery of 70-130% |
| National Association of Testing Authorities (NATA) certified laboratories used | As per NEPM (2013) |

### 6.6.2 VALIDATION OF EXCAVATED AREAS

Once remediation target depths have been achieved and the environmental consultant has confirmed that the excavation has either been terminated on native soils or all impacted materials have been removed, soil validation samples will be collected for laboratory analysis and results compared to the validation criteria to ensure that the site will be suitable for the proposed future land use following the completion of the remediation works. Validation samples will be collected from the base and walls of excavations where the surface soils will present a future exposure risk; i.e., where not covered by buildings or hardstand.

Validation samples will be analysed for TRH, BTEXN, PAHs, metals and asbestos. Results will be compared to the validation criteria, provided in Section 5.5.

### 6.6.3 VALIDATION OF SITE SOIL FOR REUSE

Soil excavated as part of the construction process outside the remediation areas may be suitable to use for backfill where excavations exceed the design levels. To validation site soil for reuse, samples will be collected at a rate of 1 sample per 25 $m^3$ of soil, with a minimum of 3 samples collected, and analysed for TRH, BTEXN, PAHs, metals and asbestos. Results will be compared to the validation criteria, provided in Section 5.5.

### 6.6.4 VALIDATION OF IMPORTED SOILS

Where VENM is required for backfilling, it should be certified as VENM and be assessed to determine that it is suitable for the intended use. This would involve:

- reviewing the history of the source of the material
- a visual inspection for foreign material or unusual staining
- confirmation sampling.

Where ENM is to be imported to the site for use as backfill, the material should be assessed in accordance with the NSW EPA requirements under the Resource Recovery Order under Part 9, Clause 93 of the *Protection of the Environment Operations (Waste) Regulation 2014* (NSW Government, 2014*)* prior to being imported to the site. Confirmation sampling will be undertaken of ENM imported to site.

Confirmation sampling for VENM and ENM will be undertaken at a rate of 1 sample per 100 $m^3$ of material, with a minimum of 3 samples collected. Samples will be analysed for TRH, BTEXN, PAHs, metals and asbestos.

## 6.7 QA/QC

The data quality indicators (DQIs) for validation and groundwater monitoring are presented in Table 6.1.

Table 6.5 Data quality indicators

| INDICATORS | DESCRIPTION |
|---|---|
| **Procedures** | All approvals and licences required must be obtained prior to work commencing. All field work will be carried out in accordance with relevant guidelines and standard operating procedures. All site staff must sign site register and be inducted. Remediation equipment must be regularly inspected. All field work information to be recorded on field day sheets. All works to be undertaken by experienced staff. |
| **Storage and transport** | Samples collected will be placed directly into laboratory supplied containers and stored in a secure, chilled box. Chain of custody documentation will be used to ensure the integrity of the samples from collection to receipt by the analytical laboratory. |
| **Laboratory** | All laboratories used should comply with AS/NZS ISO 9001:2001 quality assurance programs, be accredited by the National Association of Testing Authorities for the analyses requested and perform their own internal QA/QC programs. |

| INDICATORS | DESCRIPTION |
|---|---|
| **QA/QC – Field work** | The field QA/QC procedures, at the minimum, should comprise:<br>— Duplicate samples: 1 in 20 blind duplicates (intra-laboratory) to the primary laboratory and 1 in 20 split duplicates (inter-laboratory) to the secondary laboratory. NEPM (2013) indicated that for soil samples if the relative per cent difference (RPD) for the primary and duplicate is greater than 30%, a review should be conducted of the cause (e.g. instrument calibration, extraction efficiency, appropriateness of the method used, etc.). The RPD variation can be expected to be higher for organic analysis than for inorganics, and for low concentrations analytes (AS4482.1, 2005).<br>— Sample blanks: Sample blanks to be collected to verify that cross-contamination has not occurred during sampling or during transportation of the samples. Equipment rinsate samples will be collected for each sampling day and analysed for the contaminant of concern. Trip blanks (prepared by the laboratory) will be analysed for each batch of soil and groundwater samples submitted to the laboratory. The trip blanks will be analysed for volatile contaminants.<br>— Trip spike: The purpose of a trip spike is to confirm the adequacy of sample preservation in the field and during sample transportation to the laboratory by measuring the amount of volatile losses. Trip spikes will be prepared by the laboratory. Non-compliance is to be documented in the report and the sample to be re-analysed or higher level to be conservatively adopted. |
| **QA/QC – Laboratory** | Laboratory QA/QC limits vary between analytes and between laboratories. If duplicate results are not satisfactory, non-compliance is to be documented in laboratory reports. Primary laboratory QA/QC acceptance limits are as follows:<br>— surrogates: 70 – 130% recovery<br>— matrix spikes: 70 – 140% recovery (organics) and 80-120% (inorganics)<br>— control samples: 70 – 139% recovery (soil) and 80-120% (water)<br>— duplicate samples: RPD less than 30%<br>— method blanks: 0 to < practical quantitation limit. |

## 6.8 REPORTING

Following the remediation and validation works a final report will be prepared in accordance with the NSW EPA (1997) *Guidelines for Consultants Reporting on Contaminated Sites*. The validation report will detail the extent and nature of the remedial works undertaken, characterisation and disposal of contaminated soils, the validation of imported clean fill and topsoil (if any) and will consider the overall status of the site.

The report will include the following sections:

- executive summary
- scope of works
- site identification
- site history
- site conditions and surrounding environment

- geology and hydrogeology
- previous investigation results
- summary of the RAP
- validation criteria
- nature and extent of the remediation undertaken
- sampling and analysis plan and sampling methodology
- field and laboratory QA/QC
- results of the validation sampling and sampling of imported fill materials
- contractor supplied information (such as waste disposal documentation)
- discussion of the land use suitability at the completion of remedial works
- conclusions.

It should be noted that to enable the validation report to be produced, the contractor will be required to supply:

- the quantities and types of waste disposed of
- details of the receiving facility/facilities accepting waste from the site
- disposal dockets for the waste disposed
- details of any imported materials (including VENM certification, laboratory results, origin and supplier, exemption details, quantities and areas of placement).

