# REMEDIATION ACTION PLAN

## Aspect Industrial Estate, Mamre Road, Kemps Creek, NSW 2178 – Rev 3 Final

Prepared for Mirvac Projects Pty Ltd

15 OCTOBER 2020

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This report has been prepared for Mirvac Projects Pty Ltd in accordance with the terms and conditions in the Consultant Agreement for Lots 54-58 (DP25135) Mamre Road, Kemps Creek – Phase 2 DSI, FIP, UFP, Dam Decommissioning Strategy, Groundwater Management Plan dated September 24, 2019. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

## REVISIONS

| Revision | Date | Description | Commissioned by | Prepared by | Approved by |
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# CONTENTS

# APPENDICES

# ABBREVIATIONS

| Acronym | Definition |
|---|---|
| ACM | Asbestos containing material |
| AEC | Areas of environmental concern |
| AF | Asbestos fines |
| ASS | Acid sulfate soil |
| CA | Consignment authorisation |
| CEMP | Construction environmental management plan |
| CoPC | Contaminants of potential concern |
| CSM | Conceptual site model |
| DA | Development application |
| DDS | Dam decommissioning strategy |
| DQO | Data quality objectives |
| DSI | Detailed Site Investigation |
| EIL | Ecological investigation level |
| EPA | Environmental protection agency |
| ESL | Ecological screening level |
| FA | Fibrous asbestos |
| GSW | General solid waste |
| HAZMAT | Hazardous materials |
| HBMS | Hazardous building material survey |
| HSL | heath screening levels |
| LOR | Limit of reporting |
| magl | Metres above ground level |
| mbgl | Metres below ground level |
| mTOC | Metres below top of casing |
| NATA | National association of testing authorities |
| NEPM/NEPC | National environment protection measure / national environment protection council |
| NSW EPA | New south wales environment protection authority |

| Acronym | Definition |
|---|---|
| OC/OPP | Organochlorine & organophosphorus pesticides |
| PACM | Potential asbestos containing material |
| PSI | Preliminary site investigation |
| QA/QC | Quality assurance/quality control |
| RAP | Remediation action plan |
| RL mAHD | Relative level Australian height datum |
| RPD | Relative percent difference |
| QA/QC | Quality assurance/quality control |
| SEAR | Secretary's environmental assessment requirements |
| SCC | Specific contaminant concentration |
| SMF | Synthetic mineral fibre |
| SVR | Site remediation and validation report |
| TBA | To be advised |
| TC | Transport certificate |
| TCLP | Toxicity characteristics leaching procedure |
| TPH/TRH | Total petroleum hydrocarbons / total recoverable hydrocarbons |
| UFP | Unexpected finds protocol |
| VENM | Virgin excavated natural material |
| VOC | Volatile organic compound |

# EXECUTIVE SUMMARY

Arcadis Australia Pacific Pty Ltd (Arcadis) was commissioned by Mirvac Projects Pty Ltd (Mirvac) to compile a remediation action plan (RAP) for the proposed Aspect Industrial Estate, located at Lots 54 to 58 DP259135 Mamre Road, Kemps Creek (the site).

The site comprises an approximate area of 56.3 ha and is located within the Penrith City Council Local Government Area (LGA). The site is currently zoned as IN1 General Industrial land within the Broader Western Sydney Employment Area stipulated within State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP WSEA), updated 11 June 2020.

Preliminary and detailed site investigations completed between 2018 and 2019 reported exceedances of the adopted health and ecological assessment criteria for the following:

- Elevated concentrations of heavy metals (copper and zinc) at six locations (HA06, HA08, HA13, HA18, SO01 and SO03.
- A Cu, Zn and staining hotspot at HA01.
- A total recoverable hydrocarbon hotspot at HA15, which extends to a depth of 0.6 m below ground level.
- A redundant asbestos pipe, approximately 0.3 m below ground level and approximately 350 m in length, was identified near the boundary of Lot 57 and Lot 58.
- Isolated surface fragments of bonded asbestos were identified at three locations (ASB01, ASB02 and ASB04) across Lot 57 and Lot 58.
- A hazardous building material survey also identified the presence of asbestos, lead paint and synthetic mineral fibre in the existing buildings and structures across the five lots.

Based on the results of the PSI and DSI, a remediation action plans was recommended to be developed for the site to make it suitable for its proposed industrial land use without the need for a long term environmental management plan or notification on Title. Furthermore, remediation or management is required to make the site safe for construction/ maintenance workers, future sites users and terrestrial ecosystems.

Characterisation of sediments of the five dams on site and removal of surface plastics identified within the market garden areas of Lot 55, 56 and 58 is also detailed in this RAP.

In addition, this remediation action plan is required under the Secretary’s Environmental Assessment Requirements.

## RAP Objectives

The aim of this RAP is to provide a plan of activities, procedures and objectives to facilitate the effective and controlled remediation of the site for localised surface ACM, shallow Cu and/or Zn, and hydrocarbon hotspots, as well as the remediation of a redundant buried asbestos pipe and hazardous materials identified in existing structures onsite.

The objectives of this RAP are:

- Remediate the site to make is suitable for the proposed industrial land use without the need for a long term Environmental Management Plan and notification on Title
- Remediate the site for Zn contamination at HA06, HA08, HA13, HA18, SO01 and SO03 which exceeded the adopted EIL
- Remediate the site for Cu, Zn and staining at HA01 which exceeded the adopted EIL.
- Remediate the site for TRH contamination at HA15 which exceeded the adopted ESL and management limits.
- Remediate the site of ACM fragments and PACM cladding.
- Remediate the site of the buried asbestos pipe located along the boundary of Lot 56 and 57 and which extend to DAM01.

- Remediate existing buildings/structures and associated footprints of hazardous material (ACM, lead paint and SMF).
- Validate building footprints post demolition and remediate as deemed necessary in accordance with this RAP and associated UFP.
- Validate the remedial works in accordance with the relevant NSW EPA guidelines.
- Remove anthropogenic plastics (irrigation pipes and black plastic) from market garden areas.
- Characterise dam sediments for Dam01 to 05.
- Make sure material leaving the site is classified appropriately prior to off-site disposal.

## Remediation Scope of Work

To achieve the remediation objections the following scope of work is proposed to be conducted:

| Location | Scope |
|---|---|
| Zn hotspots | • Excavated Zn impacted material (up to 200 mm)<br>• Blended with additional topsoil and re-use on site as first fill layer within NW corner of the site.<br>• Covered with a minimum of 3.0 m of fill material as per bulk earthwork specifications (PSM, 2020a).<br>• Validate SO01 excavation footprint |
| Cu, Zn and Staining hotspot | • Excavate visually impacted (stained) material based on visual, olfactory observations and PID; and temporarily stockpile onsite on a plastic tarp.<br>• Analysis of three additional waste classification samples including leachability to meet NSW EPA sampling requirements and appropriately classify the material.<br>• Development of a brief waste classification report to be submitted to the accepting landfill in accordance with NSW EPA guidelines.<br>• Dispose of impacted material to appropriate landfill<br>• Validated excavation base (~ 0.3 mbgl) with PID, excavate additional material if elevated PID readings recorded. |
| TRH hotspot | • Excavate impact TRH material via visual, olfactory observations and PID; and temporarily stockpile onsite on a plastic tarp.<br>• Analysis of three additional waste classification samples including leachability to meet NSW EPA sampling requirements and appropriately classify the material.<br>• Development of a brief waste classification report to be submitted to the accepting landfill in accordance with NSW EPA guidelines.<br>• Dispose of impacted material to appropriate landfill<br>• Validate walls and base of the excavations |
| Asbestos pipe | • Engage and supervise licenced asbestos removalist to.<br>– Manage the excavation, validation disposal and tracking of ACM pipe and associated material, including:<br>– Validation of excavation and remediation work zone<br>– Provide a clearance certification report for incorporation in SVR.<br>– Conduct asbestos air quality monitoring will include as minimum pre (background), during and post remediation in accordance with NEPM endorsed WA DoH (2009) asbestos guidelines |

| Location | Scope |
| --- | --- |
| Surface ACM fragments | Engage licences asbestos removalist/hygienist to conduct remediation under supervision of Environmental Scientist.<br>Impacted areas will be remediated via an emu-bob with raking as necessary and validated via laboratory analysis. |
| Hazardous material –including ACM cladding and building footprints | Engage HAZMAT specialist to remediate all existing buildings of hazardous material as reported in the Hazardous Materials Survey (HMS) (Airsafe, 2019).<br>Pre demolition remediation of existing buildings of hazardous materials (Asbestos, lead paint and Synthetic Mineral Fibre (SMF)) as per the methodology incorporated in the HBMS report.<br>As part of the pre demolition remediation of existing buildings/structures for hazardous material, the Environmental Scientist will validate the building footprints post demolition. |
| Building footprints – non-hazardous material | • Post demolition and clearance from the HAZMAT specialist, an Environmental Scientist will conduct validation sampling of building footprints.<br>• Footprint validation sampling for key contaminants of concern will be conducted in accordance with the NSW EPA (2015) sampling density guidelines |
| Anthropogenic Plastics – Market Gardens | Removal of anthropogenic plastics (black plastic and irrigation piping) from market garden surface during general site works.<br>Burial of residual fragments at depth in fill areas. |
| Characterisation of dam sediments | • Excavate dam sediments and spread for drying (landfarming).<br>• Track dam sediment movements.<br>• Collect soil samples and submit for laboratory analysis to appropriately characterise sediments from each dam.<br>• Assess suitability of material for reuse onsite by comparison against site specific assessment criteria, proposed use and, if applicable, depth of burial onsite.<br>• Compile and submit sediment characterisation report, including proposed use of material i.e. re-use on site, disposal offsite, to Auditor for approval. |
| Interim SRV reporting | Compile and submit to Auditor summary report for<br>• Building footprint post demolition, detailing remediation works completed, and additional remediation required.<br>• Remediation and validation report prior to commencement of bulk earth works.<br>The interim site remediation and validation reports are to include remediation methods, variations to RAP scope, volume of material disposed offsite, results of validation sampling and summarise clearance work conducted by subcontractors. |
| Final SVR report | At completion of site works, compile a site remediation and validation report detailing the remediation methods, variations to RAP scope, volume of material disposed offsite, documentation that imported fill is fit for use, results of validation sampling and summarise clearance work conducted by subcontractors. |

## Conclusion

It is considered that the objectives of the onsite remediation will be achieved subject to the successful implementation of the actions contained in this RAP, which will enable the site to be suitable for proposed commercial / industrial land use.

Validation of onsite soils will be undertaken over the remediation surfaces across the site. Due to the scale of the development, proposed cut and fill depths, no impacted material is anticipated to remain on site, or be at a depth at which it is anticipated to be encountered an pose a potential risk to health or the environment.

# 1 INTRODUCTION

## 1.1 Site and Project Information

Arcadis Australia Pacific Pty Ltd (Arcadis) was commissioned by Mirvac Projects Pty Ltd (Mirvac) to compile a remediation action plan (RAP) for the proposed Aspect Industrial Estate, located at Lots 54 to 58 DP259135 Mamre Road, Kemps Creek (the site). The location of the site and site boundary is provided in Figure 1, Appendix A.

The site comprises an approximate area of 56.3 ha and is located within the Penrith City Council Local Government Area (LGA). The site is currently zoned as IN1 General Industrial land within the Broader Western Sydney Employment Area stipulated within State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP WSEA), updated 11 June 2020.

Mirvac require the following documentation to support a State Significant Development (SSD) application relevant to the site:

- Detailed Site Investigation (DSI).
- Imported Fill Protocol (FIP).
- Unexpected Finds Protocol (UFP).
- Dam Decommissioning Strategy (DDS).
- Groundwater Management Plan (GMP).

This remediation action plan (RAP) is required under the Secretary's Environmental Assessment Requirements (SEARs).

The DSI, UFP and IFP have been reviewed and endorsed by Tom Onus of Ramboll Australia Pty Ltd, who is a NSW Accredited Contaminated Sites Auditor under the *Contaminated Land Management Act 1997*.

## 1.2 Background

The site has approximately 950 m of frontage to Mamre Road, with a proposed signalised intersection providing vehicular access via Mamre Road to the M4 Motorway and the Great Western Highway to the north and Elizabeth Drive to the south. Known historical land uses at the site include rural residential, grazing, dairy farming, poultry farming and horticulture.

Ministerial Local Planning Direction 3.5 precludes future residential development of the site due to its proximity to the Western Sydney Airport ANEF 20 noise contours. However, future land uses relevant to employment generating purposes are consistent with the approved 2014 Amendment to the SEPP WSEA and the 2018 Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan (LUIIP) Stage 1: Initial Precincts.

- The proposed redevelopment of the site will facilitate land uses consistent with commercial and industrial use, as prescribed in the National Environmental Protection Measure as amended in 2013 (NEPM, 2013) and will involve the following activities:
- Demolition and removal of existing rural structures.
- Heritage salvage works (if applicable).
- Clearing of existing vegetation on the subject site and associated dam dewatering and decommissioning.
- Realignment of existing creek.
- Onsite bulk earthworks including dewatering.
- The importation, placement, and compaction of soil material, consisting of:
  - Virgin Excavated Natural Material (VENM) within the meaning of the POEO Act; and/or

  - Excavated Natural Material within the meaning of the NSW Environmental Protection Agency's (EPA) Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the POEO (Waste) Regulation 2014 – The Excavated Natural Material Order 2014; and/or
  - Materials covered by a specific NSW EPA Resource Recovery Order and Exemption which are suitable for their proposed use.
- Boundary retaining walls.
- Catchment level stormwater infrastructure, trunk services connections, utility infrastructure, roads and access infrastructure (signalised intersection with Mamre Road) associated with Stage 1.
- Construction fit out and 24 hours a day / 7 day per week use of industrial warehouse and distribution buildings within Stage 1.
- Detailed earthworks, stormwater, services and utility infrastructure associated with the construction of industrial logistics and warehouse buildings within Stage 1.
- Boundary stormwater management, fencing and landscaping.
- Staged subdivision of Stage 1.

Information provided to Arcadis by Mirvac indicates that approximately 200,000 m3 of VENM and/or ENM will be imported onto the site to support earthworks undertaken as part of the Stage 1 site redevelopment works.

A preliminary site investigation (PSI) undertaken at the site by JBS&G in January 2019 identified sources of onsite contamination. The PSI identified localised surficial soil impacts at the site, specifically elevated concentrations of copper (Cu) and/or zinc (Zn) above the adopted ecological investigation level (EIL) at seven locations (HA01, HA06, HA08, HA13, HA18, SO01 and SO02),and TRH concentrations above the adopted ecological screening levels (ESL) at HA15. Staining was also reported around the transport at HA01, however TRH concentrations were below the adopted assessment criteria. Trace level friable asbestos fines were identified at one location (HA13). The friable fibres were concluded to have been liberated due to weathering or physical degradation of the bonded fibre board. A detailed summary of the PSI findings is included in Section 5.1.

Based on this information the PSI recommended a Hazardous Building Material Survey (HBMS) be undertaken prior to demolition of existing site structures and a DSI be conducted.

The HBMS subsequently identified the presence of hazardous material (ACM, lead paint and synthetic mineral fibre) in approximately seven groups of structures across five lots.

A DSI was subsequently conducted by Arcadis in late 2019 and is summarised in Section 5.2 of this report. The DSI concluded remediation is required for:

- Shallow surface (0.0-0.1 mbgl) Zn contamination at HA06, HA18, SO01 and SO03.
- Zn contamination was also reported at HA08 and HA13, however the depth of impact is unknown.
- HA01 for Cu, Zn and staining.
- TRH contamination to a depth of 0.6 mbgl at HA15.
- Remediation is also required to remove surface fragments of asbestos containing material (ACM) at Lot 57 and Lot 58; a buried, redundant asbestos pipe (350 m long) on the boundary of Lot 56 and Lot 57.
- Appropriate management of asbestos is also required during building demolition.

The DSI also recommended additional sediment sampling to characterisation of sediments of the five dams on site (Dam01 to Dam05) once the dams have been dewatered in accordance with the DDS (Arcadis, 2020b).

Anthropogenic plastics in the form of black plastic and plastic irrigation piping was observed within the market garden areas. This aesthetic issue is proposed to be addressed as part of the general site clearing works.

## 1.3 Objective

The aim of this RAP is to provide a plan of activities, procedures and objectives to facilitate the effective and controlled remediation of the site for localised surface ACM, shallow Cu and/or Zn, and hydrocarbon hotspots, as well as the remediation of a redundant buried asbestos pipe and hazardous material identified in existing structures onsite, and further characterisation of the sediments of Dam01 to Dam05 post dewatering.

The RAP describes the procedures and standards to be followed during remediation to facilitate successful remediation / management of the site for the above mention contamination and for the protection of human health and the environment.

## 1.4 Scope of Works

Arcadis completed the following scope of work during the preparation of this RAP:

- Review of historical investigations and data.
- Develop a methodology to appropriately characterise the sediments of the five dams onsite.
- Identified the hotspots and sources of contamination requiring management or remediation based on the outcomes of previous investigations.
- Documented the site remediation goals and management criteria.
- Completed an assessment of management and remediation options.
- Identified and documented a recommended remediation and/or management strategy for the site.
- Developed and outlined a site validation strategy.
- Documented the licences, approvals, procedures, and standards that apply to the remediation, validation, and monitoring of the site.
- Outlined remediation contingency and emergency response measures.
- Identified outstanding data gaps and recommendations for further assessment.
- Prepared a remediation action plan (this report) in accordance with the NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Sites.

# 2 LIMITATIONS

The findings of this report are based on the Scope of Work described in this report. Arcadis performed the services in a manner consistent with the level of care and expertise exercised by members of the environmental profession.

No warranties, express or implied, are made. Subject to the Scope of Work, Arcadis' assessment is limited strictly to identifying typical environmental conditions associated with the subject property.

While normal assessments of data reliability have been made, Arcadis assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Arcadis, or developments resulting from situations outside the scope of this project.

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Information from samples collected by Arcadis or historical data reviewed relating to soil, groundwater, waste, air or other matrix conditions in this document is considered to be accurate at the date of issue. Surface, subsurface and atmospheric conditions can vary across a particular site or region, which cannot be wholly defined by investigation. As a result, it is unlikely that the results and estimations presented in this report will represent the extremes of conditions within the site that may exist. Subsurface conditions including contaminant concentrations can change in a limited period of time and typically have a high level of spatial heterogeneity.

From a technical perspective, there is a high degree of uncertainty associated with the assessment of subsurface, aquatic and atmospheric environments. They are prone to be heterogeneous, complex environments, in which small subsurface features or changes in geologic conditions or other environmental anomalies can have substantial impact on water, air and chemical movement.

Arcadis' professional opinions are based upon its professional judgment, experience, and training. These opinions are also based upon data derived from the limited testing and analysis described in this report. It is possible that additional testing and analysis might produce different results and/or different opinions. Arcadis has limited its investigation(s) to the scope agreed upon with its client.

That standard of care may change and new methods and practices of exploration, testing and analysis may develop in the future, which might produce different results.

# 3 SITE IDENTIFICATION

The site identification details for Aspect Industrial Estate, located at Lots 54 to 58 Mamre Road, Kemps Creek have been prepared in general accordance with the NSW EPA (2020) *Guidelines for Consultants Reporting on Contaminated Sites* and the NEPM (2013) Field Checklist 'Site Information' sheet and are provided in Table 3-1 below.

*Table 3-1 Site identification*

| Item | Details |
|---|---|
| Address | 804-882 Mamre Road, Kemps Creek, NSW, 2178 |
| Lot and plan | Lots 54 to 58 DP259135 |
| Local government area | Penrith City Council |
| Current land use | Rural residential properties |
| Current zoning | IN2: General Industrial |
| Trigger for assessment (Proposed land use) | Site is proposed to be redeveloped to an industrial and/or commercial land use (employment purposes) |
| Site coordinates to the approximate centre of the site (Geographic) | Latitude: -33.842987<br>Longitude: 150.784934 |
| Land area ($m^3$) | Approximately 563,000 $m^2$ (57 ha) |
| Locality map | Figure 1, Appendix A |
| Site layout map | Figure 2, Appendix A |
| RAP remediation requirements | Figure 3, Appendix A |

An overview of the site condition and surrounding environment is provided in Section 4. Site history information is provided in Section 5.

## 3.1 Current Site Use

The site was historically used for light agricultural purposes (i.e. grazing, historical dairy farming, poultry farming and horticulture). Arcadis understands, the site was purchased by Mirvac Projects Pty Ltd to be redeveloped into an industrial/commercial property for employment purposes.

## 3.2 Proposed Site Use

The site is proposed to be redeveloped into a warehouse and distribution centres, including 11 warehouse and office combined compounds. Figure 1, Appendix B shows the proposed future Lot layout of the site.

Bulk earthworks, including both cutting and filling of the site, will be required as part of the proposed industrial development. A geotechnical investigation (PSM, 2019) and bulk earthwork specification (PSM, 2020b) for the proposed development indicate:

Cut depths will extend up to approximately 10 m. Topsoil will be stripped and blended at a ratio of 1:8 for use as fill material.

- Fill depths will extend up to approximately 10.0 m.

  - Where fill is proposed to be greater than 1.0 m, it is anticipated the topsoil will remain.
- Existing dams will be drained and sediment at the base excavated and removed prior to filing; as per the Dam Decommissioning Strategy.
- Blended Topsoil shall not be placed within 3.0 m of the final bulk earthworks level.
- Figures 2 to 4, Appendix B illustrate the anticipated cut and fill requirements for the proposed redevelopment.
- The final layout and occupants of Aspect Industrial Estate had not been determined at the time this report was developed.

## 3.3 Surrounding Land Use

The following current land uses have been identified immediately surrounding the site:

- North – rural residential properties,
- South – rural residential properties, market gardens
- East – rural residential properties
- West – Mamre road, with rural residential properties located immediately west of Mamre Road

# 4 SITE CONDITION AND SURROUNDING ENVIRONMENT

## 4.1 Topography

The site slopes down to the south west and has an elevation of approximately 37 to 50 m relative level to the Australian Height Datum (RL mAHD). The site exists within a generally flat alluvial plain with localised undulating rises/falls, generally sloping toward Kemps Creek/South Creek to the west.

## 4.2 Geology

The 1:100,000 Geological Survey of NSW map of Sydney indicates the site is underlain by Bringelly Shale of the Wianamatta Group. This is described as comprising shales, carbonaceous clay, laminate and coal.

The eSPADE NSW Soil and Land Information database indicates the site is underlain by Blacktown and Luddenham Soil Landscapes.

The soils encountered during the 2019 DSI fieldwork aligned with the above descriptions and were described as:

- Fill material generally comprising topsoil and brown silty clay to a typical depth of 0.2 m below ground level (mbgl) and a maximum depth of 1.2 mbgl (in TP110 and MW01); and
- Natural material generally comprising slightly stiff, orange to brown clay with grey mottling turning into grey to brown weathered shale.

## 4.3 Hydrogeology

Groundwater is present within the Bringelly Shale. Typically, the Bringelly yields low volumes of saline groundwater, which is consistent with groundwater physico-chemical observations in DSI (salinity ranged between 14,068 µS/cm to 25,598 µS/cm). Shale generally has low water transmitting properties, displaying a very low primary porosity with most of the flow being via saturated structural features such as fractures, joints and laminations. Groundwater can be perched at the base of the weathered soil profile along the interface with fresh bedrock. The regional aquifer within the shale is often confined or partially confined and rises once intersected in a borehole.

A review of NSW Department of Primary Industries Office of Water records for groundwater bores within a 2,000 m radius of the site did not identify groundwater boreholes around the site. This is consistent with the groundwater within the shale being of moderate salinity, low yielding and a general abundance of surface water.

During the DSI, groundwater was encountered within the shale between 6.0 m and 11.5 mbgl in a confined aquifer, with water level returning to 2.5 – 9.5 m below top of casing (mTOC) (Arcadis, 2020). Groundwater flow was identified to be in a north west direction, towards South Creek (Figure 2, Appendix A).

## 4.4 Hydrology

The DSI identified five dams across the site which were primarily used for stock watering and irrigation (Arcadis, 2020). The site is predominately surfaced with grass cover, and as such, it is anticipated surface water generated during periods of rainfall will likely infiltrate at a rate reflective of the silty clay topsoil permeability (Arcadis, 2020). During periods of heavy or prolonged rainfall, excess water is likely to result in overland flow and traverse south-west towards Kemps Creek, following the topographic gradient. A portion of the overland flow is also likely to be captured by the existing onsite dams.

The nearest surface water bodies include several small dams in the neighbouring properties and Kemps Creek, which is located approximately 600 m to the west of the site. Kemps Creek drains into

South Creek approximately 900 m west of the site, before ultimately discharging into the Hawksbury River located approximately 26 km north of the site.

## 4.5 Acid Sulfate Soil Risk

Acid sulfate soils (ASS) are generally associated with low-lying coastal areas, including estuarine flood plains, rivers and creeks.

The PSI states the location and elevation of the site (greater than RL 40 mAHD) are such that the likelihood of ASS within the study area (i.e. the site) is low (JBS&G, 2019).

Salts are naturally present in soil, bedrock and groundwater. In western Sydney salts naturally occur within the Ashfield Shale and are mobilised in the subsurface by the movement of groundwater. When saline groundwater is present close to the surface the salts can precipitate on the ground as the saline groundwater is drawn to the surface by fluctuating water tables combined with capillary action. Seepage of saline groundwater can cause corrosion of building materials, inhibit growth of most plant species except for highly salt tolerant vegetation, contributing to increased soil erosion. Salinity hazard mapping indicates the site is of moderate salinity potential due to the site being located on Ashfield Shale (DIPNR, 2012). Off site adjacent to drainage lines the salinity potential is considered high as the saline groundwater becomes shallower with an increased potential of the water table intersecting the ground surface.

# 5 SITE HISTORY

A detailed report on the site condition (Lots 54 to 58 DP 269135, rural residential), surrounding environment (rural residential), and site history is presented in the PSI (JBS&G, 2019) and DSI (Arcadis, 2020).

A summary of the findings from the PSI and subsequent DSI are presented below.

Current site layout including areas of environmental concern (AEC) identified during the PSI and DSI are presented in Figure 2, Appendix A.

## 5.1 Preliminary Site Investigation (JBS&G, 2019)

A PSI with limited soil sampling was conducted by JBS&G in January 2019 and is summarised in Table 5-1 below.

Figure 1, Appendix C, summarise the PSI exceedances.