# 7 SITE SAFETY PLAN

A HESP will be prepared prior to performing on-site works associated with this RAP. The HESP will address the health and safety of residents and workers in the surrounding area. As a minimum, it will consider:

- site security
- asbestos controls
- potential exposure to contamination
- excavation safety
- vibration
- noise
- odour
- dust.

Work associated with the remediation of the site will conform, at a minimum, to the requirements of the SafeWork NSW requirements and associated regulations. Typically, the HESP will address the following issues:

- regulatory requirements
- responsibilities
- hazard identification and control
- chemical hazard control
- sample and chemical handling procedures
- personal protective equipment
- work zones
- decontamination procedures
- emergency response plans
- contingency plans
- incident reporting.

An asbestos management plan will be prepared, either as a standalone document or as part of the HESP or construction environmental management plan (CEMP) for the work. The asbestos management plan will include monitoring requirements, dust control measures, personal protective equipment, decontamination and waste requirements.

# 8 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

A CEMP should be developed as industry best practice for the site remediation works to ensure that the on-site and off-site environment is not adversely impacted during the remediation works. The CEMP should address and take into consideration the issues discussed in the following sections. The CEMP should be prepared by the civil contractor.

## 8.1 VEHICLE TRAFFIC

The remediation works may slightly increase vehicle traffic in the vicinity of the site. Where necessary, details of traffic management will be incorporated into the CEMP to control traffic movement associated with the works and mitigate any disruption to local residents and road users.

## 8.2 WASTE TRANSPORT

All excavated soil requiring off-site disposal will be transported (subsequent to assigned classification) to an appropriate landfill facility. Asbestos waste must be tracked using the NSW EPA's WasteLocate system from pickup to disposal.

All transport trucks loaded with contaminated soil for off-site disposal should be sealed and the load completely/securely covered to prevent wind-blown emissions or spillages, and covers should be maintained until unloading. All truck tailgates should be securely fixed prior to loading and immediately after unloading soils and all vehicles are to be operated in a manner so as to prevent loss of soils during loading, transport and unloading activities.

Truck wheels should be cleaned or driven through a constructed wash bay or similar control (e.g. rumble grid) to prevent potentially contaminated soil from being transported onto local roads.

## 8.3 ODOUR AND VAPOUR

The remediation works are not considered likely to result in significant vapours and odours being released into the atmosphere. If vapours or odours do occur during the remediation, control measures could be implemented, including the following:

- wetting down the excavated soil with the use of water sprays containing odour suppressant
- all soil loaded onto trucks for off-site disposal are to be securely covered.

## 8.4 DUST

Dust will be visually monitored during the earthworks and areas generating excessive dust will be sprayed with water to reduce the dust levels. Soil that is to be stockpiled should be covered or wetted down to minimise potential dust generation.

## 8.5 ASBESTOS

Air monitoring for asbestos fibres may be carried out in the remediation areas during the excavation phase of the project, in with a site-specific asbestos management plan (to be developed prior to any excavation/civil works).

Dust suppression (see Section 8.4) will be employed when excavating where asbestos has been identified or where asbestos is suspected.

## 8.6 PLANT AND MACHINERY

It is the responsibility of the remediation contractor to ensure that all plant and machinery used on the site is properly maintained and in good working condition. Any plant or machinery used should be appropriate for the task.

## 8.7 NOISE

Increased noise levels may result from the use of on-site and off-site mechanical equipment during the course of the remediation works. To mitigate any noise which may arise as a result of site works, all works should be carried out during normal working hours and in accordance with NSW regulations on this matter.

Noise control measures to be implemented during the remediation works may include:

- specified entry controls for construction vehicles entering and leaving the site
- suitable construction techniques and methodologies
- use of quieter equipment
- restricted use of reversing alarms and all equipment should be fitted with alarm types that adjust output sound levels according to the prevailing ambient noise level.

All practical measures will be taken to minimise generation of noise, and contact information for enquires or complaints will be posted on the site entrance gate.

## 8.8 WATER AND SEDIMENT MANAGEMENT

### *8.8.1 SURFACE WATER*

Soil stockpiled during excavation works should be suitably contained to prevent run-off of any potentially contaminated water or soil to the surrounding environment, including the stormwater system. Control measures should be established to prevent surface water run-off entering and leaving excavation and stockpile areas. Control measures may include:

- temporary bunding or diversion drains
- impermeable sheeting placed under and/or over stockpiles
- silt fences/silt socks to surround stockpiles
- protection of existing drains with silt fencing/sand bags.

These mitigation measures should be regularly inspected to ensure that they are in good condition and if necessary upgraded where their performance is deteriorating.

### *8.8.2 SEDIMENT*

Drains, gutters, roads and access ways shall be free of sediment in accordance with regulatory requirements. Where required, gutters and roadways shall be swept regularly to keep them free from sediment. As for surface water, control measures should be implemented.

The erosion and sediment controls put in place during the civil works must be in accordance with:

- POEO Act
- The “Blue Book” – Managing Urban Stormwater: Soils and Construction (Landcom, 2004).

## 8.9 EQUIPMENT AND CLEANING OPERATIONS

During remediation, controls will be placed on the operation and movement of equipment. General procedures that will be implemented include the following:

- Excavation equipment will be cleaned in an environmentally sound manner prior to leaving the site.
- If necessary, effective truck wheel-washing facilities will be provided to ensure that contaminated soil is not tracked off-site.
- No trucks or equipment carrying contaminated soils should be allowed to move across unsealed ground surfaces, with the exception of designated transport corridors.

All contaminated soil requiring off-site disposal will be transported to an appropriate landfill facility. All transport trucks loaded with contaminated soil for off-site disposal should be sealed and the load securely covered to prevent wind-blown emissions or spillages. Covers should be in place until the final unloading. All truck tailgates should be securely fixed prior to loading and immediately after unloading soils and all vehicles are to be operated in a manner so as to prevent loss of soils during loading, transport and unloading activities.

As part of the CEMP, a preferred transport route to the nominated facility is required to be identified.

## 8.10 SITE SECURITY

During construction works, work areas will be barricaded or secured by a chain-wire fence, which will remain in place for the duration of the remediation works in order to exclude public visitors. Appropriate safety and/or warning signs will be posted in accordance with the SafeWork NSW requirements. If an excavation is to be left open while the environmental project manager and contractor are not on site for a substantial period of time (such as overnight), a temporary fence will be erected around the excavation. Should the excavation be deeper than 1.5 m, the edges of the excavation should be battered to a 45 degree slope or benched into 1 m steps based on industry best practices.

## 8.11 WORKING HOURS

Working hours should be undertaken in accordance with the conditions of development consent granted for the construction work, presumed to be normal working hours (7 am to 6 pm). Any works to be conducted outside the normal working hours needs to have prior agreement with the client and the Council's consent.

## 8.12 CONTACT INFORMATION

Contact details of the appropriate civil contractors and the Project Manager should be displayed in a prominent location at the site (such as the entrance or site office). Any incidents should be initially reported to the site manager, who will prepare an incident report for the Project Manager as soon as practicable.

## 8.13 INCIDENT RESPONSE

Responses to incidents occurring on site will be in accordance with the contractor's and client's emergency and evacuation procedures and incident reporting procedures. A health and safety plan and incident contact number/s are to be kept in an on-site register. All other relevant emergency contact numbers such as police, fire brigade and hospital will be listed in the HESP and posted on site for easy access.

Local contractors (including a plumber and electrician) should be on call in case an incident is reported by the site workers or local residents.

## 8.14 CONTINGENCY MANAGEMENT

Contingency plans for anticipated environmental problems that may arise during the remediation works are summarised below in Table 8.1.

Table 8.1 Contingency management plans

| ANTICIPATED PROBLEMS | CORRECTIVE ACTIONS |
|---|---|
| **Excessive dust** | Use water sprays to suppress the dust or stop the site activities generating the dust until it abates. |
| **Excessive noise** | Identify the source, isolate the source if possible, and modify the actions of the source. Ensure hearing protection is worn if the noise cannot be reduced. |
| **Excessive odours/vapours** | If excessive organic odours/vapours are being generated, stop works and implement control measures including use of odour suppressants and/or wetting down of excavated soil. |
| **Excessive rainfall** | Ensure sediment and surface water controls are operating correctly. If possible, divert surface water away from active work areas and/or excavations. |
| **Water in excavations** | Collect samples and assess against relevant assessment criteria to enable disposal options to be formulated. |
| **Leaking machinery or equipment** | If possible, stop the identified leak and clean up the spill with absorbent material. Stockpile the impacted soil in a secure location, sample and determine the appropriate disposal/treatment option. |
| **Failure of erosion or sedimentation control measures** | Stop work and repair the failed control measure. |
| **Unearthing unexpected fill or waste** | Stop activities and contact a qualified environmental consultant. Prepare a management plan to address the issue if necessary. |
| **Equipment failures** | Ensure that spare equipment is on hand at the site or ensure that the failed equipment can be serviced by on-site personnel or a local contractor. |
| **Complaint management** | Notify client representative following the complaint and report the complaint in accordance with management procedures. If possible, implement control measures to address the reason/s for complaint. |
| **Asbestos** | If unexpected asbestos material is identified in the soil, notify client and the consultant Project Managers. Asbestos monitoring may be required to continue works. |
| **Acid sulfate soils** | If acid sulfate soils are suspected, stop works and assess the material. If actual or potential acid sulfate soils are present, prepare an acid sulfate soils management plan then work according to the plan. |

# REFERENCES


- *Contaminated Land Management Act 1997, No. 140* (NSW).
- CSIRO 2017, 'Acid Sulfate Soil Risk Map', *Australian Soil Resource Information System*, http://www.asris.csiro.au
- Department of Primary Industries registered groundwater bore database; allwaterdata.water.nsw.gov.au; accessed 24 January 2018
- Friebel, E & Nadebaum, P 2011, 'Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document', *CRC CARE Technical Report no. 10,* CRC for Contamination Assessment and Remediation for the Environment, Adelaide, Australia
- GeoEnviro 2017, *Geotechnical, Salinity and Contamination Investigation Proposed Redevelopment, Armidale High School, Butler Street Armidale NSW.*
- Geological Survey of NSW Department of Resources and Energy – Interactive Geological Map of NSW; https://www.resourcesandenergy.nsw.gov.au/; accessed 24 January 2018
- *National Environment Protection (Assessment of Site Contamination) Measure 1999* (as amended 2013)
- NOHSC 1995a, *Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment*
- NOHSC 1995b, *Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment*
- NSW DECCW 2009, *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997.*
- NSW DUAP 1998, *Managing Land Contamination. Planning Guidelines SEPP 55 – Remediation of Land*
- NSW EPA 2000, *Guidelines for Consultants Reporting on Contaminated Sites*
- NSW EPA 2014, *Waste Classification Guidelines. Part 1: Classifying waste*
- *Protection of the Environment Operations Act 1997* (NSW).
- *Protection of the Environment Operations (Waste) Regulation 2005* (NSW).
- *Protection of the Environment Legislation Amendment Act 2011* (NSW).
- *State Environmental Planning Policy 55 - Remediation of land* (NSW).
- *Work Health & Safety Act 2011* and *Work Health and Safety Regulations 2011* (NSW).
- WSP 2018, *Targeted soil contamination assessment, Armidale High School, Butler St, Armidale, NSW 2350.*

# 9 LIMITATIONS

This Report is provided by WSP Australia Pty Limited (WSP) for NBRS & Partners Pty Ltd (Client) in response to specific instructions and agreement from the Client on 3 September 2018.

## PERMITTED PURPOSE

This Report is provided by WSP for the purpose described in the Agreement and no responsibility is accepted by WSP for the use of the Report in whole or in part, for any other purpose (Permitted Purpose).