*Table 5-1 Summary of PSI (JBS&G, 2019)*

| Item | Details |
|---|---|
| Sources of potential contamination | • Pesticides/herbicides used in former and current market gardens.<br>• Potential biological impacts from livestock/poultry farming.<br>• Potential use of hazardous building materials (asbestos, lead based paints, Polychlorinated Biphenyl (PCB)) in historic and current site structures resulting in localised impacts to soils in proximity to the location of site structures.<br>• Potential hydrocarbon and pesticide contamination from the storage of materials and consumables at various locations across the site area (former and current sheds).<br>• Fill materials of unknown origin.<br>• ACM in irrigation lines (conduits). |
| Limited soil investigation | Included a total of 38 locations across the site: 29 soil boreholes, two test pits and seven stockpiles |
| Limited soil investigation results | • Benzene, toluene, ethyl benzene, xylenes and naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAH), and organochlorine/organophosphate pesticides (OC/OP) concentrations were below the laboratory Limit of Reporting (LOR) and adopted assessment criteria.<br>• Zn concentrations in surface soil samples (0.0 – 0.1 mbgl) at HA01, HA06, HA08, HA13 and HA18, and Cu concentrations in HA01 (0.0 to 0.1 mbgl) exceeded the EIL. Heavy metal contamination was generally associated with existing structures or areas of stored anthropogenic materials. Elevated concentrations were most likely due to cross-contamination. The heavy metal contaminations were noted to pose a potential (unacceptable) risk to ecological receptors on site, however, did not pose a risk to human health (JBS&G, 2019).<br>• Elevated TRH concentrations at HA15 in the surface sample (0.0 to 0.1 mbgl) exceeded the NEPM (2013) management limits and adopted ESLs for TRH factions $C_{10}$ - $C_{40}$. Surface staining was limited to an area of approximately 1 $m^2$ and may pose a potential ecological risk (JBS&G, 2019). Further investigation is required.<br>• '*Anthropogenic materials at some locations were present in quantities that may pose an aesthetic concern for sensitive land uses. However, noting the proposed land use (commercial/industrial), these materials may be retained beneath hardstand without any further management*' (JBS&G, 2019). JBS&G (2019) noted '*the impacts identified were typical of the low risk historical land uses that occurred at the site*'.<br>• Two representative fragments of fibre sheet board collected from site structures did not test positive for detectable asbestos.<br>• Trace level friable asbestos fines (Chrysotile) was identified at HA13. HA13 was collected within close proximity to the fibre sheet board which clad the walls of an adjacent site structure. The board was observed to be 'fragmented and in poor condition' (JBS&G, 2019). |

| Item | Details |
| --- | --- |
| | – Laboratory calculated % weight/weight (%w/w) concentrations were below the adopted heath screening levels (HSL) for asbestos fines (FA) and laboratory LOR. The PSI concluded the AF detection in the soils was likely due to weathering or physical degradation of the bonded fibre board resulting in the liberation of fibres. |

The PSI concluded:

- Whilst the investigation identified localised surficial soil impacts at the site, the investigation did not identify widespread contamination which may preclude future redevelopment of the site.
- Identified soil impacts are considered representative of common contaminants and historical land use activities which can be readily dealt with during the Development Application (DA) stage for redevelopment and assessment for site suitability.
- JBS&G recommended that a HBMS be undertaken prior to demolition of existing site structures.

## 5.2 Detailed Site Investigation (Arcadis, 2020)

A DSI was conducted by Arcadis between October and November 2019 to address recommendations of the PSI and associated data gaps. To achieve this, the DSI was completed in two phases. Table 5-2 below summarises the two phases and key results of the DSI.

Figures 2 to 7, Appendix C summarise the soil, sediment, asbestos, water and waste classification exceedances reported in the DSI.

*Table 5-2 Summary of DSI (Arcadis, 2020)*

| Item | Details |
| --- | --- |
| Phase 1 | <u>Soil</u><br>• Soil sampling included the excavation of 15 test pits and six soil bore holes which were converted to six groundwater monitoring wells. A total of 46 surface soil samples were submitted on laboratory analysis for the following contaminants of potential concern (CoPC):<br>– Total recoverable hydrocarbons (TRH).<br>– Benzene, toluene, ethyl benzene, xylenes and naphthalene (BTEXN).<br>– Polycyclic aromatic hydrocarbons (PAH).<br>– Eight priority heavy metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc).<br>– Organochlorine/organophosphate pesticides (OCP/OPPs), polychlorinated biphenyl (PCBs) – surface soils only.<br>• Analysis of three surface soil samples near fence posts for heavy metals.<br><u>Water</u><br>• One groundwater monitoring event across the six groundwater monitoring wells and surface water sampling of five onsite dams for: TRH, BTEXN, PAHs, eight heavy metals, OCP/OPPs, PBCs. and phenolics (total).<br>• Aquifer hydraulic conductivity testing of two groundwater monitoring wells. |
| Phase 2 | <u>Soil</u><br>• Vertical delineation of HA01, HA06, HA18 for Cu and/or Zn ecological investigation level (EIL) exceedances identified in the PSI.<br>• Two soil cores (HA15B and HA15C) extended to vertically delineate TRH contamination identified to exceed the PSI EIL. |

| Item | Details |
| --- | --- |
| | • Five soil samples (SO01- SO05) collected from fence post stockpiles were analysed for halogenated and non-halogenated phenol analysis to close out a data gap.<br><br>Sediment<br><br>• Analysis of sediment samples from five onsite dams for: TRH, BTEX, PAH, OPP/OCPs, PBCs, and eight heavy metals.<br><br>Water<br><br>• A limited GME was conducted to close out a VOC data gap. |
| Summary of key Soil results | Soil exceedances of the adopted assessment criteria included:<br><br>• MW02_2.0: Benzo(a)Pyrene – ESL-D.<br><br>• HA15B 0.05, 0.15 and 0.6 mbgl: F2 TRH fraction – ESL -D.<br><br>– Depth of contamination was vertically delineated to a maximum depth of 0.8 mbgl.<br><br>• HA15B-0.6: TRH fraction C10 – C16 - ESL – D.<br><br>• SO01 and SO03: Zn concentrations – EIL.<br><br>• No potential asbestos contaminated material was observed within the fill and natural soils on site.<br><br>Sediment exceedances of the ANZECC (2000) Interim Sediment Quality Guideline Trigger Values - ISQG-Low were recorded for:<br><br>• DS01 and DS02: As marginally exceeded.<br><br>• QA5 (DS02): Pb marginally exceeded.<br><br>• DS05: Ni concentrations approximately 2x ISQG-Low.<br><br>Potential ACM<br><br>No potential ACM (PACM) was observed on roads or open paddocks.<br><br>Fragments of PACM on surface soils surrounding buildings reported detectable asbestos.<br><br>Fibre board sheeting (intact) dumped on site did not report to contain asbestos. |
| Indicative waste classification: | Fill and soils encountered during intrusive works indicate material may be suitable for disposal as CT1 'General Solid Waste' (GSW) under the NSW EPA (2014) Waste Classification Guidelines, except for:<br><br>• SO01: Ni,<br><br>• MW02_2.0: Benzo(a)pyrene. |
| Summary of key water results | Groundwater exceeded the adopted DGVs and GILs for:<br><br>• Cd - MW03 and MW04,<br><br>• Cu - MW03,<br><br>• Zn - MW02, MW03, MW04 and MW06.<br><br>These results are believed to most likely be representative of background values.<br><br>Surface waters reported analytes below the adopted criteria, however, physico-chemical parameters exceeded the adopted guidelines for pH and EC. |

The DSI concluded:

- There was no gross or substantial contamination identified at the site.
- To confirm the suitability of the site from a contamination perspective for the proposed development as an industrial estate, the following will be required:

  - Further investigation or management/remediation of the F2 contamination identified at HA15B.
  - Further investigation or management/remediation of the Zn contamination identified at HA06, HA08, HA13 and HA18.
  - The removal of identified surface ACM on Lot 54 and the issuing of a validation report.
  - Appropriate management of asbestos during building demolition.
  - Appropriate management of Zn concentrations at SO01 and SO03 which exceeded the adopted EIL indicating a potential ecological risk.
- No sampling was undertaken within building footprints. An assessment of the building footprints may be undertaken when these locations are accessible.

The DSI made the following recommendations for the site are made:

- Develop of a RAP for asbestos, Zn and F2 contamination identified, unless risks can be managed via other measures. The RAP is to include provision to managing building footprint validation.
- Surface asbestos requires removal by a licenced asbestos removal contractor and a clearance certificate issued by an appropriately qualified occupational hygienist.
  - Arcadis recommends this work is undertaken after the demolition of onsite structures which may contain ACM.
- If buildings are demolished appropriate management of inbuild asbestos will be required. Recommended asbestos is removed from the buildings prior to demolition. Validation of the build footprints may still be required.
- The site unexpected finds protocol (UFP) is to be implemented during works on site. The UFP is to include visual and/or analytical assessment of the materials below the building footprints after demolition.
- Structures on site and waste material is to be assessed as part of a HAZMAT survey and an asbestos register developed for the site to identify current and potential sources of contamination during development works.
- Assumed a construction environmental management plan (CEMP) will be developed for the proposed works at the site. The CEMP may include DSI findings to appropriately manage the risks identified in the conceptual site model (CSM).
- On-site surface water is to be measured after a significant rainfall event and compared to the observations in this DSI, to assess the potential contributions (surface material leaching, groundwater impact, evaporation) to observed water quality for dam dewatering purposes.
- Additional sediment sampling is recommended to be conducted once dams have been dewatering to appropriately characterise the material.

## 5.3 PSI and DSI Data Gaps

The following data gaps have been identified based on a review of the PSI and DSI and may be addressed as part of the RAP:

- HA08 and HA13 were not vertically delineated during the DSI due to refusal on dense geology and the presence of livestock respectively. Vertical delineation required as part of RAP.
- Horizontal delineation of HA01, HA06, HA08, HA13, HA15 and HA18 no completed as part of DSI. Horizontal delineation required as part of RAP validation.
- Building footprints have not been validated, as buildings had not been demolished at the time of PSI or DSI.
- Validation sampling will be required as part of RAP.

# 6 CONCEPTUAL SITE MODEL

In accordance with NSW EPA (2020) contaminated land guidelines and NEPM (2013) a conceptual site model (CSM) was developed as part of the DSI (Arcadis, 2020). The CSM has been updated based on the results of the PSI and DSI and further refined to summarise the potential source-receptor pathways that may exist on or off site and which are deemed to pose a potential risk to the environment or human health.

Note only source-receptor pathways that exist or may exist during the proposed remediation and site redevelopment are included.

Potential sources, receptors and pathways of contamination which may pose a risk to human health on site is summarised below in Table 6-1.

## 6.1 Conceptual Site Model Revisions

The CSM is to be reviewed and updated once bulk earthworks have been completed. The CSM will be updated to include details of the unexcepted finds and associated management implemented during the earthworks. The CSM risks will also to be reviewed as part of the update.

Locations where surface levels have remained relatively unchanged and a risk is identified, additional remediation and/or validation may be required. This includes areas where unexpected finds may have been encountered and/or will form the site surface level.

The CSM is to be revised by the Environmental Scientist and potential risk to be discussed with the client and auditor as deemed necessary.

*Table 6-1 Conceptual site model – pre remediation*

| Source / Contaminant | Exposure Pathway | Receptor | Exposure Assessment | Pathway Completeness |
|---|---|---|---|---|
| TRH $C_{10}$ - $C_{40}$ contamination hotspot located at HA15 | Direct contact, incidental inhalation, or ingestion | On site construction and maintenance workers | Concentrations exceeded the adopted NEPM (2013) management limits. The risk posed by the TRH hotspot is limited to onsite construction and maintenance workers who may come into contact (direct, incidental ingestion or inhalation) with the contaminated soil prior to and during remediation. | Complete – remediation or management required |
| | | Future site users | If the TRH contamination hotspot is left in situ, it may also pose a risk to future site users who may come into direct contact or inhale or ingest contaminated material.<br>Development plans indicate HA15 is located within an area proposed to be excavate. | Complete – remediation or management required |
| | | Terrestrial ecosystems on site | TRH $C_{10}$ - $C_{40}$ concentrations exceeded the adopted ESLs, thus pose a potential risk to terrestrial ecosystems. Development plans indicate HA15 is located within an area proposed to be excavate. | Complete – remediation or management required |
| Zn contamination hotpots – SO01, SO03, HA01, HA06, HA08, HA13 and HA18 | Direct contact, incidental inhalation, or ingestion | Terrestrial ecosystems on site | Zn concentrations exceeded the adopted EIL but below the HIL, indicating elevated Zn concentrations may pose a risk to onsite terrestrial ecosystems.<br>Development plans indicate SO03, HA01, HA08, HA13 are in areas proposed to be excavated between 0 to 5 mbgl. Thereby breaking the source-receptor pathway.<br>SO01, HA06, HA13 and HA18 are in areas where approximately 1 – 2 m fill is proposed to be deposited. A potential pathway may still exist. | Complete – remediation or management required. |
| Cu contamination hotspot – HA01 | Direct contact, incidental inhalation, or ingestion | Terrestrial ecosystems on site | Cu concentrations exceeded the adopted EIL but below the HIL, indicating elevated Cu concentrations may pose a risk to onsite terrestrial ecosystems.<br>Development plans indicate HA01 is in an area where excavation is proposed to extend approximately 4 to 5 mbgl. If the material is excavated the source-receptor pathway will be broken. | Complete – management or remediation required |
| Asbestos ACM fragments and ACM building cladding | Inhalation or Ingestion free fibres/dust | On site construction and maintenance workers | ACM impacted soil and buildings clad with ACM poses a low risk to human health provided the material is in good condition, however weathered or degraded ACM poses a risk to human health due to the potential liberation of asbestos fibres or | Complete – remediation required |

| Source / Contaminant | Exposure Pathway | Receptor | Exposure Assessment | Pathway Completeness |
|---|---|---|---|---|
| | | Future site users | which may potentially be released during ACM remediation poses a risk to human health. Free fibres pose a risk to onsite construction and maintenance workers, future users as well as off site residence or workers who may inhale or ingest the fibres. Disturbance of ACM also poses a risk and appropriate management is required. | |
| | | Offsite residents or workers | | |
| Buried asbestos pipe | Inhalation or Ingestion free fibres/dust | On site construction and maintenance workers | Arcadis understands the ACM pipe is currently buried on site at a depth of approximately 0.3 mbgl. Undisturbed and in situ the pipe does not pose a risk to human health as the source-receptor pathway is incomplete. The pipe does however pose a risk to future site users and onsite construction or maintenance workers who may encounter the pipe or potential ACM impacted soil surrounding the pipe. | Potentially complete – remediation or management required |
| | | Future site users | Development plans indicate the eastern portion of the pipe is located within an area proposed to cut to a depth of up to 1 mbgl. Appropriate management and remediation of this area is therefore required. | Potentially complete – remediation or management required |
| | | Offsite residents or workers | Furthermore, Mirvac have indicated the ACM pipe is to be removed as part of the site redevelopment. As such there is the potential for fibres to be liberated during the removal of the pipe which poses a risk to both on and off site workers, and residents. Appropriate management is therefore required. | Potentially complete – remediation or management required |
| Hazardous building materials (SMF, lead paint and ACM) | Direct contact, incidental inhalation, or ingestion | On site construction and maintenance workers, future site users | Undisturbed the hazardous building material does not pose a risk, however as part of the site redevelopment existing structures and buildings on site are proposed to be demolished.<br>Unsafe handling or demolition practices may result in construction/maintenance works or future users of the site to the hazardous material, as well as the spread of contaminants across the site. Appropriate remediation of existing buildings and structure is therefore required | Potentially complete – remediation required |
| Building footprints – contamination status unknown | Direct contact, incidental inhalation, or ingestion | On site construction and maintenance workers | Contamination status of the existing building footings is currently unknown. Undisturbed the material is unlikely to pose a risk to humans or terrestrial ecosystems, however during and post demolition, the footprints will be exposed and may expose potential contaminants. | Potentially complete – further investigation and remediation or management required |
| | | Future site users | | |

| Source / Contaminant | Exposure Pathway | Receptor | Exposure Assessment | Pathway Completeness |
|---|---|---|---|---|
| | | Terrestrial ecosystems on site | | |
| Storage of various materials (such as fuel drums) and consumables | Direct contact, ingestion | Demolition/construction workers, future site users | Demolition and construction workers developing the site will come into contact with potentially contaminated soil. Additionally, future site workers may be directly exposed to potentially contaminated soil via open grass areas. | Potentially complete - managed through a CEMP during construction works. |
| Contaminated surface and groundwater | Direct contact | Demolition/construction workers | Demolition and construction workers developing the site may come into contact with potentially contaminated groundwater during excavation of service trenches or during the decommissioning of on site dams. | Potentially complete – managed through CEMP and existing dam decommissioning strategy |
| Anthropogenic plastics – market gardens | Aesthetic (visual) only | Future Site Users | Fragments of black plastic and irrigation piping present within the market garden areas of Lot 55, 56 and 58, if not addressed during the general site clearing works may pose an aesthetic issue to future site users. | Aesthetic only – complete. Management required during general site clearing works. |
| Dam Sediments | Direct contact, incidental inhalation, or ingestion | Demolition/construction workers, future site users | As and Pb concentrations were recorded above the ANZECC (2000) Interim Sediment Quality Guideline Trigger Values - ISQG-Low in DS01 and DS02, while high concentrations of Ni were recorded in DS05. However only five sediment samples were collected across the five dams due to the presence of water at the time of sampling. Due to the size of the dams, between approximately 2,500 to 33,800 square metres, there is insufficient data to characterise the material and there is the potential for additional impacts to be present below the water line.<br>There is therefore a potential risk to demolition/construction workers and terrestrial ecosystems which may come into contact, including ingestion or inhalation, with the | Potentially complete – further characterisation required. |
| | | Future site users | | Potentially complete – further characterisation required. |

| Source / Contaminant | Exposure Pathway | Receptor | Exposure Assessment | Pathway Completeness |
| --- | --- | --- | --- | --- |
| | | Terrestrial ecosystems on site | sediments when the dams have been dewatered and sediments excavated and landfarmed (spread to dry).<br>If the material is not appropriately characterised and re-used on site it may also pose a risk to future site users. | Potentially complete – further characterisation required. |

# 7 DAM SEDIMENT CHARACTERISATION

## 7.1 Background

Due to the presence of water in the five existing dams onsite (Dam01 to 05) during the PSI and DSI, sediments below the water line were inaccessible. A sediment sample was collected from each dam as part of the DSI and submitted for laboratory analysis for TRH, BTEX, PAH, OPP/OCPs, PBCs, and eight heavy metals (As, Cd, Cu, Cr VI, Hg, Pb, Ni, ZN, to provide an indication of potential contaminants of concern and potential management requirements. Concentrations were generally below laboratory limit of report and/or adopted assessment criteria: ANZECC (2000) Interim Sediment Quality Guideline Trigger Values - ISQG-Low; except for:

- DS01 and DS02: As marginally exceeded.
- QA5 (DS02): Pb marginally exceeded.
- DS05: Ni concentrations approximately 2x ISQG-Low.

Results were also compared against the adopted soil HIL-D and EIL-D assessment criteria to provide an indication of the materials potential for re-use as buried fill on site. No exceedances of the industrial/commercial land use criteria were recorded in the five samples.

In accordance with the DSI, to verify if the dam sediments and embankments are suitable for reuse onsite i.e. to be buried at depth in the infill zones, additional laboratory analysis and assessment is required to appropriately characterise the dam sediments. The following sections details the methodology for characterising the sediments of the five existing onsite dam post dewatering.

Dewatering and manage of the dewatering effluent (dam water) are included in the Dam Decommissioning Strategy (DDS) (Arcadis, 2020b), and as such is not address in this RAP.

## 7.2 Excavation Volumes

Proposed cut and fill requirements for the site are presented in Figure 4, Appendix B. The notes on Figure 4 state *'additional excavation of existing creeks and dams within site area to a depth specified by geotechnical consultant below invert and width of existing creek/dam extent. Depth of dams are to be confirmed in detailed design phase. Excavated material to be farmed and used as general fill within fill zones 1m below final surface (geotechnical engineer to confirm suitability of material)'.* For this RAP, an additional 1 m of excavation below the base and width of the dam has been allowed. As such volumes are indicative only and should be reviewed based on the geotechnical consultants advice.

For the purpose of this RAP, a conservative approach has been applied and the maximum extent of the five dams, based on aerial photographs dated June 2020, when the dams were at capacity (Plate 1) (Nearmap, 2020), was used to estimate potential excavation volumes. In June 2020, Dam02 and Dam03 had combine to form one large dam (approximately 1.26 ha), herein referred to Dam02/03. It is assumed the creek sediments will be excavated and combined with material from the dams. As such, for the purpose of this report the creek and dam sediments have been treated as one and the same (herein referred to as dam sediments).

It is recommended the sediments are land-farmed, if staging allows, in areas where cutting is proposed to occur or infill of more than approximately 3.0 m is proposed. This is recommended in the event contamination hotspots are identified and the material is required to be buried at depth or potentially disposed off-site. If the latter, additional excavation and validation sampling may be required. This will be determined post characterisation sampling and detailed in the sediment characterisation report which will be provided to the Auditor and as such is not included in this RAP. Due to this, the land-farmed sediment must not be moved until approval has been received from the Auditor.

Based on the above information, indicative in situ sediment volumes have been calculated and are presented below in Table 7-1.

*Table 7-1 Estimated in situ dam sediment volumes*

| Dam ID | Approximate Area $m^2$ (ha) | Excavation depth (m) | Estimated in situ volume $m^3$ exc. Bulking factor |
|---|---|---|---|
| Dam01 | 33,850 (3.38) | 1.0 | 33,850 |
| Dam02/Dam03* | 12,607 (1.26) | 1.0 | 12,607 |
| Dam04 | 2,467 (0.25) | 1.0 | 2,467 |
| Dam05 | 5,297 (0.53) | 1.0 | 5,297 |

*Note: The volumes presented below in Table 7-1 are indicative only, final volumes will be determined at the time of excavation.*


Plate 1: Aerial photograph obtained from Nearmap (2020) used to estimate excavation volumes.

## 7.3 Sampling Objective

The sampling objective is to characterise the material to ascertain if it is suitable, from a contamination perspective, for re-use onsite as buried infill. The objective of this investigation does not include waste classification analysis. In the event sediment characterisation results indicate the dam sediments or part thereof, is not suitable for re-use on site, waste classification will be conducted separately and the reported accordingly to the Auditor.

## 7.4 Sampling Strategy and Methodology

### 7.4.1 Sampling Strategy

Based on the information below, a judgemental sampling regime is deemed suitable to characterise the sediments:

- DSI soil results for the wider site indicate contamination is largely limited to Cu or Zn hotspots, a TRH hotspot and hazardous building materials (SMF and ACM). Except for the TRH hotspot and building materials, the heavy metal exceedances were of the site specific EIL only. No heavy metal exceedances of the HIL-D or ESL were recorded.
- Dam water quality results from October 2019 were below the adopted assessment criteria.
- The dams are primarily fed by surface runoff during rainfall events meaning accumulated sediment is likely from onsite sources.
- Historical site use has been restricted to rural agriculture.
- The material is anticipated to be homogenous.
- The purpose of the investigation is to identify if the material is suitable to be farmed i.e. dried and used as deep fill (at depths greater than 2.0 m below final surface) in locations where infill is proposed (Figure 4, Appendix B).

The above sampling strategy assumes, based on previous sampling results for the site, that contaminant concentrations are likely to be low and consistent. In the event sediments are not homogenous or high contaminant concentrations are encountered during the excavation of sediments this strategy should be revised and approved by the Auditor.

Table 7-2 below summarises the proposed sampling density for each dams' sediments. This sampling density assumes that each dams' sediments will be farmed separately. As the final burial depth will largely depending on the sediment characterisation results and staging of works on site, a sampling contingency has been incorporated into the sampling strategy. Sufficient samples to allow for statistically analysis (95% UCL) to be conducted on each dam will be collected as per NEPM (2013). However, only a portion of the samples will initially be analysed. For the larger dams (Dam01, Dam02/03) a minimum of 30% of the samples collected will be analysed, this will provide a sampling density of approximately 1:750 m$^2$. For the two smaller dams a minimum of 50% of the samples will initially be analysed or a ratio of 1: 500 m$^2$.

*Table 7-2 Dam sediment sampling requirements*

<table>
<tr><th rowspan="2">Dam ID</th><th rowspan="2">Approximate Area m$^2$</th><th colspan="4">Number of samples</th></tr>
<tr><th>Statistical analysis<br>95% UCL $_{ave}$ (1:250 m$^2$)</th><th>Initial Laboratory Analysis</th><th>Samples on Hold</th><th>Inter/Intra laboratory sampling requirements</th></tr>
<tr><td>Dam01</td><td>33,850</td><td>135</td><td>45 (33% or 1:750)</td><td>90</td><td rowspan="4">11 (total)<br>4 (initial screen)</td></tr>
<tr><td>Dam02/Dam03*</td><td>12,607</td><td>50</td><td>17 (30% or 1:750)</td><td>33</td></tr>
<tr><td>Dam04</td><td>2,467</td><td>10</td><td>5 (50% or 1:500)</td><td>5</td></tr>
<tr><td>Dam05</td><td>5,297</td><td>20</td><td>10 (50% or 1:500)</td><td>10</td></tr>
</table>

### 7.4.2 Sampling Methodology

Due to safety concerns associated with the stability of the dam sediments post dewatering, sampling is proposed to be conducted once the material has been excavated and land-farmed.

Prior to commencing work on site a Safe Work Method Statement (SWMS) will be developed in accordance with Occupational Health and Safety requirements for field staff undertaking the sampling and updated as deemed necessary.

Soil sampling will be conducted in general accordance with Australian Standard 4482.1-2005 Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil – Part 1: Non-Volatile and Semi-Volatile Compounds and Arcadis 'Standard Operating Procedures' for soil sampling and logging.

At the time of writing, the staging of works and proposed landfarming location(s) had not been established. However, the following sampling methodology will be undertaken:

- The sediment from each dam should be spread out separately and location tracked i.e. surveyed and mapped.
- Sediment will be visually inspected via a walkover by a suitably qualified environmental scientist. The aim of the walkover is to identify any visible areas of potential contamination or irregularities in material type.
- Where irregularities or potential contamination hotspots are visually identified a representative sample will be collected for laboratory analysis and screened for VOC's with a PID. The location GPS coordinates, and soil description will be recorded on the field sheet, as well as approximate size of the potentially impacted area. Photographs of the samples will also be taken for later reference if needed.
- Once potential hotspots have been sampled, the remaining sample locations will be spread across land-farmed sediment.
- Each sample will be collected:
  - Using new nitrile powder free gloves and decontaminated trowel (if needed) between each sample location.
  - From below the landfarmed sediment surface at a depth of between 0.05 and 0.25 m.
  - Directly into pre-labelled, laboratory supplied glass jar(s) and placed directly into a chilled (ice or ice block) esky. The following details will be recorded on each sample jar: sampler initials, unique samples identification code i.e. Dan01-1, Dam02/03-1, job number, date/time of sampling and sample depth.
  - QA/QC sampling locations will also be recorded on the field sheet.
  - A representative sample will also be collected in a zip lock plastic bag for screening with a PID for detection of VOCs.
  - Logged in accordance with USCS classification, including any signs of staining, presence/absence of odour etc.
- Field duplicate/triplicate (Inter/Intra laboratory duplicate) will be collected at rate of 1:20 primary samples in accordance with AS4482.1 (2005).
- The PID must be calibrated with isobutylene gas and fresh air zero at the start of each day and fresh-air zeroed after every 1:100 primary sample or as deemed necessary i.e. after a high level reading.
- All samples are to be submitted for the following analysis to a NATA accredited laboratory:
  - TRH.
  - BTEXN.
  - PAH.
  - Eight heavy metals: As, Cd, CrVI, Cu, Pb, Hg, Ni, Zn.
  - OCP/OPPs.

- Samples are to be transported within 24 hours of sampling to the laboratory in chilled eskys that must be accompanied by a Chain of Custody. The Chain of Custody should include: the name of the sampler, sample identifier, sample matrix, collection date, analyses to be performed, sample preservation method, sample release date and be signed by the environmental scientists submitting the samples for analysis.

### 7.4.3 Quality Control / Quality Assurance

As per the DSI, the quality control/ quality assurances will be collected during the sediment sampling program:

- Field blind replicates (duplicate and triplicate samples). Duplicate samples will be collected at a rate of 1:20 primary samples submitted for analysis. Triplicate samples will also be collected at a rate of 1:20 primary samples submitted for analysis to a different laboratory.
- Field rinsate samples (daily final rinse water collected following the decontamination of sampling equipment after sampling) to check for any cross-contamination from the sampling equipment. If no reusable sampling equipment was used, no field rinsate will be collected.
- Field blanks will be collected at a rate of one sample per event by pouring deionised water supplied by the laboratory through the air into a clean sample container during sampling activities. The field blank samples are used to assess the presence of any airborne contamination that may have occurred and contaminated the sample.
- Trip blank samples consist of a clean sampling container filled with deionised sediment prepared by the laboratory or under controlled conditions that is taken to site along with the other sampling containers. The trip blank container is not opened on site and is then returned to the laboratory at the end of the day for analysis. Trip blanks assess the presence of contamination that may have occurred as a result of the storage and transport of the sample.

## 7.5 Assessment Criteria

Sediment results will be compared against the same assessment criteria adopted during the DSI (Arcadis, 2020). A summary of the assessment criteria is presented below. For full details pertaining to the adopted assessment criteria, including parameter specific assessment criteria refer to Section 4 of the DSI (Arcadis, 2020).

### 7.5.1 Sediment Assessment Criteria

The following sediment assessment criteria were selected:

- ANZG (2018) Interim Sediment Quality Guideline Trigger Values - ISQG-Low
  - The lower level sediment default guideline values (DGVs) have been selected to indicate the concentrations below which there is a low risk of unacceptable effects occurring (ANZG, 2018).
- ANZG (2018) Interim Sediment Quality Guideline Trigger Values - ISQG-High
  - ISQG-high has been selected to provide an indication of concentrations at which you might already expect to observe toxicity-related adverse effects (ANZG, 2018).

### 7.5.2 Soil Assessment Criteria

The following soil assessment criteria (SAC) were adopted:

- NEPM (1999) Amended 2013, Health Investigation levels (HILs):
  - For this site, the HILs for Soil Contaminants for commercial/industrial land uses were adopted (HIL D). This scenario was selected to provide risk-based assessment on the development as an industrial estate. The HILs are applicable for assessing human health risk via relevant pathways of exposure.
- NEPM (1999) Amended 2013, Health Screening Levels for soil vapour intrusion (HSLs) Clay:

- HSL D (commercial/industrial) are adopted to evaluate the risk posed from vapour intrusion. The soil HSLs are based on depth of impacts, overlying soil type and land use. The selection of HSL-D was based on the intended use of the site, the potential receptor/s onsite and the exposure that may be experienced. After a review of subsurface conditions, the predominant soil type is clay at site locations with a depth greater than two meters.

- NEPC (1999) amended 2013, Management Limits (MLs):
  - MLs have been adopted to assess the presence of hydrocarbons within soil. The Commercial/industrial, fine soil MLs have been adopted.
- NEPM (1999) Amended 2013, Ecological Screening Levels (ESLs):
  - ESLs for commercial/industrial have been adopted to evaluate the risk of selected petroleum hydrocarbon compounds and TPH fractions to terrestrial ecosystems. ESLs are generally applicable to the top 2m of soil. Arcadis have adopted the 'fine' soil assessment conditions.
- NEPM (1999) Amended 2013, Ecological Investigation Levels (EILs):
  - Site-specific EIL criteria were calculated as part of the PSI and have been adopted for this DSI. The adopted EILs, presented below in Table 7-3, and will be used to assess the risk of selected metals and organic substances risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and land use scenarios and generally apply to the top 2 m of soil. The commercial/industrial criteria has been adopted based on the proposed land use.

*Table 7-3 PSI site specific EILs*

| Investigation Levels | | | |
|---|---|---|---|
| Contaminant | ABC | ACL | EIL |
| | | Commercial / Industrial | Commercial / Industrial |
| Arsenic[3] | Not Applicable | 160 | 160 |
| Chromium (III) | 11 | 310 | 321 |
| Copper | 23 | 85[1] | 108 |
| DDT[3] | Not Applicable | 180 | 180 |
| Lead | 161 | 1800 | 1961 |
| Naphthalene[3] | Not Applicable | 170 | 170 |
| Nickel | 5 | 55 | 60 |
| Zinc | 105 | 110[2] | 215 |

[1] Selected utilising the CEC value to determine the most conservative ACL.
[2] Selected based on value for pH and CEC resulting in the most conservative ACL.
[3] Generic EIL

*Source: JBS&G (2019) PSI, page 21.*

## 7.6 Reporting Requirements

### 7.6.1 Initial result review

Upon receipt of the initial sediment characterisation results, the results will be assessed against the adopted assessment criteria. In the event the initial results indicate the presence of a hotspot or need for additional analysis, the Auditor will be contacted, and the proposed analysis and/or additional sampling methodology discussed.

### 7.6.2 DSI Addendum

A brief addendum to the DSI will be complied and submitted to the auditor for comment upon receipt of all sediment characterisation results A response should be received from the Auditor prior to works associated with the dam sediments progressing on site.

The addendum report is to be prepared in general accordance with the NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (EPA 2020), documenting the works as completed. This addendum will contain information including:

- Summary of the works completed including variations from the initial scope.
- Sampling methodology and locations, including material tracking i.e. photographs and survey results.
- Assessment criteria applied.
- Summary of observations, including photolog, sample descriptions etc.
- Summary of field and laboratory analysis results, including tabulated results and complete laboratory documentation.
- Discussion of results including suitability of material for re-use on site.
- Discussion of proposed re-use locations (if appropriate).
- Recommendations further investigation or analysis required i.e. waste classification (if needed), validation of dam footprints etc.

# 8 REMEDIATION CRITERIA

## 8.1 Remediation Requirements

Based on the results of the PSI and DSI and revised CSM (Table 6-1, Section 6), management or remediation is required for: exceedances of the adopted EIL for Cu and Zn; TRH exceedances of the ESL and management limits; surface ACM; a buried asbestos pipe and hazardous materials within existing structures on site. Staining was also observed at HA01 around the transformer, although hydrocarbon concentrations were below the adopted assessment criteria remediation is to be undertaken.

Details of the remediation requirements identified during the PSI and DSI are summarised below in Table 8-1.

*Table 8-1 Remediation requirements*

| Matrix | Contaminant | Location | Excavation Depth (mbgl) | Remediation Requirement | Comment |
|---|---|---|---|---|---|
| Soil | TRH $C_{10} – C_{40}$ | HA15 – Lot 56 | 0.8 mbgl | Exceed adopted NEPM ESLs and Management Limits | Lateral extent of contamination unknown |
| | Zn | HA06 – Lot 54<br>HA08 – Lot 55<br>HA13 – Lot56<br>HA18 – Lot 56<br>SO01 – Lot 54/55<br>SO03 - Lot 58 | 0.2 mbgl<br>Unknown<br>Unknown<br>0.2 mbgl<br>Unknown<br>Unknown | Exceed adopted EIL | Lateral extent of contamination unknown |
| | Cu, Zn and staining | HA01 – Lot 54 | 0.2 mbgl | Exceed adopted EIL, no visible signs of staining | Lateral extent of contamination unknown.<br>Staining also observed around transform, however TRH concentrations below adopted assessment criteria. |
| | Asbestos (ACM) | Lot 56 and Lot 57 Confirmed ACM<br>PACM in structures – Lots 54-58 inclusive | Surface | ACM fragments is soil exceed NEPM (2013) ACM guideline value<br>PACM – removal prior to building demolition | -<br>- |
| | Asbestos (pipe) | Lot 56 and Lot 57 | 0.5 mbgl | Excavation and disposal to remove risk. | Client preferred remedial outcome |
| Buildings | SMF, ACM and lead paint | Existing structures across Lots 54 to 58 | Above ground.<br>Potentially surface | Removal by HAZMAT specialist | - |

| Matrix | Contaminant | Location | Excavation Depth (mbgl) | Remediation Requirement | Comment |
|---|---|---|---|---|---|
| Post demolition building footprints | Unknown – potentially ACM, heavy metals, pesticides | Existing building footprints | To be determined (TBD) | TBD | Post demolition footprint sampling required to identify if contamination present and to delineate extent of contamination |
| Anthropogenic Plastics | Fragments of black plastic and PVC irrigation piping | Surface Lot 55, 56 and 58 | Surface | Removal of visible fragments. Burial of residual fragments at depth. | Hard plastics are deemed to be an aesthetic issue and will largely be removed during the sites' general clearing works. Residual fragments not captured during initial clearing works will be buried at depth within the infill areas. |

Where the lateral extent of TRH, Cu or Zn contamination was not delineated as part of the PSI or DSI, the lateral extent may need to be identified as part of the validation works.

Surface water quality exceedances recorded in the existing on site dams will be managed in accordance with the site's dam decommissioning strategy (Arcadis, 2020c); and as such are not addressed in this RAP. The characterisation of dam sediments is presented in Section 7 of this RAP.

## 8.2 Remediation Criteria

The remediation criteria have been developed with consideration of the following:

- NSW EPA (2020) Guidelines for Consultants Reporting on Contaminated Sites.
- National Environment Protection (Assessment of Site Characterisation) Measure (NEMP, 2013).
- WA DoH (2009) Guidelines for Asbestos-Contaminated Sites in Western Australia.
- The remediation criteria presented in the RAP have been adopted based on an assessment of the:
  - Proposed land use – Industrial,
  - Exceedances were limited to the ESL, site derived EILs and management limit (commercial/industrial, fine) for heavy metals Cu and Zn; and TRH respectively,
  - Site specific assessment criteria calculated as part of the PSI and DSI, and
  - Mirvac preferred end goal of a contamination free site to enable the future sale of the site or portion of the site without conditions.

Based on the above considerations, remediation criteria have been developed for the site and are presented below in Table 8-2.

The PSI states calculated EILs were derived in accordance with NEPM (2013) guidelines. The calculated EILs have been applied to assess the risk of Cu and Zn pose to terrestrial ecosystems and inform the remediation options and objectives of this RAP. EILs depend on specific soil physicochemical properties and land use scenarios, and generally apply to the top 2 m of soil. As per the PSI and DSI, the commercial/industrial criteria have been adopted based on the proposed land use. For details and calculations pertaining to how the EILs were calculated refer to page 21 of the PSI (JBS&G, 2019).

*Table 8-2 Remediation Criteria*

| Contaminant of Concern | Location | Reference | Remediation Criteria | | Rationale |
|---|---|---|---|---|---|
| TRH $C_{10}$ – $C_{40}$ | HA15 | NEPM (2013) Schedule B1, Table 1B(6) ESLs for TPH | ESL – commercial and industrial, fine | 170 mg/kg (F2)<br>2,500 mg/kg ($C_{16}$ -$C_{24}$)<br>6,600mg/kg ($C_{34}$-$C_{40}$) | TRH concentrations at HA15 exceeded the adopted ESL and management limit, however concentrations were below other assessment criteria. Goal is therefore to reduce concentrations at HA15 to below ESL and management limit or break source-receptor pathway. |
| | | NEPM (2013) Schedule B2, Table 1B (7) Management limits for TPH | Management limits – commercial and industrial, fine | 1,000 mg/kg ($C_{10}$ -$C_{16}$)<br>5,000 mg/kg ($C_{16}$ -$C_{24}$)<br>10,000 mg/kg ($C_{34}$-$C_{40}$) | |
| Zn | HA06, HA08, HA13, HA18 | PSI calculated EIL (JBS&G, 2019) | Commercial and industrial | 108 mg/kg | Zn concentrations exceeded EIL, however was below other adopted assessment criteria. Remediation goal is to reduce Zn concentration below EIL or break source-receptor pathway. |
| Cu, Zn and Staining | HA01 | PSI (JBS&G, 2019) | | 108 mg/kg – Zn<br>215 mg/kg - Cu<br>No visible staining | Cu and Zn concentrations exceeded EIL, however was below other adopted assessment criteria. Remediation goal is to reduce Cu and Zn concentration below EIL or break source-receptor pathway.<br>PSI sampling for HA01 did not recorded elevated concentrations of TRH, however staining was observed around the transformer. Remediation is required to removal all staining. |
| Asbestos (ACM) including ACM fragments and pipe | Lot 56 and Lot 57 Confirmed ACM<br>PACM in structures – Lots 54-58 inclusive | NEPM (2013) Schedule B1, Table 7 Health screening levels for asbestos contamination in Soil | Bonded ACM, - commercial / industrial (HSL-D) | 0.05 %w/w | Clients preferred goal: to removal visible ACM and PACM thereby breaking the potential source-receptor pathway and making the site safe for future site users. |
| | Lot 57 and Lot 58 | | HSL | No visible asbestos for surface soil | |
| Asbestos (friable – FA/AF) | Potentially Lot 54-58 post demolition. | | HSL | 0.001 %w/w | PACM has been identified in existing structures on site. Proposed redevelopment includes the demolition of structures and removal of buried ACM pipe. Remedial works have the potential to liberate friable asbestos. FA/AF HSL will form part of site management and remediation requirements. |

| Contaminant of Concern | Location | Reference | Remediation Criteria | | Rationale |
|---|---|---|---|---|---|
| Post demolition building footprints | Existing building footprints – Lots 54-58 | NEPM (2013) EIL, HIL, HSL and management limits – industrial/commercial | TBD – below NEPM (2013) EIL, HIL, HSL and management limits | TBD – below NEPM (2013) EIL, HIL, HSL and management limits | Post demolition building footprints should be below the adopted NEPM (2013) assessment criteria for an industrial land use, thereby allowing redevelopment of the site to proceed. |
| Anthropogenic plastics – market gardens | Market gardens – Lot 55, 56 and 58 | - | Black irrigation piping and plastics removed from market garden surface. | | Majority of the irrigation pipework and larger pieces of black plastic will be removed during the site cleaning process. Residual fragments will be removed and buried at depth as part of site development works. |

# 9 REMEDIATION OPTIONS

The PSI and DSI identified approximately eight heavy metal (Cu and Zn) and TRH contamination hotspots as well as several ACM impacted areas, including a buried ACM pipe, but did not identify the presence of gross or widespread contamination. Based on the isolated nature of these hotspots, the volumes of contaminated soil material on the site is likely to be relatively small.

The HBMS also identified the presence of hazardous building materials (SMF, ACM and lead paint) which will need to be appropriate managed/remediated prior to demolition.

Anthropogenic plastics in the form of black plastic and plastic irrigation piping was also identified on the surface of the market gardens at Lot 55, 56 and 58 which is proposed to be managed as part of the site preparation and cut/fill works.

## 9.1 Remediation Objectives

The aim of this RAP is to provide a plan of activities, procedures, contingency measures and objectives to facilitate the effective and controlled remediation of the site for localised surface ACM, shallow Cu and/or Zn, and TRH hotspots, as well as the remediation of a redundant buried asbestos pipe and hazardous building materials and anthropogenic plastics.

The objectives of this RAP are:

- Remediate the site to make is suitable for the proposed industrial land use without the need for a long term EMP and notification on Title.
- Remediate the site for Zn contamination at HA06, HA08, HA13, HA18, SO01 and SO03.
- Remediate the site for Cu, Zn contamination and hydrocarbon staining at HA01.
- Remediate the site for TRH contamination at HA15.
- Remediate the site of ACM fragments and PACM cladding.
- Remediate the site of the buried asbestos pipe located along the boundary of Lot 56 and 57 and which extend to DAM01.
- Remediate existing buildings/structures and associated footprints of hazardous material (ACM, lead paint and SMF).
- Remove plastic irrigation piping and fragments from surface of market garden areas in lot 55, 56 and 58.
- Validate building footprints post demolition and remediate as deemed necessary in accordance with this RAP, and associated UFP.
- Validate the remedial works in accordance with the relevant NSW EPA guidelines.
- Make sure material leaving the site is classified appropriately prior to off-site disposal.

## 9.2 Extent of Remediation Required

The lateral extent of the TRH, Cu or Zn contamination was not delineated as part of the PSI or DSI; to provide an indicative volume an area of 3 m x 3 m has been applied to each location. The lateral extent of the material will need to be verified as part of the remediation works i.e. validation sampling. Table 9-1 summarises the estimated volumes for each location.

*Table 9-1 Estimated remediation volumes*

| Location | Max contamination depth (mbgl) | Max excavation depth (mbgl) | Estimated area ($m^2$) | Estimated volume ($m^3$) | Indicative waste classification* |
|---|---|---|---|---|---|
| HA01 (Cu, Zn and staining) | 0.1 | 0.2 | 9 | 1.8 | Restricted solid waste |
| HA06 (Zn) | 0.1 | 0.2 | 9 | 1.8 | General solid waste |
| HA08 (Zn)** | 0.1 (TBC) | 0.2 (TBC) | 9 | 1.8 | General solid waste |
| HA13 (Zn)** | 0.1 (TBC) | 0.2 (TBC) | 9 | 1.8 | General solid waste |
| HA18 (Zn) | 0.1 | 0.2 | 9 | 1.8 | General solid waste |
| SO01 (Zn)** | 0.1 | 0.1 | 9 | 1.8 | Restricted solid waste |
| SO03 (Zn)** | 0.1 | 0.1 | 9 | 1.8 | General solid waste |
| HA15 (TRH) | 0.6 | 0.8 | 9 | 7.2 | Hazardous waste |
| ACM pipe | ~ 200 mm dia, at 0.3 – 0.5 mbgl | 0.5 | 175 (0.5m x 350m) | 87.5 (spoil and ACM pipe) | Special waste |
| ACM fragments | 0.1 | Surface pick | TBD | TBD | Special waste |
| Hazardous materials (existing buildings/structures) – asbestos, lead paint, SMF | NA | NA | TBD | TBD | Special or hazardous waste |

Notes:

* Additional sampling is required to meet NSW EPA sampling density, leachate analysis may also be required

** Vertical extend of contamination unknown, validation sampling sample to confirm approximately remediated

TBC – to be confirm

TBD – to be determined.

## 9.3 Possible Remediation Options

The evaluation of remedial options includes consideration of the preferred hierarchy for site clean-up and/or management as described in Principal 16 of the NEPM and Contaminated Sites Guidelines for the NSW Auditor Scheme (2017). The preferred hierarchy of options for site clean-up and/or management are as follows:

- Option 1: On-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level; and
- Option 2: Off-site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site; or

if the above are not practicable:

- Option 3: Consolidation and isolation of the soil on-site by containment within a properly designed barrier;

- Option 4: Removal of contaminated soil to an approved site or facility, followed, where necessary, by replacement with clean fill; and
- Option 5: Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation, or an appropriate management strategy.

The evaluation of remedial options should consider the constraints applying to the site itself as well as the environmental setting and surrounding land uses. Issues that should be taken into consideration include but are not limited to:

- Technical constraints (technical ability to remove, destroy or reduce (treat), contain or manage the substance(s) causing contamination and restore the relevant environmental values).
- Logistical constraints (such as site access, availability of materials and infrastructure and waste disposal).
- Site management issues that may arise from the preferred method(s).
- Acceptability of preferred method(s) to stakeholders, particularly owners of affected sites and neighbours
- Sustainability, including waste minimisation.

Table 9-2 summarises the remedial options considered capable of achieving the remedial objectives for the Cu, Zn, TRH including staining and/or ACM (fragments and pipe) contamination hotspots and hazardous building material on site.

*Table 9-2 Soil Remediation options screening matrix*

| Option | Discussion | Conclusion |
|---|---|---|
| **<u>General Option 1:</u>**<br>Do nothing | Not considered a viable option as the impacted material is anticipated to be disturbed or exposed during site redevelopment, particularly the ACM fragments, buried ACM pipe and TRH hotspot. Material will therefore pose a risk to construction works as well as future site users.<br>This will result in requirement for an EMP and a notice on the certificate of title. ACM and TRH impacts may result in site being listed as contaminated which does not meet client's objectives.<br>Remediation or appropriate management is therefore deemed necessary for hotspots, asbestos and hazardous building materials. | Not a viable option |
| | **Zn hotspots** | |
| **<u>Option 1:</u>**<br>Excavate material, blend with stripped topsoil and re-use on site as first fill layer within NW corner of proposed Lot 1, under 8 – 10m of fill. | • Sustainable remediation option which breaks source-receptor pathway.<br>• NEPM (2013) states EILs are applicable to the upper 2.0 m of the soil profile. Burying material at a depth greater than 2.0 m therefore removes risk to terrestrial ecosystems. Bulk earthwork specification for the proposed development states 'all blended topsoil shall not be placed within 3.0 m of the final bulk earthworks level' (PSM, 2020b). Furthermore, it is recommended the impacted topsoil from the Zn hotspots (HA06, HA08, HA13, HA18, SO01 and SO03) be used as the first fill layer in the NW corner of proposed Lot 1, where up to approximately 8 m to 10 m of imported fill (Figure 4, Appendix B).<br>• Meets NEPM preferred hierarchy by addressing and managing impacts on site.<br>• No offsite disposal costs, limited impact on construction timeframe or scheduling.<br>• Proposed design includes stripping 150 mm of topsoil for civil construction purposes, however at where hotspots are located 300 mm of topsoil will be stripped, which is an additional 100 mm for most hotspot. Additional excavation is therefore unlikely to be required, except at HA08 and HA13 where impact depth is unknown.<br>• Remediation can be incorporated into current schedule preventing delays. | Preferred option |
| **<u>Option 2:</u>**<br>Excavate and dispose offsite to landfill | • Breaks source-receptor pathway.<br>• Removes potential source off site.<br>• Addition costs associated with waste classification sampling, haulage fees and landfill disposal fees.<br>• Potential time delays. | Least preferred option due to potential delays, additional costs and least sustainable of two options. |
| | **Cu, Zn, and staining hotspot (HA01)** | |
| **<u>Option 1:</u>**<br>Excavate material, blend with stripped topsoil and | • Sustainable remediation option which breaks source-receptor pathway.<br>• NEPM (2013) states EILs are applicable to the upper 2.0 m of the soil profile. Burying material at a depth greater than 2.0 m therefore removes risk to terrestrial ecosystems. Bulk earthwork Specification for the | Least preferred option due to potential delays. |

| Option | Discussion | Conclusion |
|---|---|---|
| re-use on site as first fill layer within NW corner of proposed Lot 1, under 8 – 10m of fill. | proposed development states ‘all blended topsoil shall not be placed within 3.0 m of the final bulk earthworks level’ (PSM, 2020b).<br>• Additional TRH/TPH analysis required under and around generator due to staining, resulting in delays.<br>• No offsite disposal costs.<br>• Proposed design includes stripping 300 mm of topsoil at hotspot locations, and 150 mm across the remainder of the site for civil construction purposes.<br>• Remediation can be incorporated into current schedule preventing delays. | |
| **Option 2:**<br>Excavate and dispose offsite to landfill | • Breaks source-receptor pathway.<br>• Removes potential source off site.<br>• Addition costs associated with waste classification sampling, haulage fees and landfill disposal fees. Potential for material to be combined and disposed off site with HA15.<br>• Anticipated volume is small.<br>• Potential time delays.<br>• Use PID and visual inspection to removal all stained material.<br>• Validation sampling not deemed necessary as HA01 proposed to be cut to between 8 mbgl to 10 mbgl and provided all visible staining is excavated and PID readings are low. | Auditor’s preferred option. |
| **TRH hotspot (HA15)** | | |
| **Option 1:**<br>Construct a containment cell onsite and encapsulate the material. Site EMP and notice on title. | • Material will be disturbed during excavation of existing dams on site.<br>• Likely requirement for EMP, notice on title and potential for site to be listed as contaminated.<br>• May requirement remediation later.<br>• Does note meet client’s remediation objective of a clean site.<br>• Notably delays and additional costs associated with constructing containment cell ~ >$50 k.<br>• Estimated volume of material to be remediated is only approximately 7.2 $m^3$ (in situ).<br>• Containment cell may not be geotechnically viable and needs to be appropriately engineered. | Not a viable option |
| **Option 2:**<br>Excavate, collect additional waste classification samples and dispose offsite as hazardous waste or restricted waste | • Small volume of material approximately 7.2 $m^3$ (in situ), equates to approximately 11.5 tonne (clay conversion factor of 1.6).<br>• No EMP or notice on title.<br>• Indicative waste classification: Hazardous material, however additional waste classification to meet NSW EPA sampling requirements including leachate analysis may results in lower revised classification. | Preferred remediation option:<br>• Minimal delays,<br>• Most cost effective. |

| Option | Discussion | Conclusion |
| --- | --- | --- |
| | • Limited delays, material can be excavated and stockpiled on site pending additional sampling.<br>• Potential contamination source removed from site.<br>• Source-receptor pathway broken.<br>• Anticipated disposal cost for hazardous waste classification ~$7.5K plus excavation and haulage fees. | |
| **<u>Option 3:</u>**<br>Excavate, blend with an immobilising agent, resample and dispose offsite at a lower waste classification | In addition to option 2:<br>• Dedicated treatment area.<br>• Additional costs associated with immobilising agent, time delays on site and scheduling, will cost more than disposal offsite.<br>• Still require disposal offsite to landfill, however reduced category i.e. restricted waste or general solid waste. | Least preferred remediation option. |
| | **Buried asbestos pipe** | |
| **<u>Option 1</u>**<br>Excavate and dispose off site as special waste | • Pipe anticipated to be exposed during stripping of the site and construction proposed road which may result in material being spread if not appropriately managed.<br>• Source- receptor pathway broken.<br>• Licence contractor required to appropriate manage excavation and disposal of ACM pipe and conducted validation sampling.<br>• Licenced asbestos removalist will appropriately manage process to make sure risk to personnel on and off site is low.<br>• Dust suppression and air quality monitoring required, including pre (background), during and post remediation.<br>• Meets client remediation objective of a clean site and no risk of material be exposed at a later date or impacting future sale of property.<br>• Estimated volume of material, **excluding** bulking factor, ~87.5 $m^3$ (0.5m x 0.5m excavation x 350 m pipe). Screening material to reduce offsite disposal volume is not deemed viable due to high clay content. | Preferred remediation approach to prevent EMP or notice on title. |
| **<u>Option 2:</u>**<br>Excavate and bury on site in containment cell – unscreened | • Likely requirement for EMP, notice on title and potential for site to be listed as contaminated.<br>• Unscreened estimated excavation volume of 87.5 $m^3$, excluding bulking factor.<br>– Screening material on site will create a large amount of dust and is unlikely to be viable due to high clay content of soil.<br>• May require remediation later.<br>• Does note meet client's remediation objective for a clean site.<br>• Notably delays and additional costs associated with constructing containment cell ~ >$40 k. | Not deemed viable due to potential need for EMP and notice on title. |

| Option | Discussion | Conclusion |
| --- | --- | --- |
| | • Containment cell may not be geotechnically viable and needs to be appropriately engineered. | |
| | **Surface ACM fragments** | |
| **<u>Option 1:</u>**<br><br>Removal via Emu bob and disposal of ACM offsite | ACM fragments were limited to surface soils surrounding existing buildings and three location (ASB01, ASB02 & ASB04) across Lots 57 and 58 (Figure 3, Appendix A), bulk excavation is therefore not necessary. The recommended remediation option is therefore:<br>• Removal of ACM fragments via an Emu bob with raking of the upper 10 cm of the soil surface, as far as practically possible, by an Environmental Scientist and licenced asbestos removalist (if deemed necessary).<br>• ACM risk will be removed with minimal disturbance i.e. dust etc and ACM will be disposed offsite to licenced landfill facility by licenced removalist.<br>• Environmental Scientist will supply validation report and clearance certificate.<br>• Limited delays to site schedule and small disposal costs compared to bulk excavation/disposal. | Preferred remediation option |
| **<u>Option 2:</u>**<br><br>Bulk excavation of topsoil, disposal offsite to licenced landfill facility | • Large volume of material disposed offsite to landfill.<br>• Increased costs due to additional air quality monitoring, landfill levy and equipment hire.<br>• Validation of excavation footprint via Emu bob, potentially including raking, required post excavation.<br>• Increased risk to worker on site and potentially offsite workers/residents.<br>• Dust suppression measures and potentially structured remediation zones required.<br>• Risk of spreading contaminated material, validation of truck routes required. | Least preferred remediation option. |
| | **Hazardous building material –including ACM, lead paint, SMF** | |
| **<u>Option 1:</u>**<br><br>Demolish buildings and dispose off site | • Large risk of spreading contamination resulting in additional delays and remediation costs.<br>• Large volume of demolition rubble to be disposed offsite has special or hazardous material due to cross contamination.<br>• Validation of building footprint and demolition area required. | Least preferred option. |
| **<u>Option 2:</u>**<br><br>Engage HAZMAT specialist to removal HAZMAT from buildings prior to demolition | • Removes hazardous material prior to demolition in a safe and controlled manner.<br>• HAZMAT waste controlled and disposed offsite by HAZMAT specialist and documented.<br>• Reduced risk to construction and demolition workers.<br>• Risk of contamination being spread is low.<br>• Reduced volume of material to be disposed offsite has hazardous material.<br>• HAZMAT specialist will provide report and clearance certification; and validate building footprint. | Preferred remediation option. |

| Option | Discussion | Conclusion |
|---|---|---|
| | • Initial upfront delay to demolition schedule.<br>• Reduced costs. | |
| | **Building footprints – non-hazardous material** | |
| **<u>Option 1:</u>**<br>Post demolition validation | • Targeted soil validation sampling of building footprints post demolition for key CoPC.<br>• Additional remediation as deemed necessary. | Preferred remediation option. |
| | **Anthropogenic Plastics – market gardens** | |
| **<u>Option 1:</u>**<br>Collection and disposal of large fragments during site clearing.<br>Collection and burial of small fragments onsite. | • Aesthetic issue.<br>• Anthropogenic plastics assumed to be restricted to near surface soils of market gardens.<br>• Majority of plastics anticipated to be removed as part of general site clean-up.<br>• Smaller fragments not removed during general site clean-up can captured and buried at depth on site. | Preferred remediation option. |

### 9.3.1 Preferred Remediation Option

With consideration to NSW EPA's endorsed guideline hierarchies for soil remediation options and clean-up objectives (NSW EPA 2017), and the site-specific CoPC, proposed development and environmental setting, the preferred remediation options for the site are summarised in Table 9-3 below.