## QUALIFICATIONS AND ASSUMPTIONS

The services undertaken by WSP in preparing this Report were limited to those specifically detailed in the Report and are subject to the scope, qualifications, assumptions and limitations set out in the Report or otherwise communicated to the Client.

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# APPENDIX A

FIGURES


| | | | |
|---|---|---|---|
| Map: PS107410_GIS_001_A2 | Author: David.Naiken | | 0 25 50 m<br>1:3,000<br>Scale ratio correct when printed at A4<br>Coordinate system: GDA 1994 MGA Zone 56 |
| Date: 10/09/2018 | Approved by: - | | |

Source: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community



PRELIMINARY

wsp

**Armidale Future School**
**Figure 1**
Soil remediation areas

# APPENDIX B

## HISTORICAL SOIL RESULTS

**Table E1**
**Armidale High School**
**Butler Street, Armidale NSW 2350**
**Soil analytical results - TRH & BTEXN**

| ADOPTED ASSESSMENT CRITERIA | TRH | | | | | | | | BTEXN | | | | | | | Asbestos |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $C_6$-$C_9$ | $C_6$-$C_{10}$ | F1 | $>C_{10}$-$C_{16}$ | F2 | $>C_{16}$-$C_{34}$ | $>C_{34}$-$C_{40}$ | $C_{10}$ - $C_{36}$ (Sum of total) | Benzene | Toluene | Ethyl-benzene | Xylene (m&p) | Xylene (o) | Total Xylene | Naphthalene | |
| HSL A [1] | | | | | | | | | | | | | | | | |
| HSL C [2] | - | - | NL | - | NL | - | - | - | NL | NL | NL | - | - | NL | - | - |
| HIL C [3] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Direct contact [4] | - | - | 5,100 | - | 3,800 | 5,300 | 7,400 | - | 120 | 18,000 | 5,300 | - | - | 15,000 | - | - |
| ESL C [5] | - | - | 180 | - | 120 | 1,300 | 5,600 | - | 65 | 105 | 125 | - | - | 45 | - | - |
| EIL C [6] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 170 | - |

| Sample ID | Sample date | Laboratory report reference | Sample depth (mBGL) | Analytical results | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HA1_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 130 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | Yes |
| HA1_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA2_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA3_0 | 18-01-18 | ES1802402 | 0 - 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | No |
| HA3_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA4_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | 50 | 50 | 930 | 260 | 1,000 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA5_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA5_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA6_0 | 18-01-18 | ES1802402 | 0 - 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | No |
| HA6_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA7_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA7_0.7 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA8_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA9_0 | 18-01-18 | ES1802402 | 0 - 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | No |
| HA9_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA10_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA11_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 430 | 170 | 490 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA11_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA12_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 200 | <100 | 260 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA13_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA14_0 | 18-01-18 | ES1802402 | 0 - 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | No |
| HA14_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA15_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA16_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 120 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA17_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA18_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 120 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| QA1 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 110 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| QA2 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 150 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| QA1A | 18-01-18 | SE174604 | 0 - 0.1 | <20 | <25 | <25 | <25 | <25 | <90 | <120 | <110 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.3 | <0.1 | - |
| QA2A | 18-01-18 | SE174604 | 0 - 0.1 | <20 | <25 | <25 | <25 | <25 | 240 | <120 | 270 | <0.1 | <0.1 | <0.1 | <0.2 | <0.1 | <0.3 | <0.1 | - |
| **ALS Practical quantitation limit** | | | | **10** | **10** | **10** | **50** | **50** | **100** | **100** | **50** | **0** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **1** | **Yes/No** |
| **SGS Practical quantitation limit** | | | | **20** | **25** | **25** | **25** | **25** | **90** | **120** | **110** | **0.1** | **0.1** | **0.1** | **0.2** | **0.1** | **0.3** | **0.1** | **-** |

**Notes:**
**Bold** Sample concentration exceeds the adopted assessment criteria
All results expressed as mg/kg, unless stated otherwise
F1 = $C_6$-$C_{10}$ Fraction minus BTEX
F2 = TRH $>C_{10}$-$C_{16}$ less naphthanlene
NL = Non-limiting due to maximum vapour concentrations being below the acceptable health risk level.

[1] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low - high density residential
[2] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space
[3] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(1) HILs for soil contaminants – Recreational C
[4] CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg)
[5] NEPM (2013) Schedule B1 Table 1B(6) ESLs for TPH Fractions F1 to F4, BTEX and benzo(a)pyrene in soil.
[6] NEPM (2013) Schedule B1 Table 1B(5) EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties

**Table E2**
**Armidale High School**
**Butler Street, Armidale NSW 2350**
**Soil analytical results - PAHs & metals**

| ADOPTED ASSESSMENT CRITERIA | PAHs | | | | | | | | | | | | | | | | | | Metals | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Acenaphthene | Acenaphthylene | Anthracene | Benz(a)anthracene | Benzo(a) pyrene | Benzo(bj)fluoranthene | Benzo(k)fluoranthene | Benzo(g,h,i)perylene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-c,d)pyrene | Naphthalene | Phenanthrene | Pyrene | Benzo(a)pyrene TEQ | Total PAH | Arsenic | Cadmium | Chromium | Copper | Lead | Mercury | Nickel | Zinc |
| HSL A [1] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| HSL C [2] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| HIL C [3] | - | - | - | - | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 300 | 300 | 90 | 300 | 17,000 | 600 | 80 | 1,200 | 30,000 |
| Direct contact [4] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ESL C [5] | - | - | - | - | 0.7 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| EIL C [6] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 100 | - | 400 [8] | 95 [10] | 1,100 [7] | - | 30 [8] | 230 [9] |