*Table 9-3 Preferred remediation option*

| Contaminant | Location | Preferred remediation option |
|---|---|---|
| Zn | HA06, HA08, HA13, HA18, SO01 and SO03 | Excavate material, blend with stripped topsoil and re-use on site as first fill layer within NW corner of proposed Lot 1, under 8 – 10 m of imported fill. |
| Cu, Zn and Staining | HA01 | Excavate, collect additional waste classification samples and dispose offsite as restricted waste or potentially general waste based on leachate results. |
| TRH | HA15 | Excavate, collect additional waste classification samples and dispose offsite as hazardous waste or restricted waste. |
| Asbestos pipe | Lot 56 and 57 | Excavate and dispose off site as special waste. |
| Surface ACM fragments | ASB01, ASB02, ASB04<br>PACM soil surface around buildings | Environmental Scientist to conduct via Emu bob and licenced asbestos removalist to disposal of ACM offsite. |
| Hazardous building material –including ACM cladding, lead paint, SMF | Existing buildings/structures – Lots 54-58 | Engage HAZMAT specialist to removal HAZMAT from buildings prior to demolition and validate footprints post demolition. |
| Building footprints – non-hazardous material | Existing buildings/structures – Lots 54-58 | Validation soil sampling post demolition, pre cut/fill works. |
| Anthropogenic plastic – market gardens | Market gardens - Lot 55, 56 and 58 | Large fragments to be removed during site clean-up. Smaller, residual fragments captured and buried at depth during the cut and fill development works. |

To appropriately classify the TRH impacted soil at HA15 and material from HA01 for disposal off site, the material will need to be temporarily stockpiled onsite. As such a construction environment management plan (CEMP) will be required to make sure the impacted material is handled and managed with due consideration of health safety and the environment risks. The CEMP should be site specific and reference the existing unexpected finds protocol (Arcadis, 2020a).

In terms of management of asbestos, an emu-bob and validation of ACM hotspots should be competed in accordance with the WA DoH (2009) Guidelines for Asbestos-Contaminated Sites in Western Australia (endorsed by NEPM) to validate areas where asbestos on the surface has been identified.

Hazardous material from the existing buildings/structures onsite should be managed by a licenced HAZMAT specialist under the supervision of an Environmental Scientist. Certification certificates should be provided prior to the commencement of demolition for each building/structure to verify clearance.

## 9.4 Remediation Plan

A summary of the remedial scope of works for soil, asbestos and hazardous material is presented in Table 9-4 below. Figure 4, Appendix A shows the approximate locations and indicative remediation areas for the site.

*Table 9-4 Remediation scope of works*

| Location | Scope |
|---|---|
| Zn Hotspots: HA06, HA08, HA13, HA18 and SO03 | • Zn hotspots to be excavated as part of the site topsoil stripping program of works, which includes the stripping of the top 300 mm of material at hotspot locations.<br>• Impacted material from HA06, HA08, HA13, HA18, and SO03 will be blended with additional topsoil.<br>• Blended material to be re-use on site as first fill layer within NW corner of proposed Lot 1 (Figure 3, Appendix B).<br>– Material to be covered with, at minimum of 3.0 m, of fill material as per bulk earthwork specifications (PSM, 2020a).<br>• Estimated excavation volumes will be tracked, process photographed and included in the site remediation validation report.<br>Validation sampling is not deemed necessary at these locations due the proposed cut and fill level shown in Figure 3, Appendix A and summarised below.<br><u>Fill</u><br>• HA06 – Fill between +1.0 to +2.0 m above current ground level<br>• HA18 – Fill between +2.0 to +3.0 m above current ground level<br><u>Cut</u><br>• HA08 – Cut between -1.0 to -2.0 mbgl.<br>• HA13 – Cut between -2.0 to -3.0 mbgl.<br>• SO03 – Cut between -6.0 to -7.0 mbgl.<br>Based on the above cut and fill levels, validation sampling at these locations is not deemed necessary. Where fill is proposed to be imported (HA06 and HA18) the area will first be cut by 0.3 m thereby removing the impacted material which has been vertically delineated to a maximum depth of 0.2 mbgl. Locations HA06 and HA18 will then be filled by +1.0 to +2.0 m and +2.0 to + 3.0 m respectively.<br>At HA08, HA13 and SO03, each location will be stripped of approximately 0.3 m and then over excavated during the site developed by between -1.0 to -7.0 m. This process will therefore remove the potential ecological risk posed by elevated metals. |
| Zn Hotspots: SO01 | • SO01 will be excavated as part of the site topsoil stripping program of works, which includes the stripping of the top 300 mm of material at hotspot locations and 150mm across the rest of the site for civil construction purposes.<br>• Impacted material from SO01 will be blended with additional topsoil.<br>• Blended material to be re-used on site as first fill layer within NW corner of proposed Lot 1 (Figure 3, Appendix B).<br>– Material to be covered with, at minimum of 3.0 m, of fill material as per bulk earthwork specifications (PSM, 2020a).<br>• The vertical extent of impact material at SO01 has not been delineated. Although 0.3 m of topsoil is proposed to be stripped, there is the potential contamination may extend below 0.3 m. Furthermore, Figure 3, Appendix A, indicates SO01 is located within an area where 0.0 – 1.0 m of fill may be imported.<br>• A validation sample will therefore be collected from the hotspot footprint to verify vertical remediation. Validation sampling will be conducted in accordance with the validation plan (Section 10). |

| Location | Scope |
|---|---|
| | • Validation result will inform the need for further remediation.<br>• Estimated excavation volumes will be tracked, process photographed and included in the site remediation validation report.<br>• Remediation and validation sampling to be supervised and conducted, respectively, by a qualified Environmental Scientist. |
| Cu, Zn and Staining Hotspot<br>(HA01) | • Excavation impact material via visual, olfactory observations and PID; and temporarily stockpile onsite on a plastic tarp.<br>• Obviously impacted zones will be screened and validated with a PID by an Environmental Scientists. If elevated PID readings recorded additional material will be excavated until low PID reading recorded.<br>• Collection and analysis of three waste classification samples including leachability to meet NSW EPA sampling requirements and appropriately classify the material.<br>– In the event the excavated volume is greater than 25 $m^3$, additional samples will be collected at a rate of 1 sample per 25 $m^3$.<br>• Development of a brief waste classification report to be submitted to the accepting landfill in accordance with NSW EPA guidelines.<br>• Excavation will be photographed and PID readings including sample depth recorded to document the process.<br>• Excavated material to potentially be combined with HA15 and disposed off site in accordance with HA15 material management. |
| TRH hotspot<br>(HA15) | • Excavation impact TRH material via visual, olfactory observations and PID; and temporarily stockpile onsite on a plastic tarp. Obviously impacted zones will be screened with a PID by an Environmental Scientists and if deemed necessary excavated.<br>• Collection and analysis of three additional waste classification samples including leachability to meet NSW EPA sampling requirements and appropriately classify the material.<br>– In the event the excavated volume is greater than 25 $m^3$, additional samples will be collected at a rate of 1 sample per 25 $m^3$.<br>• Development of a brief waste classification report to be submitted to the accepting landfill in accordance with NSW EPA guidelines.<br>• Validation sampling of the walls and base of the excavations at the following frequencies:<br>– Approximately two samples from the base of the excavation at 0.8 mbgl,<br>– Approximately two sample from each wall of the excavation at a depth of approximately 0.0 and 0.5, targeting areas of concern or with higher PID reading or residual staining.<br>• In the event the hotspot is larger than 3 m x 3 m, soil samples will be collected at a rate of 1 per 5 m linear.<br>• Excavation will be photographed and PID readings including sample depth recorded to document the process. |
| Asbestos pipe | • Environmental Scientist to engage and supervise licenced asbestos removalist to:<br>– Erect warning signage, barriers, and on/off site notification.<br>– Establishment of exclusion zones including but not limited to remediation zone, loading zone and if deemed necessary decontamination zone.<br>– Excavation, disposal and tracking of ACM impacted material.<br>– Validation sampling.<br>– Dust and asbestos fibre air quality monitoring: pre (background), during and post remediation works. |

| Location | Scope |
|---|---|
| | • Subcontractor to provide a clearance certification report for incorporation in SVR.<br>• Asbestos remediation works to be conducted in accordance with the NEPM endorsed WA DoH (2009) Guidelines for Asbestos-Contaminated Sites in Western Australia and Code of Practice: How to Safely Remove Asbestos [Safe Work Australia, 2018].<br>• Environmental scientist to conduct asbestos fibre air quality monitoring. Monitoring will include as minimum pre (background), during and post remediation via:<br>– At least three stationary boundary monitoring locations (pre, during and post).<br>– One personal located on a worker within the remediation zone, i.e. outside the cabin of machinery (during only).<br>• Air monitoring should be performed in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres (NOHSC: 3003 (2005)).<br>• Validate of the excavation, remediation and loading zones in accordance with the WA DOH (2009) asbestos guidelines.<br>• Environmental Scientist to supervise asbestos subcontractor and develop SVR.<br>*Final design and methodology will be determined by the licences asbestos removalist/hygienist based their experience and conditions encountered on site.* |
| Surface ACM fragments<br>(ASB01, ASB02 and ASB04; building footprints, building surroundings) | • Surface ACM remediation will be conducted in accordance with section 5.2.1 Management in situ of DoH (2009) Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia<br>• Engage licences asbestos removalist/hygienist to conduct remediation under supervision of Environmental Scientist<br>• Impacted areas will be remediated via an emu-bob with raking consisting:<br>– Raking to 10cm, at least two passing of picking (raking if appropriate) with 90 degree direction change in between passes in grid pattern<br>– Calculation of %w/w as per DoH (2009) guidelines<br>– Final visual inspection of each hotspot with no surface ACM detected<br>• Asbestos in soil validation will also be collected via test pit as per Table 10-2 and Table 10-3.<br>• Manually collected ACM to be appropriate disposed off site by asbestos removalist.<br>• Post demolition asbestos clearance will be completed prior to cutting as to minimise cross contamination<br>• Disposal documentation to be included clearance certification report<br>• %w/w calculations to be included in SVR.<br>*Final design and methodology will be determined by the Environmental Scientist and licences asbestos removalist based their experience and conditions encountered on site.* |
| Hazardous material –including ACM cladding and building footprints | • Engage and supervise HAZMAT specialist to remediate existing buildings of hazardous material as reported in the Hazardous Materials Survey (HMS) completed December 2019 (Airsafe, 2019).<br>• Pre demolition remediation of existing buildings of hazardous materials (ACM, lead paint and SMF) as per the methodology incorporated in the HBMS (Appendix D).<br>• As part of the pre demolition remediation of existing buildings/structures for hazardous material, the HAZMAT specialist will also be engaged to validate the building footprints post demolition.<br>• HAZMAT specialist to conduct clearance testing/report prior to demolition and post demolition (building footprints). |

| Location | Scope |
| --- | --- |
| | • Asbestos (ACM, FA/AF) validation sampling will be conducted via test pitting as per Table 10-2 and Table 10-3.<br>• Clearance certification reports, including documentation of waste transportation and disposal in accordance with NSW EPA guidelines, will be incorporated in the SVR. |
| Building footprints – non-hazardous material | • Post demolition and clearance from the HAZMAT specialist, an Environmental Scientist will conduct validation sampling of building footprints.<br>• Footprint validation sampling will be conducted in accordance with the NSW EPA (2015) sampling density as detailed in Section 10.3.<br>• Sampling will include at a minimum the following CoPC<br>– Eight heavy metals: As, Cu, Cd, Cr, Pb, Hg, Mn, Ni and Zn.<br>– TRH/TPH, BTEXN, PAH.<br>– OC/OP Pesticides.<br>• No soil clearance will occur until validation results have been received. Additional excavation/remediation will be determined based on the validation results. |
| Anthropogenic Plastics – market gardens | • Collection and disposal of large plastic and irrigation pipework during general site clean-up works, prior to cut and fill development works.<br>• Residual, smaller fragments of plastic will be cleared from the soil surface as part of the site cut / fill development works.<br>• Burial of residual fragments at depth i.e. > 3m below finished site level.<br>• Tracking of material placement location.<br>• No validation is deemed necessary. |

A suitably experienced Environmental Scientist will supervise all remediation and validation works and compile report(s) required to remediate the site such as waste classification and validation reports. Certification reports provided by the licenced asbestos removalist and HAZMAT specialist will be incorporated into the SRV report

## 9.5 Estimated Soil Volumes – Disposal off site

Based on the estimated remediation volumes presented Table 9-1, Section 9.2, it is anticipated the following volumes of impacted material will be disposed off site to a licenced treatment / landfill facility as part of the remediation program of works:

- ACM pipe remediation: approximately 87.5 $m^3$, excluding bulking factor.
- TRH – HA15: approximately 7.2 $m^3$ (~11.5 T), excluding bulking factor.
  - Waste characterisation sampling required.
- Cu, Zn and Staining – HA01: approximately 1.8 $m^3$ (~2.9 T), excluding bulking factor.
  - Waste characterisation sampling required.

*Note: The above mentioned volumes are indicative only and subject to change based on conditions encountered on site and should not be used for design purposes.*

The volume of special waste (ACM) and hazardous waste anticipated to be removed as part of the ACM hotspot and building pre-demolition hazardous material remediation is unknown.

# 10 VALIDATION PLAN

## 10.1 Data Quality Objectives

According to NSW Environment Protection Agency (NSW EPA, 2017) Guidelines for the NSW Site Auditor Scheme (3rd edition), data quality objectives (DQOs) are qualitative and quantitative criteria that clarify the objectives of an investigation, define the amount and type of data to be collected, and specify the tolerable levels of decision making errors. DQOs make sure that the data collected is of the appropriate quantity (sampling frequency) and quality to allow for sound decisions to be made about the nature and extent of subsurface impacts.

It is recognised as the most efficient way to accomplish these goals is to establish criteria for defensible decision making before data collection begins and develop a data collection design based on these criteria. The DQO process consists of seven steps, which are designed to clarify the study objectives, define the appropriate type of data and specify tolerable levels of potential decision errors. DQO process, was established by the United States Environmental Protection Agency and is endorsed in AS4482.1-2005, will make sure that appropriate DQOs are established for the Site.

The DQOs derived for this RAP have been developed in general accordance with:

- NEPM 2013.
- Sampling Design Guidelines (NSW EPA, 1995); and
- Guidelines for Consultants Reporting on Contaminated Sites (EPA, 2020).

The seven steps are outlined as follows:

- Step 1: State the Problem – concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem.
- Step 2: Identify the Decision – identify what questions the study will attempt to resolve, and what actions may result.
- Step 3: Identify the Inputs to the Decision – identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement.
- Step 4: Define the Study Boundaries – specify the time periods and spatial area to which decisions will apply. Determine when and where data should be collected.
- Step 5: Develop a Decision Rule – define the statistical parameter of interest, specify the action level, and integrate the previous DQO outputs into a single statement that describes the logical basis for choosing among alternative actions.
- Step 6: Specify Tolerable Limits on Decision Errors – define the decision maker's tolerable decision error rates1 based on a consideration of the consequences of making an incorrect decision; and
- Step 7: Optimise the Design –evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource-effective design that meets the DQOs.

The remediation validation DQOs for the site are summarised in Table 10-1 below.

*Table 10-1 Remediation validation data quality objectives*

| Step | Details |
|---|---|
| 1. State the problem | PSI and DSI soil and HAZMAT survey results identified:<br>• Seven shallow heavy metal (Cu and/or Zn) contamination hotspots across the site which exceeded the adopted EIL.<br>• One hydrocarbon staining hotspot at HA01.<br>• One TRH contamination hotspot at HA15 up to a depth of 0.8 mbgl. Concentrations exceeded the adopted ESL and management limits.<br>• Three surface ACM hotspots across Lot 57 and Lot 58.<br>• Hazardous building materials (ACM, lead paint and SMF) in approximately seven groups of buildings/structures across Lots 54 to 58.<br>Remediation of the above mentioned locations is required prior to the site being redeveloped into an industrial estate. |
| 2. Identify the decision | • Do the validation results meet the adopted remediation criteria?<br>• Has remediation works met the remediation objectives and achieved the desired outcome for the proposed industrial/commercial land use? |
| 3.Identify the inputs to the decision | • Excavation, manual collection, burial and/or disposal off site of contaminated material.<br>• Field investigation including validation sampling of remediated areas to assess if contamination has been managed in accordance with the adopted remediation criteria and site remediation objectives.<br>• EPA and NEPM endorsed published guidelines for protection of health under the relevant land use scenario.<br>• Analytical results. |
| 4. Define the study boundaries | The study boundary is restricted to the lateral and vertical extent of contamination and associated remediation areas located within the wider site's cadastral boundary, identified as Lots 54 to 58 DP259135 (Figure 1, Appendix A)<br>Indicative remediation areas are included in Figure 4, Appendix A. |
| 5. Develop a Decision Rule | If the concentrations of CoPCs in selected sampling media are reported to be below the relevant adopted guidelines, then the site will be deemed suitable and no additional management/remediation will be required for the proposed land use at the site.<br>However, if the concentration of one or more CoPCs are greater than the guidelines, then further remediation may be required to appropriately remediated site. |
| 6. Specify tolerable limits on decision errors | The acceptable limits for validation samples are as follows:<br>• %RPD for laboratory duplicates for TPH/TRH analysis is less than 60%<br>• Recovery of matrix spikes, surrogate spikes is as per the laboratory's quality assurance targets accepted under their NATA accreditation<br>• Precision is measured using the standard deviation 'SD' or Relative Percent Difference '% RPD'.<br>• Replicate data for field duplicates for inorganics, including metals, is expected to be as follows:<br>– RPD criteria of 30 % or less, for concentrations > or = 10 times PQL; |

| Step | Details |
|---|---|
| | – RPD criteria of 75 % or less, for concentrations between 5 and 10 times the PQL; and<br>– RPD criteria of 100 % or less, for concentrations < 5 times PQL.<br>• Where acceptable limits for field duplicates are not met, a discussion on low biased error may be required. |
| 7. Optimise the design | The remediation design has been optimised by using the methodologies described in the following industry best practice guidelines:<br>• Sampling Design Guidelines (EPA 1995).<br>• WA DoH (2009) asbestos management guidelines.<br>• Guidelines for the NSW Site Auditor Scheme 3rd Edition, October 2017.<br>• National Environment Protection (Assessment of Site Contamination) Measure, National Environment Protection Council, revised 2013 (NEPM 2013).<br>• Waste Classification Guidelines. Part 1: Classifying Waste, NSW Environment Protection Authority (EPA) 2014; and<br>• Addendum to the Part 1 Waste Classification Guidelines (EPA 2016).<br>The preferred hierarchy of options for site remediation and/or management is set out in s.6(16) Assessment of Site Contamination Policy Framework of Schedules A and B of the NEPM; this hierarchy is followed in New South Wales. Sustainability (environmental, economical, and social) aspects should be considered when deciding which remediation option to choose, in terms of achieving an appropriate balance between the benefits and effects of undertaking the option.<br>This means that soil remediation and management is implemented in the following preferred hierarchy:<br>• Onsite treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level; and<br>• Offsite treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site; or,<br>If the above are not practicable<br>• Consolidation and isolation of the soil onsite by containment within a properly designed barrier; and<br>• Removal of contaminated soil to an approved site or facility, followed, where necessary, by replacement with appropriate material. |

## 10.2 Soil validation sampling methodology

Soil validation samples will be collected by appropriately trained and experienced environmental scientist. Samples will be collected in a method that mitigates cross contamination and enhances the integrity of the process. These processes are discussed briefly below:

- Soil samples should be collected using single use nitrile gloves.
- Samples should be collected directly from the excavation or sampling equipment.
- Sampling equipment should be decontaminated after collecting each sample and between sample locations using Decon90 ™ and rinsed with deionised / potable water.
- Part of the soil sample should be placed into snap lock plastic bags for screening for VOC’s using a PID.

- Samples are to be placed directly into a laboratory prepared 250 ml glass jars with the details of the sample, including the sample name, the job number, the date of sample and the sample depth.
- Single use nitrile gloves are to be replaced after collecting each sample or if contamination of the gloves may have occurred.
- Sample preservation should be undertaken in accordance with NEPM (2013) with samples immediately placed and stored in an ice filled cooler to keep them chilled.
- A signed chain of custody form with the analysis requirements should accompany samples to the laboratory
  - Job name and number.
  - Date results are required.
  - List of samples.
  - Preservation method.
  - Analysis required.
  - Release signature and date.
  - Date sampled.
  - Acceptance signature and date.
- QA/QC sample collection of 1:20 pair (duplicate & triplicate) samples per 20 primary samples collected,
- Each soil sample should be described in general accordance with the Unified Soil Classification System and details of discolouration, staining, odours or other indicators of contamination were also noted.

## 10.3 Validation sampling requirements

National association of testing authorities (NATA) accredited labs are to be used for laboratory analyses of soils. Method not NATA accredited will require justification.

Validation of dam sediments footprints has not been included the scope of this RAP due to sediment characterisation being incomplete. The requirement for validation will be determined based on the outcome of sediment characterisation as per Section 7 of this RAP and detailed in the DSI addendum accordingly.

*Note: Due to OHS risks, 10 L bulk screening ACM samples will be submitted to the primary laboratory for sieving and analysis.*

Table 10-2 below details the validation requirements for the heavy metal, ACM and TRH hotspots. Table 10-2 also summarises the validation requirements for the subcontractors engaged to conduct the remediation of the ACM pipe and hazardous building materials.

*Table 10-2 Validation sampling requirements*

| Location | Scope |
|---|---|
| Zn Hotspots<br><br>(HA06, HA08, HA13, HA18, SO01 and SO03) | • Visual inspections should be performed during excavation to identify inconsistencies and evidence of contamination and unexpected finds.<br>• Based on the cut and fill depths (refer to Table 9-4) validation sampling is not deemed necessary at these locations. |
| Cu, Zn and Staining Hotspot<br><br>(HA01) | <u>Excavation</u><br>• Visual inspections should be performed during excavation to identify inconsistencies and evidence of contamination and unexpected finds. No visual signs of staining should be evident post excavation. |

| Location | Scope |
| --- | --- |
| | • Following excavation of impacted material, soil validation sampling will be completed on the remediation surface and walls of the excavation via visual inspection and PID readings. In the event elevated PID readings are recorded above 1 ppm additional material will be excavated.<br>Stockpile footprint<br>Once stockpiled impacted material has been appropriately classified and disposed off site, including plastic tarp, the underlying soil should be validated to verify no cross-contamination occurred.<br>• **A minimum of two samples should be submitted for Cu, Zn and TRH/TPH analysis.**<br>Additional remediation and validation sampling will be required in the event concentrations exceed the adopted remediation criteria. |
| TRH hotspot<br>(HA15) | Excavation<br>• Visual inspections should be performed during excavation to identify inconsistencies and evidence of contamination and unexpected finds.<br>• Following excavation of impacted material, soil validation sampling will be completed on the remediation surface and walls of the excavation at the following frequencies:<br>– A minimum of two samples from the remediation surface at 0.8 mbgl.<br>– Approximately two sample from each wall of the excavation at a depth of approximately 0.0 and 0.5, targeting areas of concern or with higher PID reading or residual staining.<br>• In the event the hotspot is larger than 3 m x 3 m, validation samples will be collected at a rate of 1 per 5 m linear<br>• **Samples will be submitted for TRH/TPH analysis.**<br>• In the event validation samples exceed the adopted remediation criteria (Table 8-2) additional material will be excavated until such time concentrations are below the adopted remediation criteria.<br>• The remediation area should remain cordoned off and undisturbed until the hotspot has been appropriately validated.<br>Stockpile footprint<br>Once stockpiled TRH impacted material has been appropriately classified and disposed off site, including plastic tarp, the underlying soil should be validated to verify no cross-contamination occurred.<br>• **A minimum of two samples should be submitted for TRH/TPH analysis.**<br>• Additional remediation and validation sampling will be required in the event concentrations exceed the adopted remediation criteria. |
| Asbestos pipe removal | Excavation<br>Validation sampling should be completed by the Environmental Scientist in accordance with the WA DOH (2009) asbestos guideline. As the ACM pipe is believed to be within natural material, validation by visual inspection is recommended.<br>In the event the base or walls of the excavation are suspected of containing ACM, validation sampling at a rate of at least one sample per 5 m length is recommended. Validation sampling is to include:<br>• 10 L bulk screening to be submitted for ACM absence/presence laboratory analysis. *Note: For OHS reasons, 10L bulk samples are proposed to be submitted to the laboratory for analysis, as opposed to sieving the material onsite. In the event* |

| Location | Scope |
| --- | --- |
| | *sieving is to occur onsite, sieving will be completed via a licenced asbestos removalist.*<br>• A 500 mL sample of sieved material to be submitted for FA/AF analysis.<br>• Number of samples submitted for analysis to be determined based on material encountered during test pitting and using judgemental sampling taking into consideration Table A of the NSW EPA (2015) sampling design guidelines.<br>Once the remediation criteria listed in Table 8-2 have been achieve the excavation can be backfilled/ site works can progress.<br>Remediation/loading zones<br>• Validate remediation and loading zones will be via emu-bob, with raking if deemed necessary. The surface is to be free of ACM as per Table 8-2.<br>Air quality<br>• As minimum one day of air quality monitoring should be conducted prior to the commencement of remediation works on site to establish background levels.<br>• Throughout the ACM remediation works air quality monitoring results should be reviewed on a daily basis and compared against background levels and the appropriate remediation criteria presented in Table 8-2. In the event, the adopted remediation criteria are exceeded corrective controls such as increased dust suppression with water, reduced machinery movements, wind breaks etc. should be implemented and/or increased.<br>• Post remediation air quality monitoring should be conducted by the Environmental Scientist in accordance with the WA DOH (2009) asbestos guideline for a minimum of one day and compared against background monitoring results and remediation criteria presented in Table 8-2.<br>• Air monitoring should be performed in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres (NOHSC: 3003 (2005)). |
| Surface ACM fragments<br>(ASB01, ASB02 and ASB04; building footprints, building surroundings) | Where an emu-bob has been completed the following validation samples will be collected and submitted for laboratory analysis:<br>• 10 L bulk screening to be submitted for ACM absence/presence laboratory analysis, collected via test pitting.<br>• A 500 mL sample of sieved material to be submitted for FA/AF analysis.<br>• Number of samples submitted for analysis to be determined based on material encountered during test pitting and using judgemental sampling taking into consideration Table A of the NSW EPA (2015) sampling design guidelines. |
| Hazardous material – including ACM cladding and building footprints including building fringes | HAZMAT specialist to conduct clearance testing/report prior to demolition and post demolition (building footprints).<br>Although the HAZMAT survey did not identify lead paint within the buildings, validation of the building footprint fringes for lead paint is to be conducted via judgemental sampling.<br>Validation sampling to be conducted in accordance with Table 10-3 below. |
| Building footprints – non-hazardous material | An Environmental Scientist will conduct validation sampling of building footprints.<br>• Footprint validation sampling, including building fringes will be conducted using judgmental sampling. Judgemental sampling should take into consideration Table A of the NSW EPA (2015) sampling design guidelines.<br>• **Sampling laboratory analysis will include at a minimum the following CoPC**<br>– **Eight heavy metals: As, Cu, Cd, Cr, Pb, Hg, Mn, Ni and Zn.**<br>– **TRH/TPH, BTEXN, PAH.** |

| Location | Scope |
|---|---|
| | – **Asbestos as per Table 10-2.**<br>o 10 L bulk screening for ACM, collected via test pitting<br>o 500 mL sieved material for FA/AF<br>– **OC/OP Pesticides.**<br>– Additional analytes may be assessed based on conditions encountered on site, staining, odours, and/or additional information obtained about the historical usage of the building. Additional analysis requirements will be determined by the environmental scientist.<br>• In the event validation samples exceed the adopted remediation criteria (Table 8-1), additional material will be excavated until such time concentrations are below the adopted remediation criteria.<br>• The remediation area should remain cordoned off and undisturbed until the hotspot has been appropriately validated. |
| Poultry Sheds (Lot 54) | In addition to the above 'building footprint' validation requirements, analytical analysis for the presence of pathogens at the poultry shed footprints may be required.<br>This requirement is to be determined by the Environmental Scientist based on field observations prior to, during and/or post demolition. The number of samples and analytical suite will be determined at the time of sampling, taking into consideration NEPM (2013) and Table A of the NSW EPA (2015) sampling design guidelines. |
| Fill containing anthropogenic material | Environmental Scientist to supervise testing pitting of fill material identified to contain anthropogenic material including unexpected finds.<br>Validation sampling will include:<br>• 10 L bulk screening to be submitted for ACM absence/presence laboratory analysis collected via test pitting.<br>• A 500 mL sample of sieved material to be submitted for FA/AF analysis.<br>• Number of samples submitted for analysis to be determined based on material encountered during test pitting and using judgemental sampling taking into consideration Table A of the NSW EPA (2015) sampling design guidelines.<br>In the event validation samples exceed the adopted remediation criteria (Table 8-2, the lateral and vertical extent of impacted fill material will be delineated. The material is to be appropriately classified in accordance with Section 12.3.1 and disposed off site in accordance with Section 12.3 Waste Management Plan |

*Table 10-3 Hazardous material validation requirements*

| Lot | Location | Material | Type | Validation requirement |
|---|---|---|---|---|
| | | Asbestos | | |
| Lot 54 | Chicken Sheds - Building external walls | Fibreboard | Non-friable | Footprint ACM in soil - 10 L bulk screening to be submitted for ACM absence/presence laboratory analysis. A 500 mL sample of sieved material to be submitted for FA/AF |

| Lot | Location | Material | Type | Validation requirement |
|---|---|---|---|---|
| | Rare of property - Building external broken sheeting | Fibreboard | Non-friable | analysis. Number of samples submitted for analysis to be determined based on material encountered during test pitting and using judgemental sampling taking into consideration Table A of the NSW EPA (2015) sampling design guidelines. |
| Lot 55 | House 1/844 - Internal bathroom walls | Fibreboard | Non-friable | Licenced asbestos removalist clearance pre-demolition |
| | House 1/844 - Internal laundry walls | Fibreboard | Non-friable | |
| Lot 55 | House 1/844 - External rare veranda fascia | Electrical backing board | Non-friable | Licenced asbestos removalist clearance pre-demolition<br>Footprint ACM in soil - 10 L bulk screening to be submitted for ACM absence/presence laboratory analysis. A 500 mL sample of sieved material to be submitted for FA/AF analysis. Number of samples submitted for analysis to be determined based on material encountered during test pitting and using judgemental sampling taking into consideration Table A of the NSW EPA (2015) sampling design guidelines. |
| | House 1/844 - External electrical box | Fibreboard | Non-friable | |
| Lot 56 | Rare shed - Building external upper wall sheeting | Fibreboard | Non-friable | |
| | Rare shed - Building lower wall corrugated sheeting | Fibrous cement sheet | Non-friable | |
| | Rare shed - External electrical box | Electrical backing board | Non-friable | |
| Lot 57 | Building external drainpipe | Fibrous cement sheet | Non-friable | |
| Lot 58 | External driveway fragments | Fibrous cement sheet | Non-friable | Emu-bob. |
| | | SMF | | |
| Lot 55 | House 1/844 - Ceiling void | Fibrous insulation | Bonded | Licenced asbestos removalist clearance pre-demolition |
| | House 2/844 - Ceiling void | | | |
| | Car shed Insulation - behind house 2/844 | | | |
| Lot 56 | House 1/56 - Ceiling void | | | |
| | House 2/56 - Ceiling void | | | |
| Lot 57 | House - Ceiling void | | | |

## 10.4 Quality Assurance/Quality Control

The QA/QC program for the site should comprised the following elements:

- Field duplicate samples: one field duplicate sample to be collected for every 20 primary samples collected (or part thereof). Duplicate samples are to be sent to the primary analytical laboratory to check the accuracy of the analytical results.
- Field triplicate samples: one field triplicate sample to be collected for every 20 primary samples collected (or part thereof). Triplicate samples are sent to be sent to a secondary analytical laboratory to check the accuracy of the analytical results.
- Rinsate blank: A rinsate blank to be collected during each sampling event. Rinsate blanks are to be collected from rinsing field sampling equipment to assess the effectiveness of the decontamination procedures between sampling locations.

## 10.5 Remediation Validation Criteria

Refer to Table 8-2 for site specific remediation criteria.

## 10.6 Imported Fill criteria

No fill is proposed to be imported under this RAP. In the event fill is imported it will be conducted in accordance with the Imported Fill Protocol (Arcadis, 2020b).

## 10.7 Site Remediation and Validation (SRV) Report

### 10.7.1 Interim SRV reporting

Interim SRV reports are required to be submitted to the Auditor for review at the follow stages of work.

- Remediation and validation of building footprints
  - Report is to summarise demolition, remediation and validation sampling conducted for the building footprints as per the RAP.
  - Additional remediation required post demolition.
- Post remediation, prior to commencement of bulk earth works.
  - Report is to summarise all remediation and validation work conducted at the site.
  - Report should be reviewed by the auditor prior to the commencement of bulk earth works.

The reports are to be prepared in general accordance with the NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (EPA 2020), documenting the works as completed. The report be compiled as per with Section 10.7.2.

### 10.7.2 Final SRV reporting

At the completion of the remediation works a SRV report is to be prepared in general accordance with the NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (EPA 2020), documenting the works as completed. This report will contain information including:

- Details of the remediation works conducted.
- Details of the landfill and recycling sites where material has been disposed of (i.e. weighbridge dockets, EPL licence number).
  - A copy of disposal dockets is to be included in the SRV report appendices.

- Details of the air monitoring program implemented during the remediation of ACM materials from the three hotspots and existing buildings/structures.
- Information demonstrating that the objectives of the RAP have been achieved, in particular the sample results of waste classification, along with assessment of the data against both the pre-defined DQOs and to the remediation acceptance criteria.
- Information demonstrating compliance with appropriate regulations and guidelines.
- Variations to the strategy undertaken during the implementation of the remedial works.
- Documentation confirming earthworks personnel were adequately inducted into:
  - The unexpected finds protocol (Arcadis, 2020a).
  - The imported fill protocols (Arcadis, 2020b).
- Documentation confirming earthworks personnel were adequately briefed in how to identify potential contamination and the protocol to be implement when potential contamination was identified i.e. UFP and IFP.
- Details of unexpected finds, including potential, encountered during site works, the management approach or remediation approach implemented, and validation works conducted.
  - If no unexpected finds were encountered, a clear statement is required to that effect.
- Inclusion of surveys showing cut and fill thickness across the site, including locations of areas of concern identified. Unexpected finds locations encountered during the site works should also be included.
- Documentation demonstrating imported fill is suitable for use i.e. certification from source site that material is clean fill and, if available, laboratory analytical results. If source site cannot provide certification, laboratory analysis may be required prior to use on site.
- Details of environmental incidents occurring during the remedial works and the actions undertaken in response to these incidents.
- Other information as appropriate, including requirements (if any) for ongoing monitoring / management.

The report will serve to document the remediation works for future reference.

The following records will be maintained by the civil contractor including licenced asbestos removalist and HAZMAT specialist during remediation work and will be made available for inclusion into the SRV report:

- Complaints made towards the remedial works, the date and time that the complaint was made, and corrective actions taken.
- Records of approvals to remove or dispose soil from the site.
- Suspicious soil/material encountered in the materials brought onto site.
- Dockets for the quantities of material being brought onto and disposed off site as well as the EPA approvals.
- Amendments to works which negate from this RAP, Auditor comments to these amendments, as well as comments and/or endorsements.
- Site visits and activities performed.
- Photographic records of the stockpiled materials (if any) as well as stockpile management, and site establishment.

The validation report is to assess the results of the post-remediation testing against the clean-up criteria stated in the RAP. Where targets have not been achieved, reasons is to be stated, and additional site work proposed to achieve the original RAP objectives.

The validation report should also include information confirming that EPA and other regulatory authorities' licence conditions and approvals have been met. In particular, documentary evidence is needed to confirm that disposal of soil off-site is done in accordance with the RAP.

# 11 CONTINGENCY PLAN

A review of remediation works has been undertaken to identify potential risks to meeting the specified site validation criteria. Several potential risks have been identified. These are listed following with contingencies that will be implemented to make sure that validation criteria are met.

## 11.1 Unexpected Finds Protocol

The possibility exists for undiscovered hazards to be present at the site. Environmental sampling is based on chemical analytes identified as a potential concern during a documented process of reviewing historical site activities. However, ground conditions between sampling points may vary, and further hazards may arise from unexpected sources and/or in unexpected locations. The nature of undiscovered hazards which may be present at the site are generally detectable through visual or olfactory means, for example:

- Petroleum impacted soils (staining / discoloration visible).
- Hydrocarbon organic compound impacted soils (odorous).
- Fragments of ACM (visible).
- Significant ash and / or slag impacted soils / fill materials (visible).
- Underground Storage Tanks that have not been previously identified.

As a precautionary measure, to facilitate the protection of the workforce and surrounding community, should unexpected potentially hazardous substance be encountered, works should cease immediately before being assessed by a suitably qualified and experienced environmental professional in accordance with the Sites Unexpected Finds Protocol (Arcadis, 2020a).

## 11.2 Excessive Odours from Works

Based on the nature of the identified contaminants, off- site odour complaints may not be likely. Where complaints do occur, the following will be undertaken:

- Installation of an odour screening / masking system at the site boundaries.
- Disturbance of soils during meteorologically favourable periods only.
- Covering of impacted soils.

## 11.3 Remediation Strategy Unsuccessful

Should validation be deemed not suitable for the sites intended land uses, the RAP will be required to be revised to manage exposure pathways and potential risks to site users. In this case, other remediation options may need to be considered (Section 9 Remediation Options).

# 12 SITE MANAGEMENT PLAN

## 12.1 Interim Site Management Plan

Safety and environmental controls are to be implemented as part of the first stage of the remediation works. Controls will be implemented in accordance with the site specific construction environment management plan (CEMP) and may include:

- Locate and isolate required utilities in proximity proposed area of remediation.
- Work area security fencing or barricades.
- Site signage and contact numbers.
- Work specific signage and barricades will be installed by the licenced asbestos removalist and HAZMAT specialist.
- Assess the requirements of dust and odour control measures.
- Sediment fencing (attached to security fencing – as deemed necessary).
- Stormwater runoff, sediment controls (hay bales - as deemed necessary).

Controls may be revised or modified based on site conditions encountered prior to and/or during the remediation program of works or on advice of the clients Site Manager.

## 12.2 Site Management Plan (Operational Phase)

The following section contains appropriate details to mitigate / manage potential environmental emissions which may be generated by or during the site remediation works.

### 12.2.1 Hours of operation

Remediation works shall only be permitted during the indicative hours presented in Table 12-1 below.

*Note: Hours of operation are indicative only and subject to change in accordance with Site specific hours of operation.*

*Table 12-1 Indicative Hours of Operation*

| Day of the week | Start time | Finish time |
|---|---|---|
| Monday to Friday: | 7:00 am | 6:00 pm |
| Saturdays: | 8:00 am | 1:00 pm |
| Sundays and Public Holidays: | No work permitted. | |

### 12.2.2 Site signage and contract details

Throughout the duration of remediation works appropriate signage shall be erected around the remediation area with the contact details of the remediation contractor, project manager, environmental scientist, and client site manager.

### 12.2.3 Remediation schedule

Remediation schedule is to be advised.

### 12.2.4 Site access

During remediation works, perimeter fencing will be maintained to restrict access to the works area, including bioremediation area. Only authorised persons will be able to enter the works area.

Vehicle access to the site shall be stabilised to prevent the tracking of soil around the site and the adjoining driveway/access point to the road will be swept or cleaned on an as-needed basis. Collected materials shall be treated as potentially impacted and will be suitably managed.

### 12.2.5 Soil and water management

Management of dam dewatering is included in the DDS (Arcadis, 2020b). Management of dam sediments will be determined based on the sediment characterisation testing detailed in Section 7 of this report and included in the DSI addendum as deemed necessary.

As remediation requirements for the site are limited to localised hotspots within the upper 1.0 m of the soil profile additional soil and water management measures beyond the existing site management requirements are not deemed necessary.

During larger remediation events such as the excavation and disposal of the buried ACM pipe the following will, or a variation, therefore, will be completed by engaged licenced asbestos remover/HAZMAT specialist:

Prior to exposing and/or disturbing the known or potential ACM impacted soils by intrusive earthworks or excavation works, the following activities should be carried out and implemented by the party responsible for the disturbance to soil in the affected areas:

- Notification to the responsible party (Owner, Principal Contractor etc.) to discuss the scope of works to be undertaken, the likelihood of generating dust, excess spoil or waste and the management of this material.
- Make sure contractors / workers are aware of the potential for asbestos impacted materials to be encountered.
- Setup of work area, and exclusion zone including appropriate signage and barriers.
- Assess proposed scope of works to minimise the requirement to expose and / or excavate asbestos impacted materials.
- Make sure contractors / workers, where works involving asbestos impacted materials is expected or identified, are supervised by an appropriately qualified person as required by the relevant legislation (i.e. Class-A or Class-B licensed contractor).
- Preparation of a specific occupational health and safety plan that caters for the proposed activities / works including the provision of PPE (Section 13.6).
- Consideration and / or preparation of a dust management plan / procedure to mitigate / minimise dust generation and identify controls.
- Consideration of the equipment used to minimise potential soil exposure and dust generation.
- Preparation of a specific environmental protection plan including soil, water and air management protocols.
- Preparation of a methodology for managing excavated soil.
- Contingency planning to include encountering other suspected asbestos impacted material other than that expected.

Additional information pertaining to the transportation of ACM (Section 12.3) should also be consulted.

### 12.2.6 Imported Fill

Imported fill (ENM or VENM) is to be managed in accordance with the Auditor approved Imported Fill Protocol (IFP) (Arcadis, 2020b) and bulk earthworks specifications (PSM, 2020).

### 12.2.7 Stockpiles

Although stockpiling is only intended for TRH material excavated from HA15, in the event stockpiling is undertaken for other excavated material, provided it does not contain ACM, the following procedures have been provided:

- Impacted soil stockpiles should be placed on an impermeable or sealed surface with controls for dust, runoff and seepage to minimise further impact to surrounding areas.
- No stockpiles or other materials shall be placed on footpaths or roadways and will be away from stormwater infrastructure (including drainage lines, stormwater pits, gutters, etc.) where possible. Where this is not possible, sediment controls will be placed over stormwater grates to prevent ingress of sediment to stormwater drainage lines.
- Stockpiles shall be formed with sediment control structures placed immediately down slope to protect other lands and waters from sediment pollution.
- Placement of material on a sealed or plastic lined surface.
- Covering of excavated / stockpiled impacted material.

Fill material sourced onsite or imported (ENM or VENM) should be managed in accordance with Imported Fill Protocol (Arcadis, 2020b) and bulk earthworks specifications (PSM, 2020).

### 12.2.8 Noise

The remediation works shall comply with the NSW EPA's Environmental Noise Control Manual for the control of noise from construction sites.

Machinery and equipment used on site will be in good working order and fitted with appropriate silencers when necessary.

### 12.2.9 Vibrations

The use of plant and machinery shall not cause vibrations to be felt or capable to be measured at the neighbouring premises.

### 12.2.10 Dust control

During the remediation dust levels will be monitored and minimised by using mist sprays as necessary on excavation, stockpiles and loadout.

Dust shall also be controlled by ensuring vehicles leave via the designated (stabilised) site access points.

Situations or areas which exceed the asbestos exposure standard are to be controlled to mitigate or minimise risk of exposure.

Vehicle used to transport asbestos waste should be cleaned before leaving the site and the vehicles load should be covered prior to dispatch.

### 12.2.11 Asbestos air quality monitoring

Health and air monitoring is to be undertaken when a worker is at risk of exposure to asbestos while performing work that is not licensed asbestos removal work. The need for health and air monitoring of these workers should be determined on the basis of the potential for exposure, frequency of potential exposure and duration of the work being undertaken.

Consideration is to be given to the worker's demographic, medical and occupational history and records of the worker's personal exposure. The health and air monitoring is to include a physical examination of the worker with emphasis on the respiratory system, including standardised respiratory function tests, unless another form of health and air monitoring is recommended by a registered medical practitioner.

Workers are to be informed of health and air monitoring requirements before the worker carries out work that may expose them to asbestos.

Air monitoring for asbestos exposure may be required as result of the assessment and should be conducted by a competent person in accordance with *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)].*

Exposure standards set out the airborne concentrations of asbestos, which should not damage the health of workers. The exposure standards for asbestos are:

- Amosite (brown asbestos) 0.1 f/mL (Fibres per millilitre of air);
- Crocidolite (blue asbestos) 0.1 f/mL; and
- Chrysotile (white asbestos) 0.1 f/mL.

Areas or equipment with asbestos or ACM in situ should be assessed by a competent person to evaluate the appropriate inspection periods to make sure risk controls are effective. Inspection periods are to be identified by the person responsible for the area.

A site specific asbestos fibre air-quality monitoring programme will be development and implement by the licenced asbestos removalist or HAZMAT specialist engaged to undertaken the remediation works.

## 12.2.12 Regulatory approvals and licencing

A summary of the primary regulatory approvals and licences for the proposed remediation works is presented in Table 12-2 below.

*Table 12-2 Summary of regulatory approvals and licencing applicable to this RAP and associated remediation*

| Item | Details |
|---|---|
| Protection of the Environment Operations Act 1997 | In relation to the licensing requirements under the Protection of the Environment Operation Act 1997 (POEO Act):<br>• The works do not fall within the licensing requirements for Contaminated Soil Treatment Works (i.e. works will not incinerate more than 1,000 m3 of impacted soil per year, treat and store more than 30,000 m3 of impacted soil or disturb more than 3 hectares of impacted soil); and<br>• The works do not fall within the licensing requirements for Crushing, Grinding or Separating Works (i.e. works will not process more than 150 tonnes of material per day or 30,000 tonnes of material per year).<br>Material to be excavated and removed from the site (including associated activities such as classification) will be undertaken in strict accordance with the requirements of the POEO Act 1997. Such requirements include:<br>• Ensuring waste is classified appropriately and in accordance with relevant guidelines.<br>• Waste materials are disposed offsite to appropriately licensed facilities.<br>• Other materials are removed to facilities lawfully able to accept such materials. |
| Protection of The Environment Operations (Waste) Regulation 2014 | The regulations make requirements relating to non-licensed waste activities and waste transporting. The proposed works on the site will not require to be licensed. Section 48 of the Regulation requires that wastes are stored in an environmentally safe manner and that vehicles used to transport waste is to be covered when loaded.<br>The Regulation exempts certain waste streams from the full waste tracking and record keeping requirements. Waste tracking is required only for special and restricted solid wastes. |

| Item | Details |
| --- | --- |
| Protection of The Environment Operations (Clean Air) Regulation 2010 | Requirements in relation to emission from vehicles and general obligations that the occupiers of non-residential premises do not cause air pollution by failing to operate or maintain plant, carry out work or deal with materials in a proper and efficient manner. |
| Waste Classification Guidelines, Part 1: Classifying Waste | Wastes generated shall be classified and managed in accordance with the NSW EPA Waste Classification Guidelines (2014) |
| Work Health and Safety Act 2011 | Requirements in relation to make sure work safety that are enforceable by law. |
| NSW EPA Asbestos and Waste Tyres Guidelines (2015) | Outlines the legal requirements that consignors, transporters, and occupiers of premises must meet in addition to their obligations under the Waste Regulation |
| Work Health and Safety Act 2011 (WHS Act) – Work Health and Safety Regulation 2017 (WHS Regulation) | Outlines the legal requirements for notifying SafeWork NSW five calendar days before undertaking any licenced asbestos removal works. |

### 12.2.13 Complaint reporting and resolution

Complaints from adjoining site occupants or workers on site will be directed initially to the responsible person onsite (owner, principal contractor, civil contractor). Following that, discussion with the environmental consultant and the complainant will investigate the issue and remedy it as required or applicable.

### 12.2.14 Site disestablishment

On completion of the remediation works mechanical plant, equipment, and safety and environmental controls shall be removed from the site unless contracted for ongoing redevelopment or construction works.

## 12.3 Waste Management Plan

### 12.3.1 Waste classification reporting and disposal

Soil will be classified, managed, and disposed in accordance with the Waste Classification Guidelines Part 1: Classifying Waste (NSW EPA 2014).

Impacted soil to be disposed off site will be accompanied by a waste classification report appropriately characterising the material in accordance with Waste Classification Guidelines Part 1: Classifying Waste (NSW EPA 2014).

In addition, waste to be disposed off site will be registered online via WasteLocate as per section 12.3.1 and 12.3.2.

### 12.3.1 Material tracking

A material tracking register/ waste ledger is to be used to track material movements on and off site, including:

- Waste material offsite for disposal.
- Materials brought onto site as part of the remediation work including ENM and VENM.

- Temporary stockpiling of material including impacted material i.e. TRH hotspot material.
- Excavation and deposit location of heavy metal impacted material proposed to be buried at depth on site i.e. HA06, HA08 etc.
  – Including any unexpected finds encountered during the site development.
- The register should also include:
  - Type of material i.e. ENM, VENM, TRH impacted material.
  - Volume of material.
  - Location where the material to be disposed offsite originated from onsite.
  - Source of material, supplier i.e. trucking company and where it was deposition on site.
  - Date and time, and
  - Location of stockpiles on site.

Where possible photographs should be taken of locations.

Imported fill is required to be certified as ENM or VENM and accompanied by a waste classification certificate or be sampled in accordance with the ENM Order (NSW EPA 2014). A copy of the waste classification certificates are to be included in the SVR and certificate numbers should be recorded on the tracking register.

An accredited surveyor is also required to monitor earthworks and validate of each phase of the remediation works regarding material removed, deposited and / or reinstated. A copy of the survey data including unexpected finds is to be included in the SVR.

## 12.3.2 Material transport

Trucks will be loaded in a designated area away from the impacted material excavations. The transporting contractor shall make sure that there is no material tracked out onto the street and that the load is securely covered. In addition, site vehicles should leave the site in a forward direction.

Appropriate road rules shall be observed, and state roads will be selected as far as practicable over local roads when deciding on the transport route to the off-site material disposal location.

**Hazardous waste**

Under the NSW EPA Protection of the Environment Operations (Waste) regulation 2014, the legal requirements that consignors, transporters and occupiers of premises should meet, in addition to the Waste Regulations for transportation of hazardous waste, the following requirements are noted:

- A transporter of hazardous waste is to be registered as a transporter of hazardous waste on WasteLocate (https://wastelocate.epa.nsw.gov.au/) before transport of such waste is to occur.

The transporter of hazardous waste is to also:

- Obtain/ hold a consignment authorisation (CA) from the receiving facility or NSW EPA to transport the hazardous waste.
- Create / hold a transport certificate (TC) which includes information about the waste, its classification, records the transport, disposal of the waste and discrepancies i.e. wrongly classified waste, different transport agent than nominated etc.
- The TC is to be printed and accompany the waste load during transport.

A copy of the CA and TC may be included in the SVR if deemed necessary along with disposal receipt dockets for proof of correct disposal.

**Asbestos**

Under the NSW EPA Asbestos and Waste Tyre Guidelines 2015 the legal requirements that consignors, transporters and occupiers of premises should meet in addition to the Waste Regulations for ACM transportation the following requirements are noted:

- A transporter of asbestos waste is to be registered as a transporter of Asbestos Waste on WasteLocate (https://wastelocate.epa.nsw.gov.au/) before transport of Asbestos Waste is to occur.

The transporter of asbestos waste should provide the following information to the NSW EPA upon registration on WasteLocate no later than on delivery of its first load of Asbestos Waste to the receiving facility:

- Name and address of the transporter.
- Mobile telephone number of the transporter's registered driver.
- Email address of the transporter.
- Trading name or agency name of the transporter.
- Drivers licence number of the transporter's registered driver.
- Postal address of the transporter, if different from address.
- Primary telephone number of transporters.
- The Australian Business Number (ABN) for the transporting company (if the entity has an ABN); and
- WorkCover licence number of the transporter, if held.

The transporter of a load of asbestos waste should provide the following information to the NSW EPA by using WasteLocate before the transportation of loads of Asbestos Waste:

- Type of Asbestos Waste in the load.
- Vehicle registration.
- Number of the vehicle driven by the transporter's registered driver for the specific consignment.

A transporter of a load of asbestos waste to any premises should scan the EPA Fixed Plate at the premises through their mobile device for each load. Scanning of the EPA Fixed Plate by the transporter for a load enables the occupier to meet its obligations under clause 76(7) or 79(6) (as applicable) of the Waste Regulation for that load.

If the EPA Fixed Plate at an occupier's premises is not scanned by the transporter, the occupier is to provide the EPA in writing the date and time of delivery of the load of Asbestos Waste, the vehicle registration number of the vehicle driven by or on behalf of the transporter for the specific consignment.

Where material is to be imported, controls are to be implemented to maintain separation between impacted and non-impacted materials.

It is noted that WasteLocate may not be required to be used for transport of asbestos impacted soils depending on the status of a temporary directive issued by NSW EPA. The status of WasteLocate requirements in relation to asbestos impacted soil is to be confirmed at the time of disposal.

### 12.3.3 Hazardous waste

Hazardous waste is subject to strict controls regarding its movement. Methods for management of hazardous waste will be developed, if required, based upon the CoPC and concentrations involved. There are currently two potential sources of hazardous waste on site which will be remediated under this RAP:

1. Hazardous materials (ACM, lead paint and SMF) was identified in existing structures/ buildings on site. Surface ACM was also located at three hotspots: ASB01, ASB02 and ASB04. This material be remediated and disposed of by a HAZMAT specialist in accordance with NSW EPA guidelines.
2. HA15 – Surface TRH concentrations reported in November 2018 (PSI) were compared against NSW EPA waste guidelines to obtain an indicative waste classification. Based on the single results which excluded leachability, the surface material falls into the category of hazardous waste. However, additional sampling is required to appropriately characterise the material, especially as the initial result was recorded in November 2018 and concentrations may have changed over time.

Management of hazardous waste is to be undertaken in consultation with and supervised by a suitably qualified environmental consultant. Remediation of hazardous wastes may require involvement of regulatory authorities, specialist contractors and storage or disposal.