| Sample ID | Sample date | Laboratory report reference | Sample depth (mBGL) | Analytical results | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HA1_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | 1.9 | **2.5** | 2.7 | 1.1 | 1.7 | 2.2 | <0.5 | 5.3 | <0.5 | 1.3 | <0.5 | 2.9 | 5.1 | **3.2** | 26.7 | 35 | <1 | 36 | 40 | 170 | 1.1 | 16 | 324 |
| HA1_0.5 | 18/01/2018 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 74 | 13 | 16 | <0.1 | 19 | 29 |
| HA2_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 64 | 18 | 15 | 0.1 | 24 | 101 |
| HA3_0.5 | 18/01/2018 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 118 | 22 | 10 | <0.1 | **43** | 21 |
| HA4_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | 1 | **1.1** | 0.9 | <0.5 | <0.5 | 1 | <0.5 | 2.3 | <0.5 | <0.5 | <0.5 | 1.7 | 2.3 | 1.3 | 10.3 | <5 | <1 | 42 | 21 | 26 | <0.1 | **33** | 90 |
| HA5_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 1.2 | <0.5 | <0.5 | <0.5 | 0.7 | 1.2 | 0.6 | 4.1 | <5 | <1 | 45 | 23 | 66 | <0.1 | **61** | 41 |
| HA5_0.5 | 18/01/2018 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 69 | 24 | 6 | <0.1 | **44** | 24 |
| HA6_0.5 | 18/01/2018 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 86 | 24 | <5 | <0.1 | **75** | 24 |
| HA7_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | <0.5 | 1.6 | <5 | <1 | 39 | 12 | 13 | <0.1 | 23 | 25 |
| HA7_0.7 | 18/01/2018 | ES1802402 | 0.6 - 0.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 77 | 27 | 5 | <0.1 | **98** | 25 |
| HA8_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.7 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | <0.5 | 1.5 | <5 | <1 | 38 | 13 | 10 | <0.1 | 26 | 31 |
| HA9_0.5 | 18/01/2018 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 32 | 5 | <5 | <0.1 | 7 | <5 |
| HA10_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | 0.7 | **0.8** | 0.8 | <0.5 | <0.5 | 0.8 | <0.5 | 2.2 | <0.5 | <0.5 | <0.5 | 1.4 | 1.9 | 1 | 8.6 | <5 | <1 | 74 | 16 | 28 | 0.3 | 15 | 36 |
| HA11_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | 1.2 | 2.1 | 7.6 | **7.9** | 8 | 2.3 | 2.7 | 7.6 | 0.7 | 16.8 | <0.5 | 2.4 | <0.5 | 11.4 | 17 | **10.7** | 87.7 | <5 | <1 | 58 | 17 | 23 | <0.1 | 24 | 49 |
| HA11_0.5 | 18/01/2018 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 63 | 14 | 9 | <0.1 | 26 | 13 |
| HA12_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | 0.6 | 2.3 | **2.8** | 2.9 | 1.1 | 1.1 | 2.6 | <0.5 | 6.9 | <0.5 | 0.9 | <0.5 | 4.3 | 6.5 | **3.6** | 32 | <5 | <1 | 54 | 12 | 19 | <0.1 | 15 | 37 |
| HA13_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.9 | <0.5 | <0.5 | <0.5 | 0.5 | 0.9 | <0.5 | 2.3 | <5 | <1 | 27 | 8 | 18 | <0.1 | 6 | 22 |
| HA14_0.5 | 18/01/2018 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 76 | 22 | 10 | <0.1 | 29 | 22 |
| HA15_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 93 | 35 | 10 | <0.1 | **55** | 58 |
| HA16_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | 1.1 | **1.3** | 1.1 | <0.5 | <0.5 | 1.2 | <0.5 | 2.7 | <0.5 | <0.5 | <0.5 | 1.6 | 2.7 | 1.5 | <0.5 | <5 | <1 | 45 | 21 | 20 | <0.1 | **32** | 43 |
| HA17_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | <0.5 | <0.5 | <0.5 | 0.5 | 0.8 | <0.5 | 2.1 | <5 | <1 | 44 | 21 | 13 | <0.1 | 24 | 39 |
| HA18_0 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | 1.6 | **1.7** | 1.6 | 0.6 | 0.9 | 1.6 | <0.5 | 2.7 | <0.5 | 0.7 | <0.5 | 1.2 | 2.8 | 2.2 | 15.4 | <5 | <1 | 30 | 15 | 14 | <0.1 | 18 | 55 |
| QA1 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | 0.6 | 2.8 | **2.6** | 2.5 | 1 | 1.3 | 2.7 | <0.5 | 4.9 | <0.5 | 1 | <0.5 | 2.3 | 4.9 | **3.4** | 26.6 | <5 | <1 | 31 | 12 | 15 | <0.1 | 19 | 39 |
| QA2 | 18/01/2018 | ES1802402 | 0 - 0.1 | <0.5 | 0.6 | 1.3 | 3.4 | **3** | 2.9 | 1 | 1.3 | 3.4 | <0.5 | 6.8 | <0.5 | 1.1 | <0.5 | 4.9 | 6.7 | **3.5** | 36.4 | <5 | <1 | 62 | 12 | 10 | <0.1 | 17 | 15 |
| QA1A | 18/01/2018 | SE174604 | 0 - 0.1 | <0.1 | 0.4 | 0.3 | 2.3 | **2.5** | 2.7 | 1.1 | 1.1 | 1.8 | 0.2 | 3.3 | <0.1 | 1.5 | <0.1 | 1.7 | 3.7 | **3.9** | 23 | 4 | <0.3 | 38 | 15 | 16 | <0.05 | 22 | 54 |
| QA2A | 18/01/2018 | SE174604 | 0 - 0.1 | 0.3 | 1.0 | 1.7 | 6.5 | **6.2** | 6.4 | 2.8 | 2.5 | 4.4 | 0.4 | 11 | 0.6 | 3.4 | 0.2 | 6.8 | 11 | **8..6** | 65 | <3 | <0.3 | 70 | 25 | 23 | <0.05 | 28 | 67 |
| **ALS Practical quantitation limit** | | | | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | | **0.5** | **5** | **1** | **2** | **5** | **5** | **0.1** | **2** | **5** |
| **SGS Practical quantitation limit** | | | | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | **0.1** | | **0.8** | **3.0** | **0.3** | **0.3** | **0.5** | **1.0** | **0.1** | **0.5** | **0.5** |