Waste classification is determined by assessment of specific contaminant concentration (SCC) and / or toxicity characteristics leaching procedure (TCLP) with predetermined concentration criteria and waste classification categories include, general solid waste, restricted solid waste and hazardous waste.

# 13 HEALTH AND SAFETY PLAN

The principal remedial contractor should prepare a separate CEMP prior to the remediation works beginning. The information presented below is not exhaustive and is to be included along with additional relevant information in the CEMP.

The objectives of the health and safety plan are:

- To apply standard procedures that reduce risks resulting from the above works.
- To make sure employees are provided with appropriate training, equipment, and support to consistently perform their duties in a safe manner.
- To have procedures to protect other site workers and the public. These objectives will be achieved by:
  - Assignment of responsibilities.
  - An evaluation of hazards.
  - Establishment of personal protection standards and mandatory safety practices and procedures.
  - Provision for contingencies that may arise while operations are being conducted at the site.

This health and safety section does not provide safety information specific to construction and other demolition or excavation activities carried out by contractors, such as the safe operation, maintenance and inspection of plant, etc. Contractors will be required to prepare their own e.g. Safe Work Method Statements (SWMS), Job Hazard Analysis (JHA), Standard Operating Procedures (SOP) and task-based Risk Assessments (RA) for their work activities. Parties working on the site shall comply with applicable Health and Safety legislation, regulations, codes, and guidelines.

## 13.1 Responsibilities

Table 13-1 summarise the remediation roles and responsibilities

*Table 13-1 Remediation roles and responsibilities*

| Role | Responsibilities |
|---|---|
| Client Site Supervisor / Manager | • Advice on obtaining development approval.<br>• Helping to make sure works are compliant with the development approval.<br>• Assisting with community consultation.<br>• The client supervisor/manager contact details will be provided prior to the works. |
| Remediation Contractor | • Ensuring works are undertaken as per the RAP.<br>• Make sure all works involving the disturbance of the ACM impacted soils are conducted under the supervision of a suitably qualified Class A or Class B asbestos licensed contractor.<br>• Make sure ACM impacted soils are wetted to reduce the potential generation of dust.<br>• Minimise erosion at the site, including erosion of soils exposed during excavation and demolition works.<br>• Protect nearby receiving environments from potential contamination.<br>• Make sure impacted site plant and equipment are decontaminated prior to commencing work in soil that meets Residential A criteria.<br>• Signs and record keeping should indicate the origin and location of impacted materials.<br>• No stockpiling of impacted soils (where possible) to prevent cross contamination of soil that meets Residential A criteria. |

| Role | Responsibilities |
| --- | --- |
| | • Direct transport from impacted area to burial site.<br>• Validated areas should be isolated to prevent cross contamination.<br>• Routine site inspections.<br>• Ensuring works are undertaken in accordance appropriate regulations and standards.<br>• Ensuring works are undertaken as per the health and safety plan.<br>• Ensuring a copy of the health and safety plan is available at the site during the remediation/validation activities.<br>• Confirming individuals are competent in performing allotted tasks.<br>• Liaison with the client supervisor/manager and contractor representatives, as appropriate, regarding safety matters.<br>• Investigation and reporting of incidents and accidents.<br>• The remediation contractor contact details will be provided prior to commencement of works.<br>The remediation contractor contact details will be provided prior to commencement of works. |
| Environmental Consultant | • Coordinate and manage all onsite remediation works including subcontractors.<br>• Coordinate and conduct asbestos and dust air quality monitoring prior to, during and post remediation works.<br>• Review monitoring results on a daily basis and inform Site Supervisor of any exceedance and proposed controls. Oversee implementation of controls as deemed necessary<br>• Undertake remediation and validation sampling as per the RAP.<br>• Ensuring consultant works are undertaken as per the health and safety plan.<br>• Liaison with the contractor representatives, as appropriate, regarding safety matters.<br>• Undertake validation and reporting as per the RAP. |

The contact details of the responsible parties are provided in Table 13-2.

*Table 13-2 Contact Details*

| Client's Supervisor / Manager | Details |
|---|---|
| Name | To be advised (TBA) |
| Company | TBA |
| Address | TBA |
| Contact Phone | TBA |
| **Remediation Contractor** | **Details** |
| Name | TBA |
| Company | TBA |
| Address | TBA |
| Contact Phone | TBA |
| **Environmental Consultant** | **Details** |
| Name | TBA |
| Company | TBA |
| Address | TBA |
| Contact Phone | TBA |

## 13.2 Other Members of the Site Workforce

Individual workers are responsible for conducting their allocated tasks in a safe manner and in accordance with their training and experience. They should give due consideration to the safety of others in their proximity and cooperate in matters of health and safety. Workers should leave their work areas in such a condition that the location will not be hazardous to others at any time.

## 13.3 Hazards

The known or potential hazards associated with the work activities are listed below:

- Chemical hazards associated with the presence of impacted soil.
- Physical hazards, including:
  - Work in or near excavations,
  - Operating machinery,
  - Heat stress and UV exposure,
  - Underground or overhead services,
  - Manual handling,
  - Noise.

In the event of the discovery of conditions that would suggest the existence of a situation more hazardous than anticipated, or of new hazard that could potentially cause serious harm to personnel or the environment, work will be suspended until the Project Manager has been notified and appropriate instructions have been provided to field personnel.

## 13.4 Chemical Hazards

The main chemical hazards associated with the remediation/validation works are ACM based products. SafeWork Australia has published 'How to safely remove asbestos code of practice' (October 2018) which provides additional information on safety standards when removing asbestos.

Workers involved in disturbing the known impacted soil, and surrounding stakeholders, could be exposed by:

- Respiration of dust or potential fibres generated from the soil.
- Dermal contact with asbestos impacted soils.
- Ingestion of asbestos impacted soils.
- Possible secondary exposure from impacted equipment or clothing.

Planning of the earthworks involving exposure and / or disturbance of ACM impacted soils, and implementation of appropriate health and safety measures, will minimise the potential for contact with impacted materials through the above listed pathways.

Machinery (i.e. excavators and / or trucks) that are required to conduct work on or pass over the site will need to be enclosed (windows wound to the full up position) with re-circulatory air functioning. Movement outside of the vehicle should be conducted with the required PPE. Equipment and PPE is to be handled as outlined in Section 13.6 unless done in a designated clean area of the site.

When working with impacted materials in general, care is to be taken to make sure that the contamination is not introduced to the worker via ingestion, inhalation, or absorption. PPE and decontamination requirements related to the remedial works are summarised in Sections 13.6 and 13.7.

## 13.5 Physical Hazards

### 13.5.1 Manual handling

When lifting or handling heavy objects, use correct lifting techniques, bending the knees not the back. If the item to be lifted is too heavy or awkward for one person to lift, seek assistance from other company employees or use mechanical help.

### 13.5.2 Operating machinery

Heavy plant and equipment operating in the vicinity of field personnel presents a risk of physical injury. Personnel should be aware of their position in relation to operating machinery.

Personnel should wear high visibility clothing when onsite.

Never walk behind or to the side of operating equipment without the operator's knowledge.

Do not assume that the operator knows your position.

Personnel should stay at least 1 m from the operational area of heavy equipment and should not stand directly below loads or pieces of equipment (e.g. backhoes, excavators, vehicles).

### 13.5.3 Noise

Long-term exposure to high levels of noise is unlikely. However, operating machinery may cause significant noise exposures for short periods. Earplugs or earmuffs should be worn in situations where noise levels make normal conversation difficult.

### 13.5.4 Work in or near excavations

No site personnel are to stand closer than 0.5 m to the edge of an excavation. No site personnel are to enter excavation greater than 1 m deep. Additionally, at the end of each day excavations are to be barricaded to prevent access.

### 13.5.5 Cuts and abrasions

The manual work associated with the remediation works gives rise to the risk of cuts and abrasions to personnel working in the area. As well as the direct consequences of cuts or abrasions, such injuries can lead to the possibility of exposure to contaminants through the wound as well as diseases such as tetanus. To minimise the risk of direct or indirect injury, personnel will wear the personal protective equipment described.

### 13.5.6 Heat stress and UV exposure

Site personnel may experience heat stress due to a combination of elevated ambient temperatures and the concurrent use of personal protection equipment; this depends in part on the type of work and the time of year.

In addition to heat stress, overexposure to UV radiation in sunlight can result in sunburn to exposed skin. The use of a high protection sunscreen (SPF15 or greater) on exposed skin is recommended. Hats (including hard hats in specified areas) will also provide additional sun protection during the peak (i.e. 10:00 am to 3:00 pm) sun period. Sunglasses should be worn (where appropriate) to protect eyes from effects of UV exposure.

### 13.5.7 Underground services

There is the potential for underground services (electricity, natural gas lines, water, telephone, optic fibre, sewer, and stormwater) to be present beneath the work area. The remediation contractor shall make sure that appropriate procedures will be taken to minimise the risk associated with excavation near services.

### 13.5.8 Above ground Electrical Hazards

Electrical plant and equipment is to comply with the requirements of Australian Standard AS 3000. Handheld portable tools shall comply with AS/NZS 3160 "hand-held portable electric tools" and shall be double insulated.

Cord connected Portable hand lamps shall comply with AS/NZS 3118. A Residual Current Device (RCD) shall protect plug-in Portable equipment, which is connected to a supply above Extra Low Voltage - 12-24volts (including equipment supplied from a generator or welding set). RCD protection shall be provided during maintenance of Portable electrical equipment at all times while the equipment is connected to a power supply above Extra Low Voltage, irrespective of whether power is switched ON or OFF. RCD's shall comply with AS 3190 and shall be type II units, rated to trip at or below 30 milliamps within 40 milliseconds.

## 13.6 Personal Protective Equipment (PPE)

Workers who may come into direct contact with impacted soil will wear the following PPE for areas with no ACM exposure risks:

- Overalls or long-sleeved collared shirt.
- Heavy duty outer gloves (e.g. Leather) where there is a risk of cuts or abrasions, otherwise PVC outer gloves if in direct contact with impacted soil.
- Steel capped boots.
- Safety glasses.

- High visibility vest or jacket.
- Hard hat.

It is further noted that additional PPE may be required as part of the WorkCover permitting process. If this occurs, then the above PPE requirements will be upgraded to reflect WorkCover's requirements.

In the event workers will be exposed to highly odorous soil conditions during remediation works, the following additional PPE should be adopted:

- Impermeable disposable overalls; and
- Half or full-face respirator with organic vapour cartridge (as per action levels identified in Table 13-3.

A PID shall be used to monitor the concentrations of VOCs within the workspace, with the following action levels at which the additional PPE mentioned above is required.

*Table 13-3 VOC protection level*

| Instrument | Airborne Levels | Level of Protection |
|---|---|---|
| PID | < 1 ppm | No additional protection |
| PID and/or Dräger or Kitagawa tubes | > 1 ppm | Half or full faced respirator* |
| PID and/or Dräger or Kitagawa tubes | > 10 ppm** or > 1 ppm on the site boundary | Stop work, cover excavation to minimise production of hydrocarbons |

*If action levels exceed the action level following 5 minutes, the use of a respirator is required. Organic respirator cartridge to be changed daily.

** 10 times the benzene exposure limit as recommended by 3M Respirator Selection Guide.

For areas where a risk of exposure to ACM is present, personal protective clothing should be made from materials that provide protection against fibre penetration and not from wool or other materials that attract fibrous dusts.

Equipment used for the removal of asbestos should be examined before the commencement of the asbestos removal work, after repairs and at least once every seven days when it is continually being used. A register with the details of these examinations, the state of the equipment and repair details should be maintained.

The level of PPE would also need to address/include other requirements relating to the nature of the activities to be undertaken. Additional PPE may be required at the request of the appropriately asbestos licensed (Class A or Class B) contractor if supervising the works.

Persons engaged in intrusive works within the vicinity of the affected area should wear respiratory protective equipment conforming to the requirements of AS/NZS1716-2003 *Respiratory Protective Devices.*

## 13.7 Decontamination Procedures

At the end of the asbestos removal work and upon leaving the asbestos removal work area, PPE is to be disposed of as asbestos waste or decontaminated and stored in sealed double bags before being removed from the asbestos removal site to be laundered by a laundry with facilities for laundering asbestos-impacted materials. PPE should be thoroughly wet before being placed in bags.

The additional decontamination procedures specified below will be followed whenever personnel, plant or equipment leave the site. Procedures are applicable where personnel or plant/equipment have come into contact with TRH hotspot material or ACM.

<u>Personnel</u>

The following steps should be taken to make sure personnel do not leave the site with potentially impacted clothing:

- Wash boots in clean water (or wear disposable boot covers),

- Remove outer gloves and store for reuse,
- Remove overalls (if used) and store for reuse,
- Remove respirator and goggles (if used) and store clean for reuse or decontamination, as appropriate; and
- Thoroughly wash hands and face.

If part of a worker's body comes into direct contact with potentially impacted material, the affected part(s) should be immediately washed with clean water.

Vehicle, Plant and Equipment

Equipment, including personal protective equipment, will be washed or otherwise cleaned to make sure that impacted soil, water or dust is removed before it leaves the Site. Plant and equipment will have their outer bodies thoroughly cleaned of soil and sediment before moving off the site.

## 13.8 Contamination Control Zone

The lunch shed/crib hut and office (or similar suitable facility) will be located outside the contamination control zone and will be designated clean zones. Personal and plant leaving the contamination zone is to undergo appropriate decontamination procedures, in a designated area (decontamination zone) as discussed above, prior to entering the site clean zones.

# 14 CONCLUSIONS

It is considered that the objectives of the onsite remediation will be achieved subject to the successful implementation of the actions contained in this RAP, which will enable the site to be suitable for proposed commercial / industrial land use.

Validation of onsite soils will be undertaken over the remediation surfaces across the site. Due to the scale of the development, proposed cut and fill depths, no impacted material is anticipated to remain on site, or be at a depth at which it is anticipated to be encountered an pose a potential risk to health or the environment.

# 15 REFERENCES


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WA DoH (2009) Guidelines for Asbestos-Contaminated Sites in Western Australia

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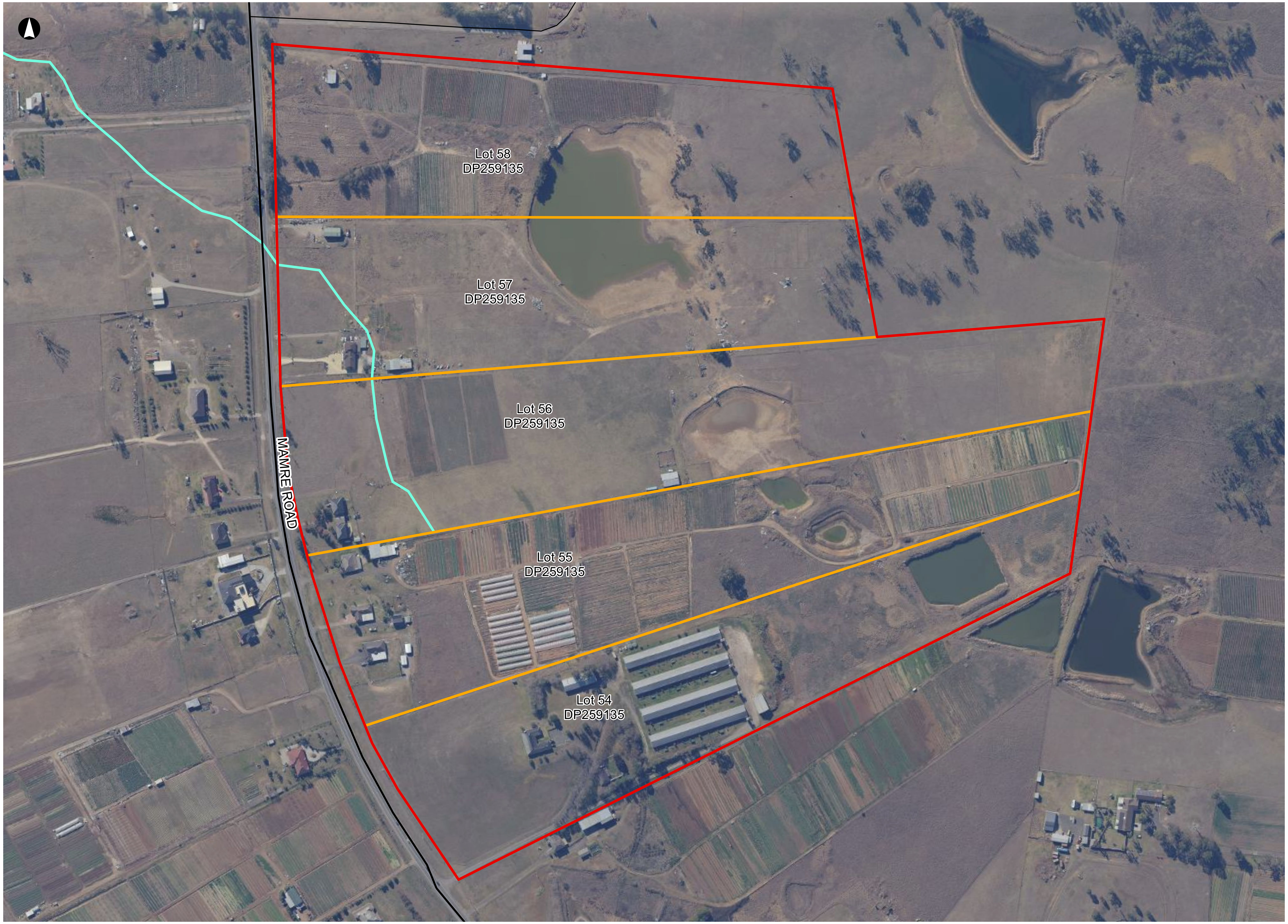
WA DOH (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, WA Department of Health

# 16 APPENDICES

# APPENDIX A – FIGURES

## 10035157 - Aspect Industrial Estate - Detailed Site Investigation




**Legend**

- Site Boundary
- Lot Boundaries
- Creek

1:4,126 at A3

**ARCADIS AUSTRALIA PACIFIC PTY LTD**
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Coordinate System: GDA 1994 MGA Zone 56
Date issued: February 14, 2020

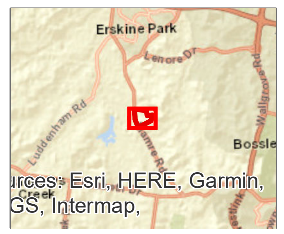


Figure 1 - Site Overview

0 40 80 160 240 320
m

Date: 14/02/2020 Path: H:\AAP_ER_GIS\Projects\10035157\DSI\Figure 1 - Site Overview.mxd
Created by : Environmental Restoration
QA by : Environmental Restoration

## 10035157 - Aspect Industrial Estate - Detailed Site Investigation


**Legend**

- Approximate Extent of Fill
- Elevated Embankment
- Former Chicken Farm Area
- Market Gardens
- Stockpiled Wastes
- Dams
- Creek
- Lot Boundaries
- Site Boundary

1:4,000 at A3

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Date issued: February 14, 2020

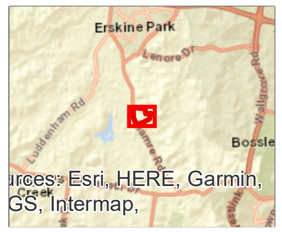
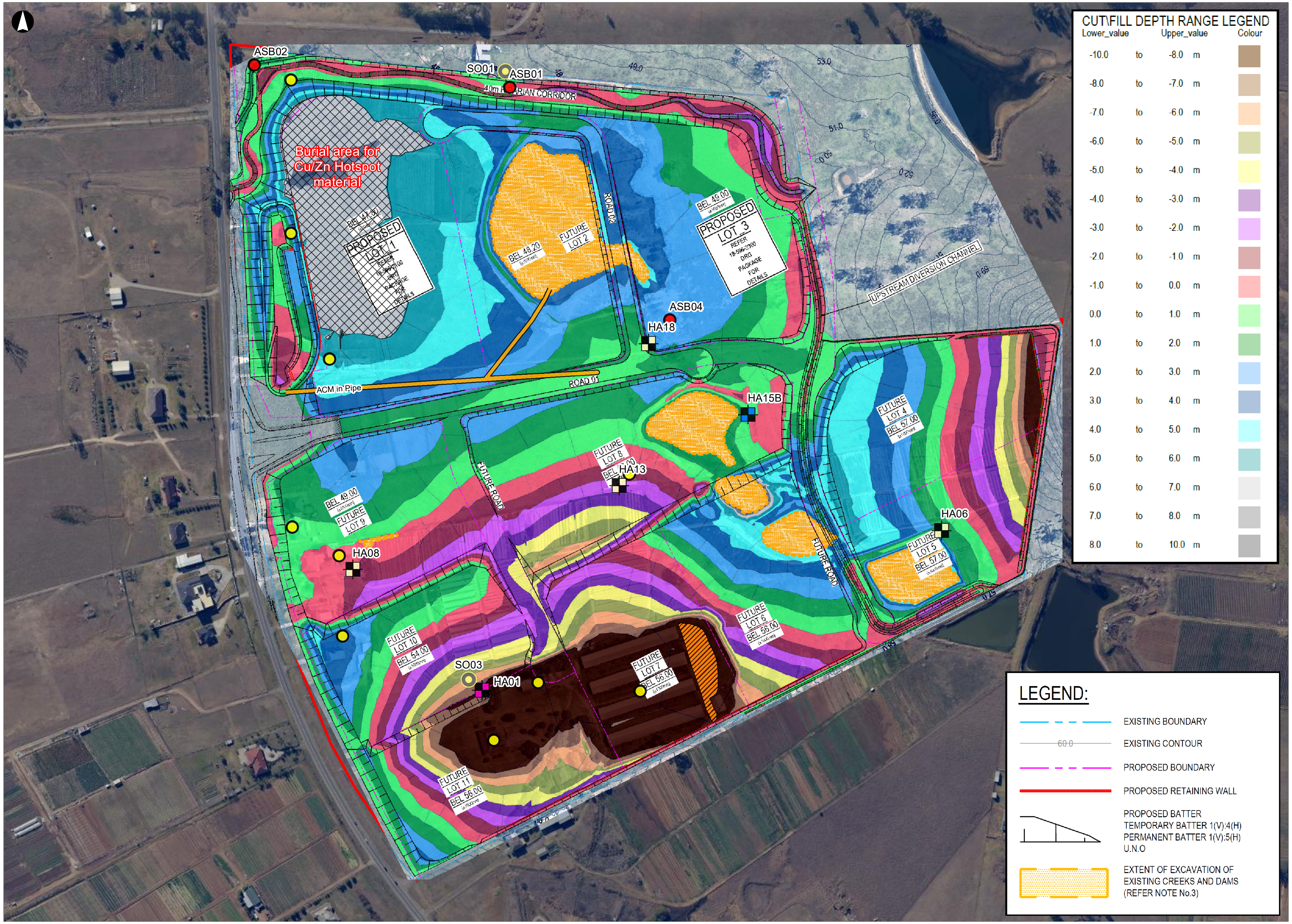



Figure 2a - Site Layout

0 40 80 160 240 320
m

Date: 14/02/2020 Path: H:\AAP_ER_GIS\Projects\10035157\DSI\Figure 2 - Site Layout.mxd
Created by : Environmental Restoration
QA by : Environmental Restoration




## Legend

- Site Boundary
- ACM at Surface
- Asbestos in Structures
- Asbestos Pipe
- Asbestos at Surface
- Material Placement Area

### Surface Soil Sample

- Copper Hotspot

### Hand Auger Locations

- Zinc Hotspots
- Zinc and Copper Hotspots
- TRH Hotspot

Note: Cut and fill plan created by AT&L, and supplied to Arcadis by Mirvac Group for inclusion in this figure.

1:4,157 at A3

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Date issued: October 14, 2020


Figure 3 - RAP Remediation Requirements

0 50 100 200 300 400 500 m

10035157 - Mirvac Group - Aspect Industrial Estate, Kemps Creek, NSW - Remedial Action Plan


Notes:
- Proposed excavation areas are not to scale.
- Asbestos pipe excavation proposed to be extended 0.5 metres to either side of pipe and 0.5 m deep.
- The remainder of remedial hotspot excavations are proposed to be 3 metres x 3 metres in area.

Note: Cut and fill plan created by AT&L, and supplied to Arcadis by Mirvac Group for inclusion in this figure.

1:4,153 at A3

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Figure 4 - RAP Indicative Remediation Locations and Areas

0 50 100 200 300 400 500 m

Date: 4/06/2020 Path: H:\AAP_ER_GIS\Projects\10035157\RAP\Remediation Area - no CF plan.mxd
Created by : CC
QA by : RB

# APPENDIX B – PROPOSED DEVELOPMENT FIGURES (AL&T, 2020)


| | | |
|---|---|---|
| B | ISSUED FOR DEVELOPMENT APPLICATION | 12-10-20 |
| A | ISSUED FOR DEVELOPMENT APPLICATION | 15-05-20 |
| Issue | Description | Date |

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1



Client

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| | | | |
|---|---|---|---|
| Scales | 1:2000 | Drawn | PDK |
| | | Designed | PDK |
| Grid | MGA | Checked | AT |
| Height Datum | AHD | Approved | AM |

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

BULK EARTHWORKS
CONTOUR PLAN

Civil Engineers and Project Managers

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Status

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A1

Project - Drawing No. 18-596-C1020

Issue B

100mm on Original

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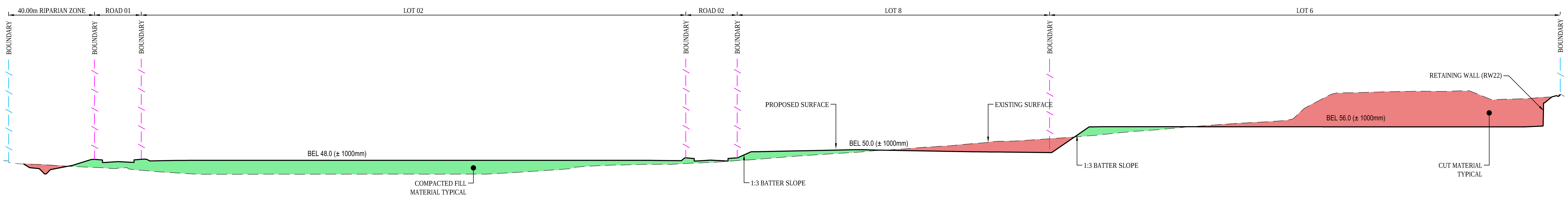


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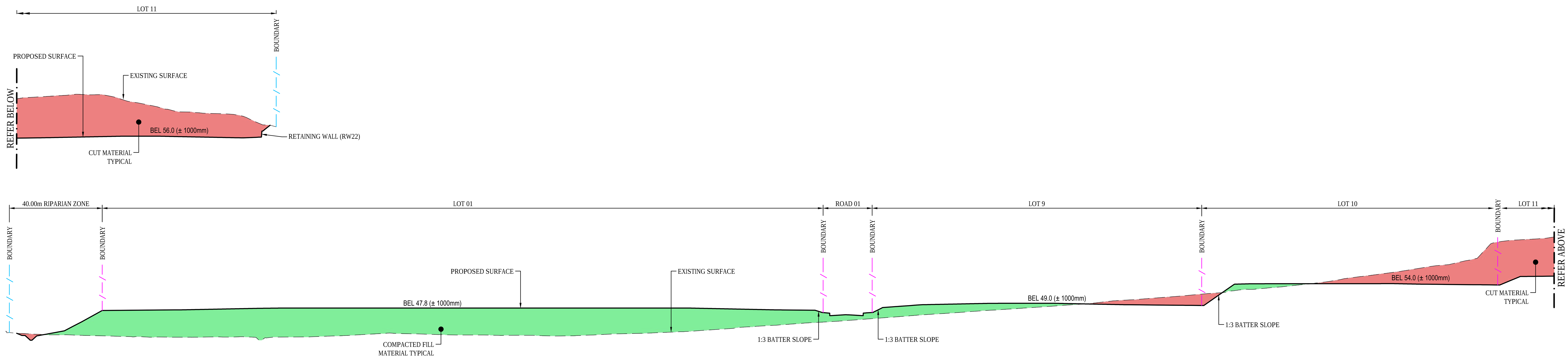
1:500(V)




SECTION BE1 (C1020)
SCALE 1:1000(H)
1:500(V)

ALL FINISHED LEVELS SHOWN ARE ±1000mm

| Issue | Description | Date |
|---|---|---|
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| A | ISSUED FOR DEVELOPMENT APPLICATION | 15-05-20 |

Bar Scales

0 20 40 60 80 100m
1 : 1000 @ A1 1 : 2000 @ A3

0 10 20 30 40 50m
1 : 500 @ A1 1 : 1000 @ A3



Client: mirvac

| Scales | 1:1000(H) 1:500(V) |
|---|---|
| Grid | MGA |
| Height Datum | AHD |

| | |
|---|---|
| Drawn | PDK |
| Designed | PDK |
| Checked | AT |
| Approved | AM |

Project: ASPECT INDUSTIAL ESTATE MAMRE ROAD, KEMPS CREEK STAGE 1

Title: BULK EARTHWORKS SECTIONS SHEET 1

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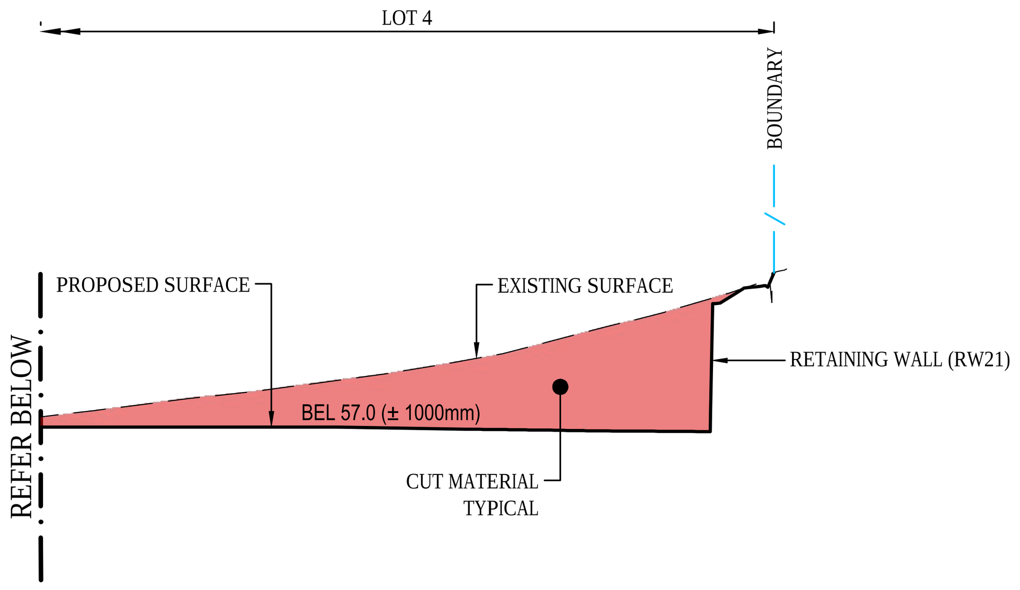


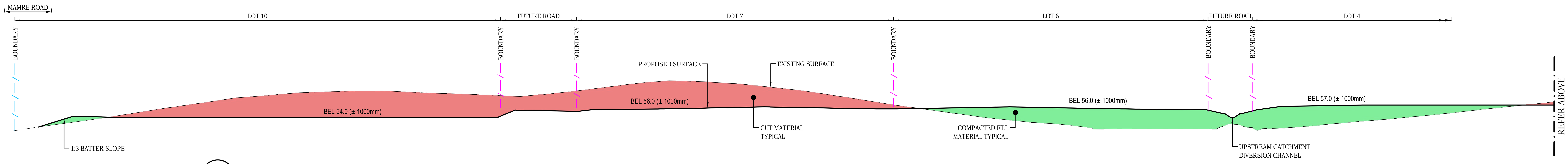


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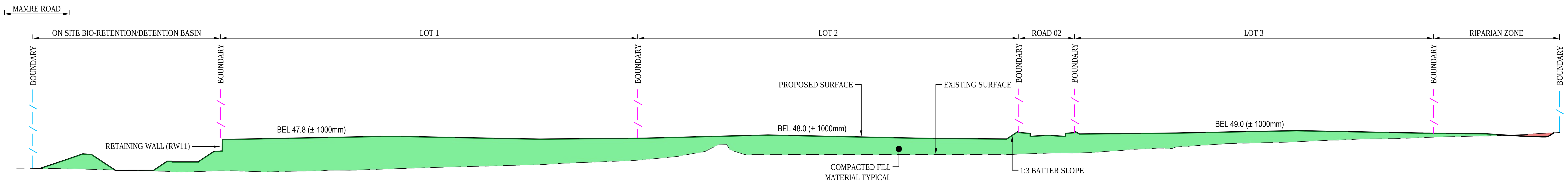
1:500(V)




SECTION BE3 C1020
SCALE 1:1000(H)

ALL FINISHED LEVELS SHOWN ARE ±1000mm

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| A | ISSUED FOR DEVELOPMENT APPLICATION | 15-05-20 |

Bar Scales

0 20 40 60 80 100m
1 : 1000 @ A1 1 : 2000 @ A3

0 10 20 30 40 50m
1 : 500 @ A1 1 : 1000 @ A3



Client: mirvac

| | | | |
|---|---|---|---|
| Scales | 1:1000(H) 1:500(V) | Drawn | PDK |
| | | Designed | PDK |
| Grid | MGA | Checked | AT |
| Height Datum | AHD | Approved | AM |

Project: ASPECT INDUSTRIAL ESTATE MAMRE ROAD, KEMPS CREEK STAGE 1

Title: BULK EARTHWORKS SECTIONS SHEET 2

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Project - Drawing No. 18-596-C1022 Issue B

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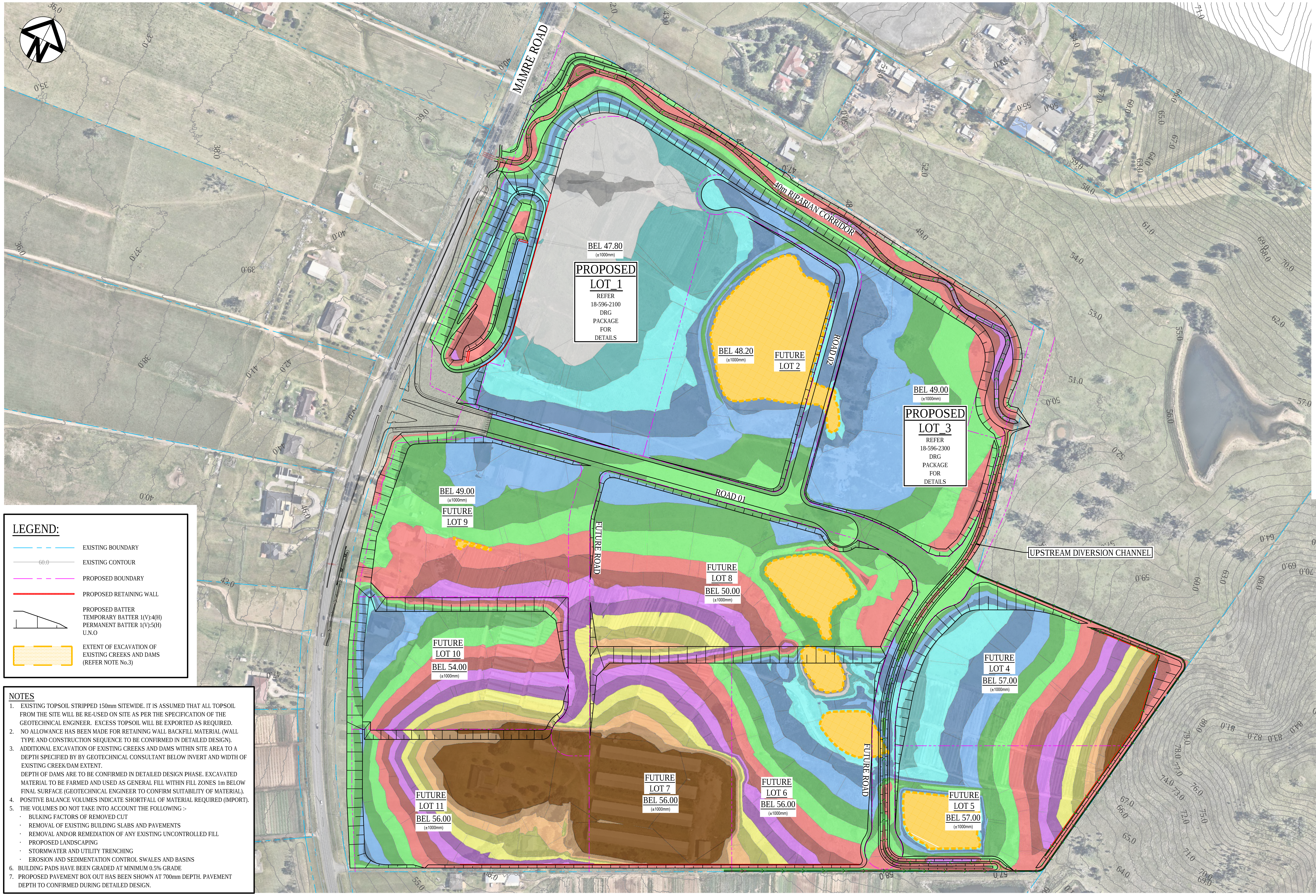


## LEGEND:

- EXISTING BOUNDARY
- 60.0 EXISTING CONTOUR
- PROPOSED BOUNDARY
- PROPOSED RETAINING WALL
- PROPOSED BATTER TEMPORARY BATTER 1(V):4(H) PERMANENT BATTER 1(V):5(H) U.N.O
- EXTENT OF EXCAVATION OF EXISTING CREEKS AND DAMS (REFER NOTE No.3)

## NOTES

1. EXISTING TOPSOIL STRIPPED 150mm SITEWIDE. IT IS ASSUMED THAT ALL TOPSOIL FROM THE SITE WILL BE RE-USED ON SITE AS PER THE SPECIFICATION OF THE GEOTECHNICAL ENGINEER. EXCESS TOPSOIL WILL BE EXPORTED AS REQUIRED.
2. NO ALLOWANCE HAS BEEN MADE FOR RETAINING WALL BACKFILL MATERIAL (WALL TYPE AND CONSTRUCTION SEQUENCE TO BE CONFIRMED IN DETAILED DESIGN).
3. ADDITIONAL EXCAVATION OF EXISTING CREEKS AND DAMS WITHIN SITE AREA TO A DEPTH SPECIFIED BY BY GEOTECHNICAL CONSULTANT BELOW INVERT AND WIDTH OF EXISTING CREEK/DAM EXTENT.
   DEPTH OF DAMS ARE TO BE CONFIRMED IN DETAILED DESIGN PHASE. EXCAVATED MATERIAL TO BE FARMED AND USED AS GENERAL FILL WITHIN FILL ZONES 1m BELOW FINAL SURFACE (GEOTECHNICAL ENGINEER TO CONFIRM SUITABILITY OF MATERIAL).
4. POSITIVE BALANCE VOLUMES INDICATE SHORTFALL OF MATERIAL REQUIRED (IMPORT).
5. THE VOLUMES DO NOT TAKE INTO ACCOUNT THE FOLLOWING :-
   - BULKING FACTORS OF REMOVED CUT
   - REMOVAL OF EXISTING BUILDING SLABS AND PAVEMENTS
   - REMOVAL AND\OR REMEDIATION OF ANY EXISTING UNCONTROLLED FILL
   - PROPOSED LANDSCAPING
   - STORMWATER AND UTILITY TRENCHING
   - EROSION AND SEDIMENTATION CONTROL SWALES AND BASINS
6. BUILDING PADS HAVE BEEN GRADED AT MINIMUM 0.5% GRADE
7. PROPOSED PAVEMENT BOX OUT HAS BEEN SHOWN AT 700mm DEPTH. PAVEMENT DEPTH TO CONFIRMED DURING DETAILED DESIGN.

## CUT\FILL DEPTH RANGE LEGEND

| Lower_value | | Upper_value | | Colour |
|---|---|---|---|---|
| -10.0 | to | -8.0 | m | |
| -8.0 | to | -7.0 | m | |
| -7.0 | to | -6.0 | m | |
| -6.0 | to | -5.0 | m | |
| -5.0 | to | -4.0 | m | |
| -4.0 | to | -3.0 | m | |
| -3.0 | to | -2.0 | m | |
| -2.0 | to | -1.0 | m | |
| -1.0 | to | 0.0 | m | |
| 0.0 | to | 1.0 | m | |
| 1.0 | to | 2.0 | m | |
| 2.0 | to | 3.0 | m | |
| 3.0 | to | 4.0 | m | |
| 4.0 | to | 5.0 | m | |
| 5.0 | to | 6.0 | m | |
| 6.0 | to | 7.0 | m | |
| 7.0 | to | 8.0 | m | |
| 8.0 | to | 10.0 | m | |

## EARTHWORKS VOLUMES

| | |
|---|---|
| CUT MATERIAL ($m^3$) | -711,670 |
| FILL MATERIAL ($m^3$) | 982,152 |
| BALANCE ($m^3$) | 270,482 (IMPORT) |

## EARTHWORKS AREAS

| | |
|---|---|
| CUT (ha) | 17.8 |
| FILL (ha) | 38.0 |
| FARM DAMS (ha) | 3.0 |
| TOTAL (ha) | 58.8 |

| Issue | Description | Date |
|---|---|---|
| C | ISSUED FOR DEVELOPMENT APPLICATION | 12-10-20 |
| B | ISSUED FOR DEVELOPMENT APPLICATION | 22-05-20 |
| A | ISSUED FOR DEVELOPMENT APPLICATION | 15-05-20 |

Bar Scales

0 50 100 150 200m

1 : 2000 @ A1

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Client

mirvac

| | | | |
|---|---|---|---|
| Scales | 1:2000 | Drawn | PDK |
| | | Designed | PDK |
| Grid | MGA | Checked | AT |
| Height Datum | AHD | Approved | AM |

Project

ASPECT INDUSTIAL ESTATE
MAMRE ROAD,
KEMPS CREEK
STAGE 1

Title

BULK EARTHWORKS
CUT/FILL PLAN

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A1

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Issue C

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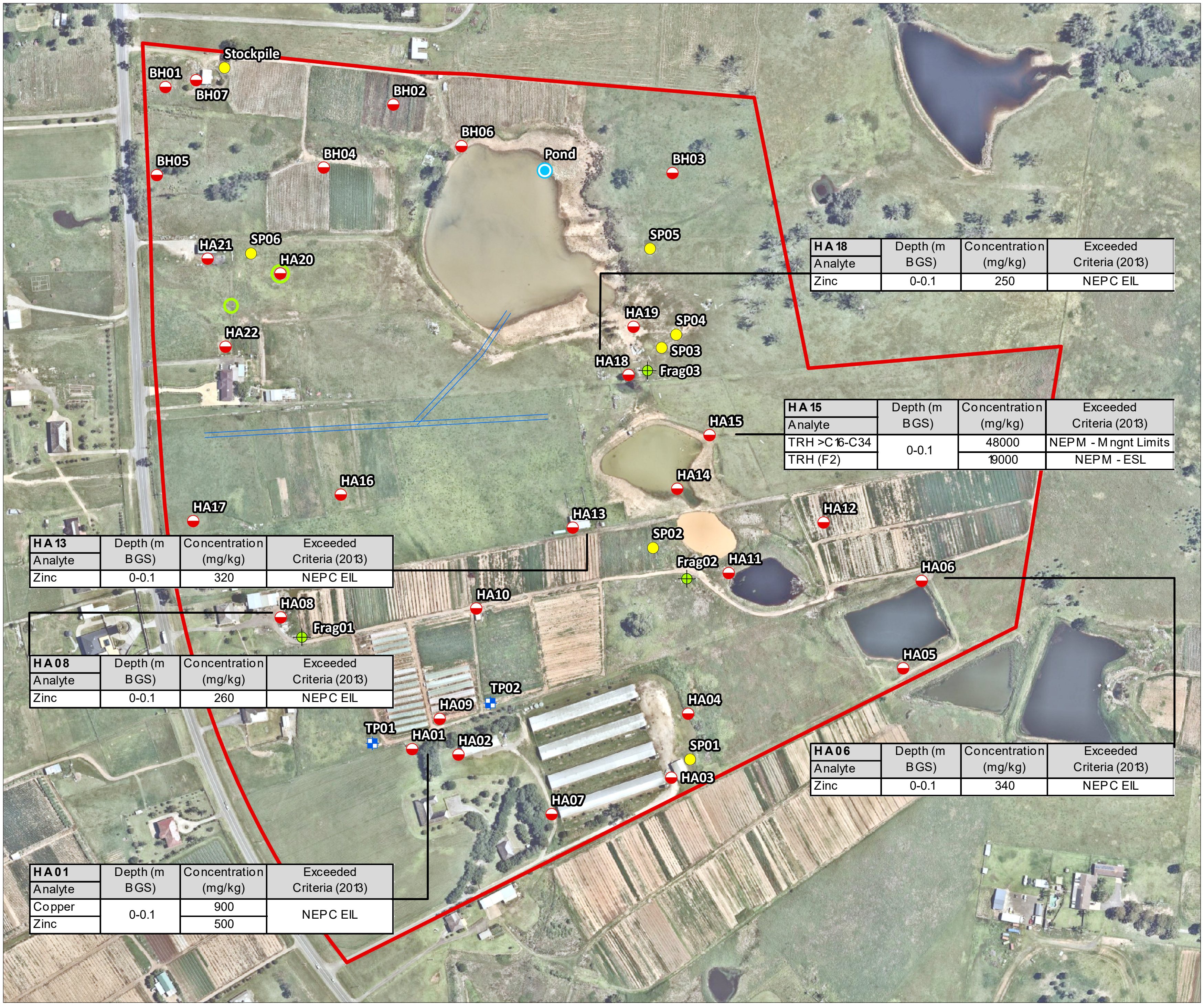
# APPENDIX C – PREVIOUS INVESTIGATION FIGURES

## Figure 1, Appendix C - Summary PSI exceedances




| HA 18 Analyte | Depth (m BGS) | Concentration (mg/kg) | Exceeded Criteria (2013) |
|---|---|---|---|
| Zinc | 0-0.1 | 250 | NEPC EIL |

| HA 15 Analyte | Depth (m BGS) | Concentration (mg/kg) | Exceeded Criteria (2013) |
|---|---|---|---|
| TRH >C16-C34 | 0-0.1 | 48000 | NEPM - Mngnt Limits |
| TRH (F2) | | 19000 | NEPM - ESL |

| HA 13 Analyte | Depth (m BGS) | Concentration (mg/kg) | Exceeded Criteria (2013) |
|---|---|---|---|
| Zinc | 0-0.1 | 320 | NEPC EIL |

| HA 08 Analyte | Depth (m BGS) | Concentration (mg/kg) | Exceeded Criteria (2013) |
|---|---|---|---|
| Zinc | 0-0.1 | 260 | NEPC EIL |

| HA 06 Analyte | Depth (m BGS) | Concentration (mg/kg) | Exceeded Criteria (2013) |
|---|---|---|---|
| Zinc | 0-0.1 | 340 | NEPC EIL |

| HA 01 Analyte | Depth (m BGS) | Concentration (mg/kg) | Exceeded Criteria (2013) |
|---|---|---|---|
| Copper | 0-0.1 | 900 | NEPC EIL |
| Zinc | | 500 | |

**Legend:**

- Approximate Site Boundary
- ACM Fragment
- ACM Pipe

**Sample Locations**

- Hand Auger Sample
- Materials Sample
- Stockpile Sample
- Testpit Sample
- Surface Water Sample

JBS&G

Job No: 55607

Client: Mirvac

Version: R01 Rev A | Date 30/01/2019

Drawn By: AV | Checked By: CK

Scale 1:5,200

0 60 120
metres

Coord. Sys. GDA 1994 MGA Zone 56

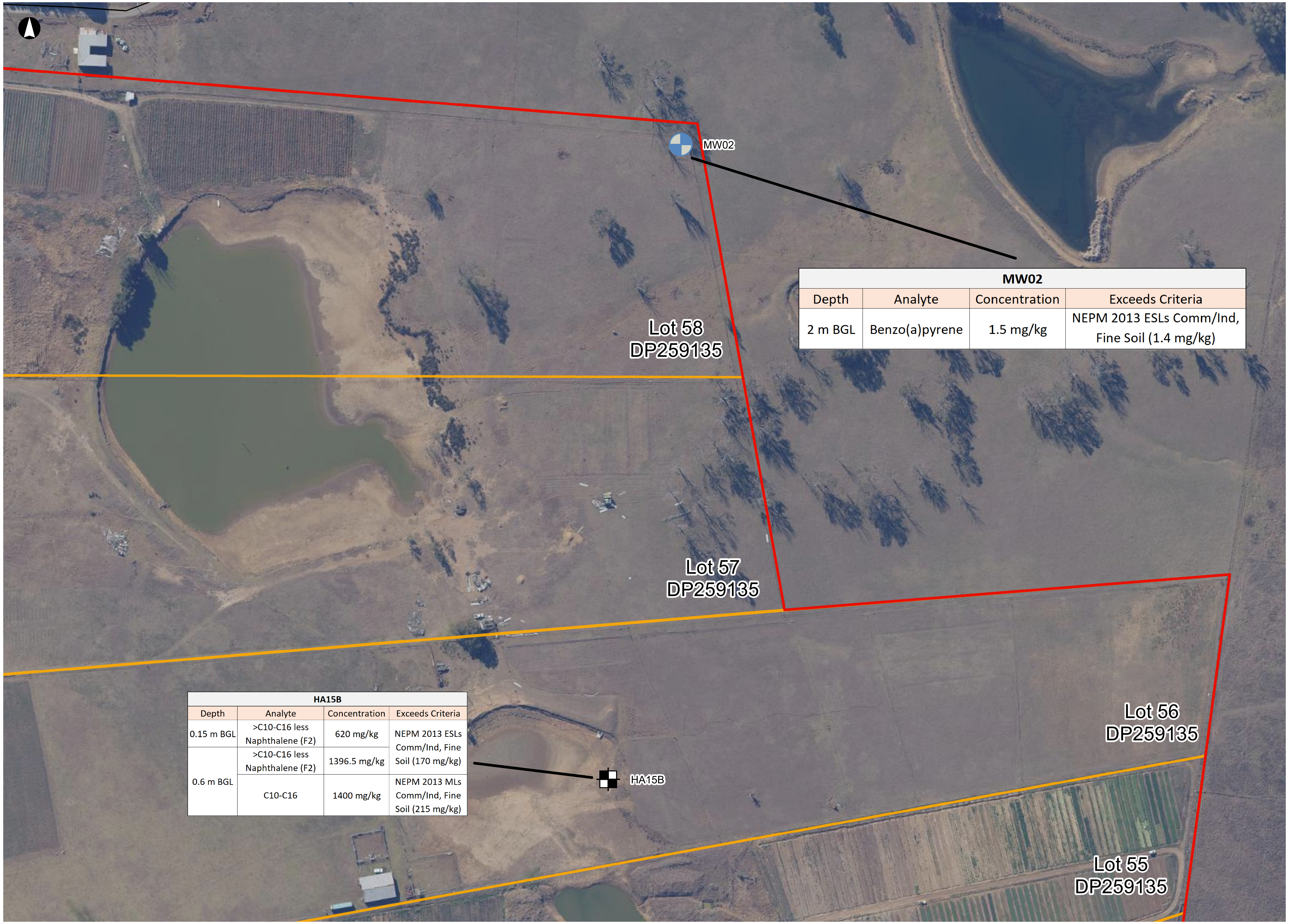
**Lot 54-58 DP 259135**
**Kemps Creek, NSW**

**GUIDELINES EXCEEDANCES – SOIL**

**FIGURE 4**

File Name: N:\Projects\Mirvac\55607 Mamre Rd, Kemps Creek\GIS\Maps\R01 Rev A\55607_04_SoilExceed.mxd
Reference: Nearmap - nearmap.com.au - Imagery 29-12-2018

# 10035157 - Aspect Industrial Estate - Detailed Site Investigation




| MW02 | | | |
|---|---|---|---|
| Depth | Analyte | Concentration | Exceeds Criteria |
| 2 m BGL | Benzo(a)pyrene | 1.5 mg/kg | NEPM 2013 ESLs Comm/Ind, Fine Soil (1.4 mg/kg) |

| HA15B | | | |
|---|---|---|---|
| Depth | Analyte | Concentration | Exceeds Criteria |
| 0.15 m BGL | >C10-C16 less Naphthalene (F2) | 620 mg/kg | NEPM 2013 ESLs Comm/Ind, Fine Soil (170 mg/kg) |
| 0.6 m BGL | >C10-C16 less Naphthalene (F2) | 1396.5 mg/kg | |
| | C10-C16 | 1400 mg/kg | NEPM 2013 MLs Comm/Ind, Fine Soil (215 mg/kg) |

**Legend**

- Hand Auger
- Monitoring Well Soil
- Site Boundary
- Lot Boundaries

1:2,104 at A3

mirvac

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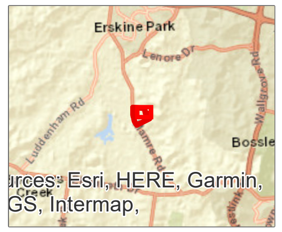


Figure 2, Appendix C - DSI Soil Criteria Exceedances

0 20 40 80 120 160
m

Date: 9/06/2020 Path: H:\AAP_ER_GIS\Projects\10035157\RAP\DSI re-exports\Fig 2 - Soil Exceedances.mxd
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**Legend**

- Hand Auger Locations
- Dams
- Lot Boundaries
- Site Boundary

1:2,300 at A3

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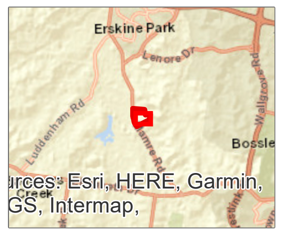


Figure 3, Appendix C - DSI Hand Auger Locations

0 20 40 80 120 160
m

Date: 9/06/2020 Path: H:\AAP_ER_GIS\Projects\10035157\RAP\DSI re-exports\Fig 3 - Hand Augers.mxd
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| DS01 | | |
|---|---|---|
| Analyte | Concentration | Exceeds Criteria |
| Arsenic | 22 mg/kg | ANZG (2018) Interim Sediment Quality Guideline Trigger Values - ISQG-Low (20 mg/kg) |

| DS02 | | |
|---|---|---|
| Analyte | Concentration | Exceeds Criteria |
| Arsenic | 21 mg/kg | ANZG (2018) Interim Sediment Quality Guideline Trigger Values - ISQG-Low (20 mg/kg) |

| DS05 | | |
|---|---|---|
| Analyte | Concentration | Exceeds Criteria |
| Nickel | 41 mgkg | ANZG (2018) Interim Sediment Quality Guideline Trigger Values - ISQG-Low (21 mg/kg) |

**Legend**

- Sediment Exceedances
- Site Boundary
- Lot Boundaries

1:2,500 at A3

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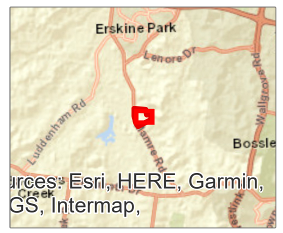