**Notes:**
**Bold** Sample concentration exceeds the adopted assessment criteria
All results expressed as mg/kg, unless stated otherwise

[1] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low - high density residential
[2] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space
[3] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(1) HILs for soil contaminants – Recreational C
[4] CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg)
[5] NEPM (2013) Schedule B1 Table 1B(6) ESLs for TPH Fractions F1 to F4, BTEX and benzo(a)pyrene in soil.
[6] NEPM (2013) Schedule B1 Table 1B(5) EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties
[7] NEPM (2013) Schedule B1 Table 1B(4) EILs for Generic added contaminant limits for lead in soils irrespective of their physicochemical properties
[8] NEPM (2013) Schedule B1 Table 1B(3) Soil-specific added contaminant limits for aged chromium III and nickel in soil
[9] NEPM (2013) Schedule B1 Table 1B(1) Soil-specific added contaminant limits for aged zinc in soil
[10] NEPM (2013) Schedule B1 Table 1B(2) Soil-specific added contaminant limits for aged copper in soils

**Table E3**
**Armidale High School**
**Butler Street, Armidale NSW 2350**
**Soil analytical results - PCBs, OCPs & OPPs**

| ADOPTED ASSESSMENT CRITERIA | PCBs | OCPs | | | | | | | | | | | | | | | | | | | OPPs | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Polychlorinated biphenyls | pp-DDE | Aldrin | cis-Chlordane | trans-Chlordane | delta-BHC | pp-DDD | pp-DDT | Dieldrin | alpha-Endosulfan | beta-Endosulfan | Endosulfan sulphate | Endrin | Endrin aldehyde | alpha - BHC | beta - BHC | delta- BHC | Heptachlor | Heptachlor epoxide | Hexachlorobenzene | Methoxychlor | Azinphos methyl | Bromophos-ethyl | Chlorpyrifos | Diazinon | Dichlorvos | Dimethoate | Fenthion | Ethion | Malathion | Parathion |
| HSL A [1] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - |
| HSL C [2] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - |
| HIL C [3] | 1 | 400 | 10 | 70 | 70 | - | 400 | 400 | 10 | - | - | - | 20 | - | - | - | - | 10 | - | 10 | 400 | - | - | 250 | - | - | - | | - | - | - |
| Direct contact [4] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - |
| ESL C [5] | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - |
| EIL C [6] | - | - | - | - | - | - | - | 180 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - |

| Sample ID | Sample Date | Laboratory report reference | Sample Depth (mBGL) | Analytical Results | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 |
| C2 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 |
| C3 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 |
| C4 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 |
| **ALS Practical quantitation limit** | | | | **0.1** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.2** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.20** |

**Notes:**
**Bold** Sample concentration exceeds the adopted assessment criteria
All results expressed as mg/kg, unless stated otherwise

[1] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low - high density residential
[2] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space
[3] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(1) HILs for soil contaminants – Recreational C
[4] CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg)
[5] NEPM (2013) Schedule B1 Table 1B(6) ESLs for TPH Fractions F1 to F4, BTEX and benzo(a)pyrene in soil.
[6] NEPM (2013) Schedule B1 Table 1B(5) EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties

**Table E4**
**Armidale High School**
**Butler Street, Armidale NSW 2350**
**Soil analytical results - Waste Classification - TRH & BTEXN**

| ADOPTED ASSESSMENT CRITERIA | TRH | | | | | | | | BTEXN | | | | | | | Asbestos |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $C_6$-$C_9$ | $C_6$-$C_{10}$ | F1 | $>C_{10}$-$C_{16}$ | F2 | $>C_{16}$-$C_{34}$ | $>C_{34}$-$C_{40}$ | $C_{10}$ - $C_{36}$ (Sum of total) | Benzene | Toluene | Ethyl benzene | Xylene (m&p) | Xylene (o) | Total Xylene | Naphthalene | |
| NSW 2014 General Solid Waste CT1 (No Leaching)[1] | 650 | - | - | - | - | - | - | 10,000 | 10 | 288 | 600 | - | - | 1,000 | - | - |
| NSW 2014 General Solid Waste SCC1 (Leached)[2] | 650 | - | - | - | - | - | - | 10,000 | 18 | 518 | 1,080 | - | - | 1,800 | - | - |
| NSW 2014 General Solid Waste TCLP1 [3] | NA | - | - | - | - | - | - | NA | 1 | 14 | 30 | | | 50 | - | - |
| NSW 2014 Restricted Solid Waste CT2 (No Leaching)[4] | 2,600 | - | - | - | - | - | - | 40,000 | 40 | 1,152 | 2,400 | - | - | 4,000 | - | - |
| NSW 2014 Restricted Solid Waste SCC2 (Leached)[5] | 2,600 | - | - | - | - | - | - | 40,000 | 72 | 2,073 | 4,320 | - | - | 7,200 | - | - |
| NSW 2014 Restricted Solid Waste TCLP2 [6] | NA | - | - | - | - | - | - | NA | 2 | 58 | 120 | - | - | 200 | - | - |

| Sample ID | Sample Date | Laboratory report reference | Sample Depth (mBGL) | Analytical Results | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HA1_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 130 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | Yes |
| HA1_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA2_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA3_0 | 18-01-18 | ES1802402 | 0 - 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | No |
| HA3_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA4_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | 50 | 50 | 930 | 260 | 1,000 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA5_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA5_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA6_0 | 18-01-18 | ES1802402 | 0 - 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | No |
| HA6_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA7_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA7_0.7 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA8_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA9_0 | 18-01-18 | ES1802402 | 0 - 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | No |
| HA9_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA10_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA11_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 430 | 170 | 490 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA11_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA12_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 200 | <100 | 260 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA13_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA14_0 | 18-01-18 | ES1802402 | 0 - 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | No |
| HA14_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | - |
| HA15_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA16_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 120 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA17_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | <100 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| HA18_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <10 | <10 | <10 | <50 | <50 | 120 | <100 | <50 | <0.2 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <1 | No |
| **ALS Practical quantitation limit** | | | | **10** | **10** | **10** | **50** | **50** | **100** | **100** | **50** | **0** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **1** | **Yes/No** |
| **SGS Practical quantitation limit** | | | | **20** | **25** | **25** | **25** | **25** | **90** | **120** | **110** | **0.1** | **0.1** | **0.1** | **0.2** | **0.1** | **0.3** | **0.1** | **-** |

**Notes:**

**Bold** Sample concentration exceeds the adopted assessment criteria

All results expressed as mg/kg, unless stated otherwise

F1 = $C_6$-$C_{10}$ Fraction minus BTEX

F2 = TRH $>C_{10}$-$C_{16}$ less naphthanlene

NL = Non-limiting due to maximum vapour concentrations being below the acceptable health risk level.

TCLP1 & TCLP2 unit are mg/L

NA = Not applicable

[1] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - General solid waste CT1

[2] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Specific contaminant concentration

[3] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Leachable concentration

[4] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - Restricted solid waste CT2

[5] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Specific contaminant concentration

[6] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Leachable concentration

**Table E5**
**Armidale High School**
**Butler Street, Armidale NSW 2350**
**Soil analytical results - Waste Classification - PAHs & metals**

| ADOPTED ASSESSMENT CRITERIA | PAHs | | | | | | | | | | | | | | | | Metals | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Acenaphthene | Acenaphthylene | Anthracene | Benz(a)anthracene | Benzo(a) pyrene | Benzo(b)fluoranthene | Benzo(k)fluoranthene | Benzo(g,h,i)perylene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-c,d)pyrene | Naphthalene | Phenanthrene | Pyrene | Total PAH | Arsenic | Cadmium | Chromium | Copper | Lead | Mercury | Nickel | Zinc |
| NSW 2014 General Solid Waste CT1 (No leaching)[1] | - | - | - | - | 0.8 | - | - | - | - | - | - | - | - | - | - | - | 200 | 100 | 20 | 100 | - | 100 | 4 | 40 | - |
| NSW 2014 General Solid Waste SCC1 (Leached)[2] | - | - | - | - | 10 | - | - | - | - | - | - | - | - | - | - | - | 200 | 500 | 100 | 1900 | - | 1500 | 50 | 1050 | - |
| NSW 2014 Restricted Solid Waste CT2 (No leaching)[3] | - | - | - | - | 3.2 | - | - | - | - | - | - | - | - | - | - | - | 800 | 400 | 80 | 400 | - | 400 | 16 | 160 | - |
| NSW 2014 Restricted Solid Waste SCC2 (Leached)[4] | - | - | - | - | 23 | - | - | - | - | - | - | - | - | - | - | - | 800 | 2000 | 400 | 7600 | - | 6000 | 200 | 4200 | - |

| Sample ID | Sample Date | Laboratory report reference | Sample Depth (mBGL) | Analytical Results | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HA1_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | 1.9 | **2.5** | 2.7 | 1.1 | 1.7 | 2.2 | <0.5 | 5.3 | <0.5 | 1.3 | <0.5 | 2.9 | 5.1 | 26.7 | 35 | <1 | 36 | 40 | **170** | 1.1 | 16 | 324 |
| HA1_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 74 | 13 | 16 | <0.1 | 19 | 29 |
| HA2_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 64 | 18 | 15 | 0.1 | 24 | 101 |
| HA3_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | **118** | 22 | 10 | <0.1 | **43** | 21 |
| HA4_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | 1 | **1.1** | 0.9 | <0.5 | <0.5 | 1 | <0.5 | 2.3 | <0.5 | <0.5 | <0.5 | 1.7 | 2.3 | 10.3 | <5 | <1 | 42 | 21 | 26 | <0.1 | 33 | 90 |
| HA5_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | 0.5 | 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 1.2 | <0.5 | <0.5 | <0.5 | 0.7 | 1.2 | 4.1 | <5 | <1 | 45 | 23 | 66 | <0.1 | **61** | 41 |
| HA5_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 69 | 24 | 6 | <0.1 | **44** | 24 |
| HA6_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 86 | 24 | <5 | <0.1 | **75** | 24 |
| HA7_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | 1.6 | <5 | <1 | 39 | 12 | 13 | <0.1 | 23 | 25 |
| HA7_0.7 | 18-01-18 | ES1802402 | 0.6 - 0.7 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 77 | 27 | 5 | <0.1 | **98** | 25 |
| HA8_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.7 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | 1.5 | <5 | <1 | 38 | 13 | 10 | <0.1 | 26 | 31 |
| HA9_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 32 | 5 | <5 | <0.1 | 7 | <5 |
| HA10_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | 0.7 | **0.8** | 0.8 | <0.5 | <0.5 | 0.8 | <0.5 | 2.2 | <0.5 | <0.5 | <0.5 | 1.4 | 1.9 | 8.6 | <5 | <1 | 74 | 16 | 28 | 0.3 | 15 | 36 |
| HA11_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | 1.2 | 2.1 | 7.6 | **7.9** | 8 | 2.3 | 2.7 | 7.6 | 0.7 | 16.8 | <0.5 | 2.4 | <0.5 | 11.4 | 17 | 87.7 | <5 | <1 | 58 | 17 | 23 | <0.1 | 24 | 49 |
| HA11_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <5 | <1 | 63 | 14 | 9 | <0.1 | 26 | 13 |
| HA12_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | 0.6 | 2.3 | **2.8** | 2.9 | 1.1 | 1.1 | 2.6 | <0.5 | 6.9 | <0.5 | 0.9 | <0.5 | 4.3 | 6.5 | 32 | <5 | <1 | 54 | 12 | 19 | <0.1 | 15 | 37 |
| HA13_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.9 | <0.5 | <0.5 | <0.5 | 0.5 | 0.9 | 2.3 | <5 | <1 | 27 | 8 | 18 | <0.1 | 6 | 22 |
| HA14_0.5 | 18-01-18 | ES1802402 | 0.4 - 0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | | <0.5 | <5 | <1 | 76 | 22 | 10 | <0.1 | 29 | 22 |
| HA15_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | | <0.5 | <5 | <1 | 93 | 35 | 10 | <0.1 | **55** | 58 |
| HA16_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | 1.1 | **1.3** | 1.1 | <0.5 | <0.5 | 1.2 | <0.5 | 2.7 | <0.5 | <0.5 | <0.5 | 1.6 | 2.7 | <0.5 | <5 | <1 | 45 | 21 | 20 | <0.1 | 32 | 43 |
| HA17_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.8 | <0.5 | <0.5 | <0.5 | 0.5 | 0.8 | 2.1 | <5 | <1 | 44 | 21 | 13 | <0.1 | 24 | 39 |
| HA18_0 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.5 | <0.5 | <0.5 | 1.6 | **1.7** | 1.6 | 0.6 | 0.9 | 1.6 | <0.5 | 2.7 | <0.5 | 0.7 | <0.5 | 1.2 | 2.8 | 15.4 | <5 | <1 | 30 | 15 | 14 | <0.1 | 18 | 55 |

| ADOPTED ASSESSMENT CRITERIA | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NSW 2014 General Solid Waste TCLP1 [5] | - | - | - | - | 0.04 | - | - | - | - | - | - | - | - | - | - | - | NA | 5 | 1 | 5 | - | 5 | 0.2 | 2 | - |
| NSW 2014 Restricted Solid Waste TCLP2 [6] | - | - | - | - | 0.16 | - | - | - | - | - | - | - | - | - | - | - | NA | 20 | 4 | 20 | - | 20 | 0.8 | 8 | - |

| Sample ID | Sample Date | Laboratory report reference | Sample Depth (mBGL) | TCLP Analytical Results | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HA3_0.5 | 18-01-18 | ES1804634 | 0.4 - 0.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | <0.1 | - | - | - | - | - |
| HA5_0 | 18-01-18 | ES1804634 | 0 - 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | <0.1 | - |
| HA6_0.5 | 18-01-18 | ES1804634 | 0.4 - 0.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | <0.1 | - |
| HA7_0.7 | 18-01-18 | ES1804634 | 0.6 - 0.7 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | <0.1 | - |
| HA11_0 | 18-01-18 | ES1804634 | 0 - 0.1 | - | - | - | - | <0.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| HA12_0 | 18-01-18 | ES1804634 | 0 - 0.1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | <0.1 | - | - | - | - | - |
| QA1 | 18-01-18 | ES1804634 | 0 - 0.1 | - | - | - | - | <0.5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **ALS Practical quantitation limit** | | | | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 5 | 1 | 2 | 5 | 5 | 0.1 | 2 | 5 |
| **SGS Practical quantitation limit** | | | | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.8 | 3.0 | 0.3 | 0.3 | 0.5 | 1.0 | 0.1 | 0.5 | 0.5 |

**Notes:**

**Bold** Sample concentration exceeds the adopted assessment criteria

All results expressed as mg/kg, unless stated otherwise

TCLP1 & TCLP2 unit are mg/L

NA = Not applicable

[1] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - General solid waste CT1

[2] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Specific contaminant concentration

[3] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - Restricted solid waste CT2

[4] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Specific contaminant concentration

[5] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Leachable concentration

[6] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Leachable concentration

**Table E6**
**Armidale High School**
**Butler Street, Armidale NSW 2350**
**Soil analytical results - Waste Classification - PCBs, OCPs & OPPs**

| ADOPTED ASSESSMENT CRITERIA | PCBs | OCPs | | | | | | | | | | | | | | | | | | | OPPs | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Polychlorinated biphenyls | pp-DDE | Aldrin | cis-Chlordane | trans-Chlordane | delta-BHC | pp-DDD | pp-DDT | Dieldrin | alpha-Endosulfan | beta-Endosulfan | Endosulfan sulphate | Endrin | Endrin aldehyde | alpha - BHC | beta - BHC | delta- BHC | Heptachlor | Heptachlor epoxide | Hexachlorobenzene | Methoxychlor | Azinphos methyl | Bromophos-ethyl | Chlorpyrifos | Diazinon | Dichlorvos | Dimethoate | Fenthion | Ethion | Malathion | Parathion |
| NSW 2014 General Solid Waste CT1 (No Leaching)[1] | <50 | - | - | - | - | - | - | - | - | 60 | 60 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 250 | 250 | 250 | 250 | 250 | - |
| NSW 2014 General Solid Waste SCC1 (Leached)[2] | <50 | - | - | - | - | - | - | - | - | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 250 | 250 | 250 | 250 | 250 | - |
| NSW 2014 General Solid Waste TCLP1 [3] | NA | - | - | - | - | - | - | - | - | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | NA | NA | NA | NA | NA | - |
| NSW 2014 Restricted Solid Waste CT2 (No Leaching)[4] | <50 | - | - | - | - | - | - | - | - | 240 | 240 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | - |
| NSW 2014 Restricted Solid Waste SCC2 (Leached)[5] | <50 | - | - | - | - | - | - | - | - | 432 | 432 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | - |
| NSW 2014 Restricted Solid Waste TCLP2 [6] | NA | - | - | - | - | - | - | - | - | 12 | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | NA | NA | NA | NA | NA | - |

| Sample ID | Sample Date | Laboratory report reference | Sample Depth (mBGL) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 |
| C2 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 |
| C3 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 |
| C4 | 18-01-18 | ES1802402 | 0 - 0.1 | <0.1 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.2 |
| **ALS Practical quantitation limit** | | | | **0.1** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.2** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.2** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.05** | **0.20** |

**Notes:**
**Bold** Sample concentration exceeds the adopted assessment criteria
All results expressed as mg/kg, unless stated otherwise
TCLP1 & TCLP2 unit are mg/L
NA = Not applicable

[1] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - General solid waste CT1
[2] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Specific contaminant concentration
[3] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Leachable concentration
[4] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - Restricted solid waste CT2
[5] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Specific contaminant concentration
[6] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Leachable concentration