Figure 4, Appendix C - DSI Sediment Criteria Exceedances

0 25 50 100 150 200
m

Date: 9/06/2020 Path: H:\AAP_ER_GIS\Projects\10035157\RAP\DSI re-exports\Fig 4 - Sediment Exceedances.mxd
Created by : Environmental Restoration
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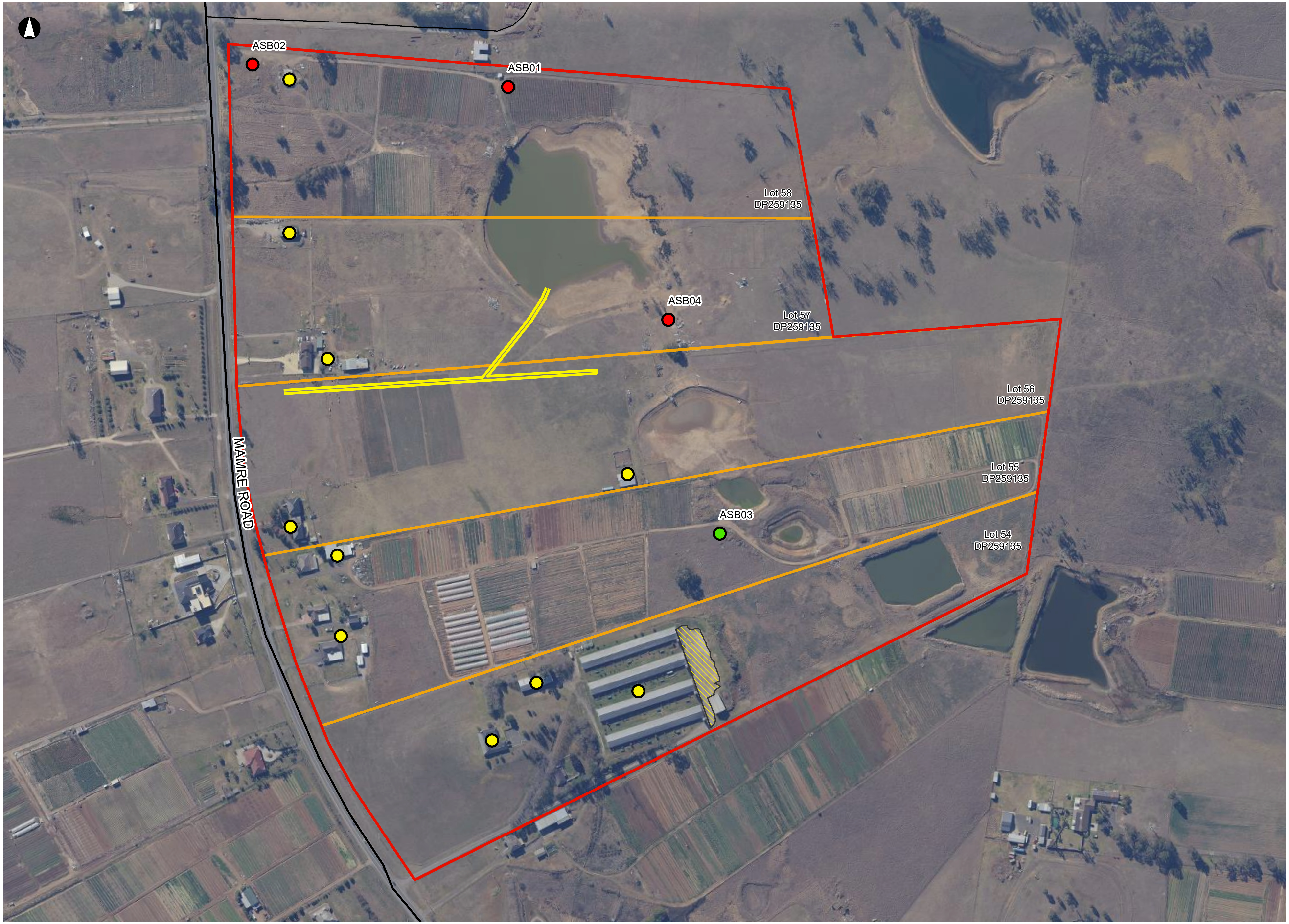


**Legend**

- Confirmed ACM
- Non-ACM
- PACM within structures
- Crushed Asbestos Sheeting
- Asbestos Pipe
- Lot Boundaries
- Site Boundary

1:4,124 at A3

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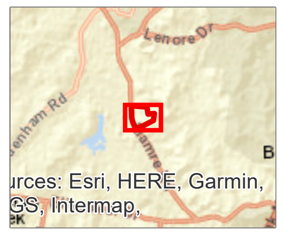


Figure 5, Appendix C - DSI Asbestos Locations

0 40 80 160 240 320
m

Date: 9/06/2020 Path: H:\AAP_ER_GIS\Projects\10035157\RAP\DSI re-exports\Fig 5 - Asbestos Exceedances.mxd
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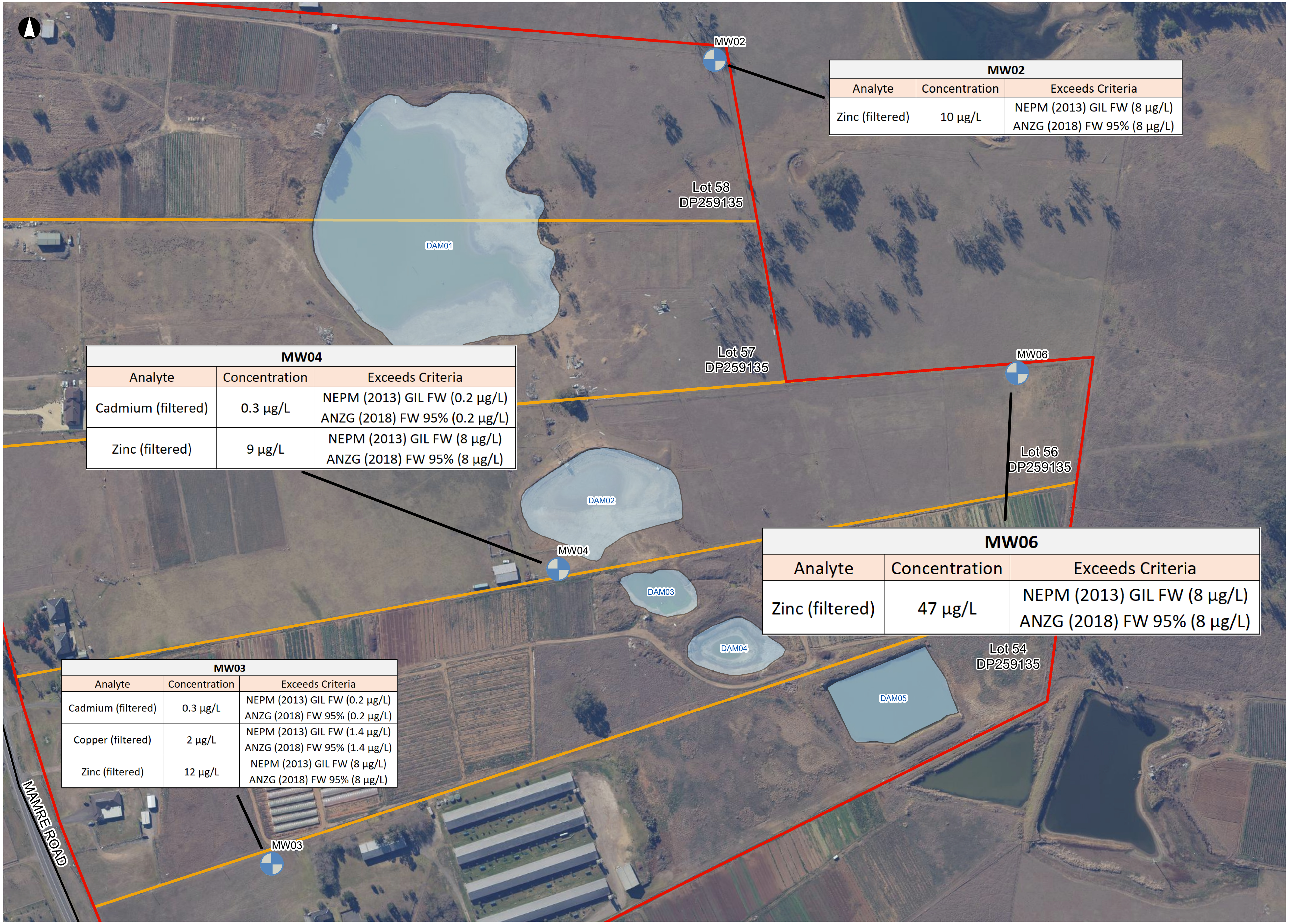


| MW02 | | |
|---|---|---|
| Analyte | Concentration | Exceeds Criteria |
| Zinc (filtered) | 10 µg/L | NEPM (2013) GIL FW (8 µg/L)<br>ANZG (2018) FW 95% (8 µg/L) |

| MW04 | | |
|---|---|---|
| Analyte | Concentration | Exceeds Criteria |
| Cadmium (filtered) | 0.3 µg/L | NEPM (2013) GIL FW (0.2 µg/L)<br>ANZG (2018) FW 95% (0.2 µg/L) |
| Zinc (filtered) | 9 µg/L | NEPM (2013) GIL FW (8 µg/L)<br>ANZG (2018) FW 95% (8 µg/L) |

| MW06 | | |
|---|---|---|
| Analyte | Concentration | Exceeds Criteria |
| Zinc (filtered) | 47 µg/L | NEPM (2013) GIL FW (8 µg/L)<br>ANZG (2018) FW 95% (8 µg/L) |

| MW03 | | |
|---|---|---|
| Analyte | Concentration | Exceeds Criteria |
| Cadmium (filtered) | 0.3 µg/L | NEPM (2013) GIL FW (0.2 µg/L)<br>ANZG (2018) FW 95% (0.2 µg/L) |
| Copper (filtered) | 2 µg/L | NEPM (2013) GIL FW (1.4 µg/L)<br>ANZG (2018) FW 95% (1.4 µg/L) |
| Zinc (filtered) | 12 µg/L | NEPM (2013) GIL FW (8 µg/L)<br>ANZG (2018) FW 95% (8 µg/L) |

**Legend**

- Monitoring Well Locations
- Dams
- Lot Boundaries
- Site Boundary

1:3,050 at A3

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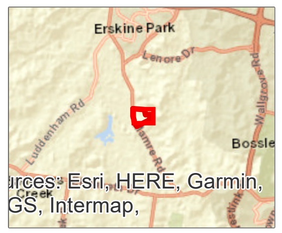


Figure 6, Appendix C - DSI Water Criteria Exceedances

0 30 60 120 180 240
m

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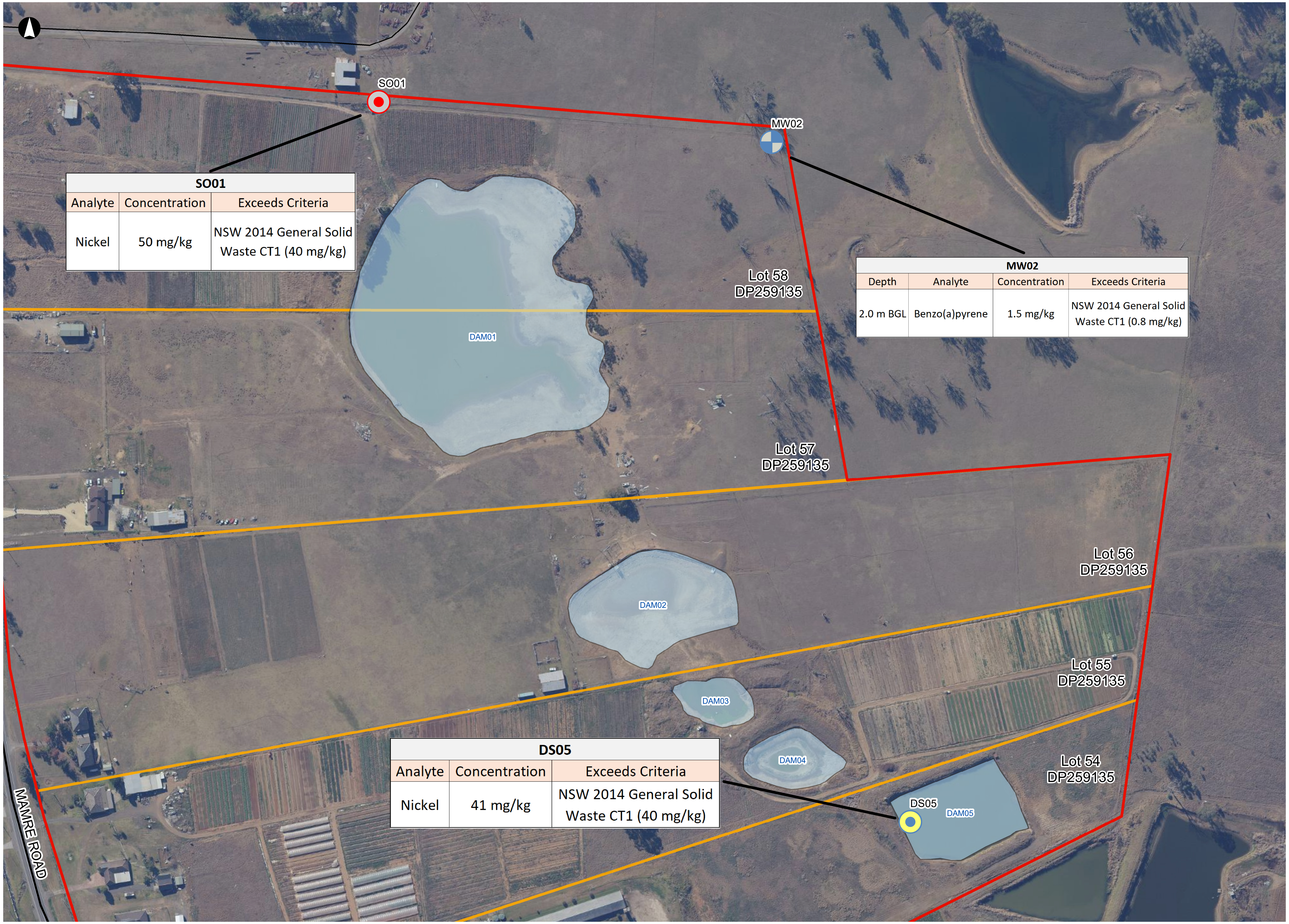


| SO01 | | |
|---|---|---|
| Analyte | Concentration | Exceeds Criteria |
| Nickel | 50 mg/kg | NSW 2014 General Solid Waste CT1 (40 mg/kg) |

| MW02 | | | |
|---|---|---|---|
| Depth | Analyte | Concentration | Exceeds Criteria |
| 2.0 m BGL | Benzo(a)pyrene | 1.5 mg/kg | NSW 2014 General Solid Waste CT1 (0.8 mg/kg) |

| DS05 | | |
|---|---|---|
| Analyte | Concentration | Exceeds Criteria |
| Nickel | 41 mg/kg | NSW 2014 General Solid Waste CT1 (40 mg/kg) |

**Legend**

- Surface Soil
- Dam Sediment
- Monitoring Well Soil
- Dams
- Lot Boundaries
- Site Boundary

1:2,910 at A3

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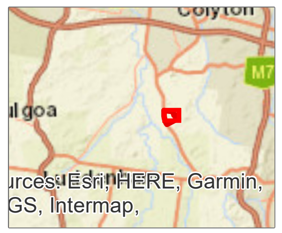


Figure 7, Appendix C - DSI Waste Classification Exceedances

0 25 50 100 150 200
m

Date: 9/06/2020 Path: H:\AAP_ER_GIS\Projects\10035157\RAP\DSI re-exports\Fig 7 - Waste Classification Exceedances.mxd
Created by : Environmental Restoration
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# APPENDIX D – HAZARDOUS BUILDING MATERIAL SURVEY (AIRSAFE, 2019)

# Report

**HAZARDOUS MATERIALS SURVEY**

**Lot 54-58 Mamre Road, Kemps Creek**

**Prepared for:**
**Arcadis Australia Pacific Pty Ltd**

**Project No.**
**48777**

**Date:**
**09/12/2019**

AIRSAFE

# Report

**HAZARDOUS MATERIALS SURVEY**

**Lot 54-58 Mamre Road, Kemps Creek**

**Prepared for:**
**Arcadis Australia Pacific Pty Ltd**

**Project No.**
**48777**

**Date:**
**09/12/2019**


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| **Client:** | Arcadis Australia Pacific Pty Ltd |
| **Title:** | Lot 54-58 Mamre Road, Kemps Creek – Hazardous Materials Survey |
| **Report Number:** | 48777 |
| **Issue Date:** | 10/12/2019 |

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|---|---|---|---|
| **Inspected by:** | John Stephens | | 28/12/2019 |
| **Prepared by:** | John Stephens | | 09/12/2019 |
| **Reviewed by:** | Benjamin Willetts<br>Licensed Asbestos Assessor<br>[SafeWork NSW Licence No LAA 000122] | | 10/12/2019 |

| Distribution | |
|---|---|
| **Recipient:** | **James Van Der Helm**<br>**Arcadis Australia Pacific Pty Ltd**<br>Level 16 580 George St<br>SYDNEY, NSW 2000 |

# TABLE OF CONTENTS

# EXECUTIVE SUMMARY

**The inspection identified the following hazardous materials:**

| Location | Material | | | | | |
|---|---|---|---|---|---|---|
| | Asbestos | | SMF | PCB's | Lead Paint | Lead Dust |
| | Non-friable | Friable | | | | |
| Lot 54 | ✓ | X | X | X | X | X |
| Lot 55 | ✓ | X | ✓ | X | X | X |
| Lot 56 | ✓ | X | ✓ | X | X | X |
| Lot 57 | ✓ | X | ✓ | X | X | X |
| Lot 58 | ✓ | X | X | X | X | X |

Airsafe recommends that for items identified in the asbestos register requiring action refer to Section 4.

Any areas, which include asbestos containing materials, should be signposted with warning signs to ensure that the asbestos is not unknowingly disturbed without the correct precautions being taken.

The Hazardous materials survey, including any risk assessments, should be reviewed every 12 months or earlier.

Confirmed SMF materials should be maintained in good condition and removed under controlled conditions prior to any refurbishment works.

Confirm the status of suspected capacitors within fluorescent light fittings prior to refurbishment or demolition in the presence of a licensed electrician. Confirmed PCB- containing electrical equipment should be handled with care and disposed of in accordance with EPA guidelines.

# REFERENCES


- AS 4964 – 2004 Method for the qualitative identification of asbestos in bulk samples.
- Code of Practice: How to Manage and Control Asbestos in the Workplace [Safe Work Australia, 2018].
- Code of Practice: How to Safely Remove Asbestos [Safe Work Australia, 2018].
- Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC: 3003 (2005)].
- AS 2601 - 2001 The Demolition of Structures.
- National Code Of Practice For The Control And Safe Use Of Inorganic Lead At Work [NOHSC:2015(1994)].
- AS/NZS 4361.2:2017 Guide To Hazardous Paint Management Part 2: Lead Paint In Residential, Public And Commercial Buildings.
- AS 4874-2000 Guide To The Investigation Of Potentially Contaminated Soil And Deposited Dust As A Source Of Lead Available To Humans.
- Identification of PCB-Containing Capacitors [ANZECC, 1997].
- Polychlorinated Biphenyls Management Plan [ANZECC, 2003].
- Schedule B1 – Guideline on Investigation Levels for Soil and Groundwater [National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013)].
- National Code of Practice for the Safe Use of Synthetic Mineral Fibres [NOHSC: 2006 (1990)].
- Safe Management of Synthetic Mineral Fibres SMF Glasswool and Rockwool [Safework NSW, 2015].
- NSW Protection of the Environment Operations (Waste) Regulation 2014.
- NSW Protection of the Environment Operations (General) Regulation 2009.
- NSW Work Health and Safety Act 2011.
- NSW Work Health and Safety Amendment Act 2018.
- NSW Work Health and Safety Regulation 2017.

## TERMS AND DEFINITIONS

| | | |
|---|---|---|
| AC | - | Asbestos Cement |
| ACM | - | Asbestos-Containing Material |
| EPA | - | Environmental Protection Agency |
| HEPA | - | High Efficiency Particulate Air |
| NATA | - | National Association of Testing Authorities, Australia |
| NES | - | National Exposure Standard |
| PCBs | - | Polychlorinated Biphenyls |
| PPE | - | Personal Protective Equipment |
| SMF | - | Synthetic Mineral Fibre |
| XRF | - | X-Ray Fluorescence |

# 1 INTRODUCTION

## 1.1 AUTHORISATION

This inspection and report was authorised by James Van Der Helm of Arcadis Australia Pacific on the 28th November 2019.

## 1.2 SCOPE OF WORK

The scope of work involved a survey of the site to determine the location, extent and condition of hazardous materials on site including asbestos, lead, SMF, and PCBs.

## 1.3 SITE DESCRIPTION

The site is located at 796-868 Mamre Road, Kemps Creek [Lot 58-54] [refer to Figure 1]. The Site consists of several blocks varying in acreage and each with either sheds or homes present.


**Figure 1**. Site Location

## 1.4 METHODOLOGY

### 1.4.1 Asbestos

An inspection of the premises has been carried out in order to identify, as far as practicable, all ACM in the workplace in accordance with the *Code of Practice: How to Manage and Control Asbestos in the Workplace [October 2018] Safe Work Australia.*

Representative samples of materials suspected of containing asbestos have been taken by competent personnel and inaccessible areas presumed to contain asbestos. Once such a presumption has been made, the material must be treated as an ACM, with work practices and disposal criteria as required for the presence of asbestos, until the material is removed or testing has confirmed that it does not, in fact, contain asbestos.

Samples have been analysed in accordance with AS 4964 – 2004 *Method for the qualitative identification of asbestos in bulk samples*.

A risk assessment has been carried out to ensure the associated risks of the identified ACM are assessed. The risk assessment takes account of the condition of the ACM (e.g whether they are friable or non-friable and stable, and whether they liable to damage or deterioration), the likelihood of exposure, and whether the nature or location of any work to be carried out is likely to disturb the ACM. Decisions about control measures to protect workers have been made depending on the assessed risks to health.

The locations of all ACM and any inaccessible areas, as well as the types and condition of asbestos have been recorded in the asbestos register.

### 1.4.2 Lead

Portable X-ray fluorescence (XRF) field tests have been used to provide a numerical value for the amount of lead present in paint on a surface. The use of the portable instrument is in accordance with the AS/NZS 4361.2:2017 Guide To Hazardous Paint Management Part 2: Lead Paint In Residential, Public And Commercial Buildings. Lead paint locations have been analysed for lead content by Airsafe OHC Pty Ltd in accordance with in house method AS103 – Operating Procedure for the use of Handheld XRF Analyzer.

Criteria for lead dust levels have not been established in Australia. Lead dust levels are typically compared to the following health investigation levels for soil contaminants as stated in Schedule B1 – Guideline on Investigation Levels for Soil and Groundwater [National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013)].

Representative ceiling dust samples were taken in accordance with the AS 4874-2000 Guide to the investigation of potentially contaminated soil and deposited dust as a source of lead available to humans.

To ensure the accuracy and precision of the XRF analyser, the machine is re-calibrated during testing in addition to the in-built self-calibration check every time the instrument is turned on or reset to a new mode. Furthermore, the calibrations are checked against several standard samples. These tests against known standards with certified values ensure that the instrument is functioning properly and the results can be validated with a permanent record of regular calibrations.

### 1.4.3 SMF

This report broadly identifies SMF materials located during the visual inspection of the site.

### 1.4.4 PCBs

Representative light fittings were inspected and the specifications of the capacitors crossed referenced against the electrical equipment known to contain PCBs listed in *Identification of PCB-Containing Capacitors* [ANZECC, 1997].

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## 1.5 INACCESSIBLE AREAS

Limited or no access was available to the areas detailed in the table below. It must be assumed they contain hazardous materials until they area accessed and it is determined whether any type of hazardous material is present or not. Care should be taken if future refurbishment, demolition or maintenance works need to access these areas.

| Inaccessible Areas | | | |
|---|---|---|---|
| Area | Item | Access | Comment |
| Lot 54 | Houses On Property | No Access to internals | No access at time/s of inspection |

## 1.6 LIMITATIONS

This report has been prepared to meet the requirements outlined in the scope of work. It does not include evaluation of any other issues. Airsafe performed the services in a professional manner, in accordance with relevant guidelines and standards, and generally accepted industry practices. Airsafe does not make any other warranty, expressed or implied, as to the professional advice contained in this report.

The survey was based on a visual inspection of the specified areas. It should be noted that this assessment is reflective of the current site conditions and cannot be regarded as absolute without extensive invasion of structures. Only materials that were physically accessible at the time of inspection were sampled. Consequently, without substantial demolition of the building, it is not possible to guarantee that every hazardous material has been located. Care should be taken during the course of normal site works, refurbishment or demolition works when entering any previously inaccessible areas. If suspect materials are encountered, works should cease in the area until samples have been collected and analysed by competent personnel.

Although this survey accessed all areas, prior to demolition/refurbishment works, a destructive hazardous materials survey of the premises as per the requirements of AS 2601: 2001 The Demolition of Structures, Part 1.6.1 and Code of Practice: Demolition Work [Safe Work Australia, 2018] should be undertaken. This will not be possible to undertake until the buildings are no longer in use due to its destructive nature.

As the buildings were in use at the time of inspection, only non-destructive sampling techniques were used. The survey is not intended for use or referral for the purpose of demolition, refurbishment, renovations or structural alterations. In the event of future demolition, refurbishment, renovation or structural alterations further investigation, which may entail destructive testing, shall be required.

It should be noted that the sampling program was limited to the collection of representative samples of suspect materials for analysis. Other materials of similar appearance are assumed to have a similar content.

The report does not cover any inaccessible areas identified during the inspection. These may include wall cavities, ceiling voids, height restricted areas, service shafts, ducts, internal areas of equipment and machinery, areas concealed within the building structure, or energised services. Hazardous materials should be presumed to be present in all inaccessible areas until removed or confirmed through testing that it does not, in fact, contain asbestos.

Where information has been supplied to Airsafe for the purpose of preparing this report, the information is assumed to be both adequate and accurate. The information provided, therefore, has not been verified or audited. Airsafe will not be liable in relation to incorrect conclusions should any information be incorrect, misrepresented or otherwise not fully disclosed.

Limitations apply to analytical methods used in the identifications of some asbestos containing materials. These limitations may be due to samples collected from non-homogenous materials not being representative, the presence of masking agents, and low concentrations of asbestos fibres. As such, sample analysis results should be considered indicative only.

This report was prepared for the sole use of the client identified on the cover page and only for the purpose for which it was prepared. Any reliance on this report by third parties shall be at their own risk and may not contain sufficient information for purposes of other parties or for other uses.

This report is not intended to be used for the purposes of tendering, programming of works, refurbishment works or demolition works unless used in conjunction with a specification detailing the extent of the works.

This report must be read in its entirety and must not be copied, distributed or referred to in part only. The report must not be reproduced without the written approval of Airsafe.

# 2 GENERAL INFORMATION

## 2.1 ASBESTOS

### 2.1.1 Effects on Health

Asbestos is formed in fibre bundles and, as it is further processed or disturbed, the fibre bundles become progressively finer and more hazardous to health. The small fibres are the most dangerous. They are invisible to the naked eye and, when inhaled, penetrate the deepest part of the lungs (respirable fibres).

Significant health risks may arise from the inhalation of airborne asbestos fibres. Compared with straight amphibole fibres, such as amosite and crocidolite, chrysotile fibres are curly and less likely to penetrate the deepest parts of the lung.

Breathing in fibres brings a risk of asbestosis, lung cancer and mesothelioma. Evidence suggests that asbestos causes gastrointestinal and laryngeal cancers in humans, but to a far lesser extent than lung cancer. Usually, asbestos related diseases have a delay or latency period of 20 to 40 years between first exposure and the onset of symptoms and detection of the disease. Asbestos-related diseases can appear or progress even after a person is no longer exposed.

**Asbestosis** is the scarring of lung tissue that can result from the inhalation of substantial amounts of asbestos over a period of years. It results in breathlessness that may lead to disability and, in some cases, death. Minor changes in X-ray images may be detected for many years without any symptoms of asbestosis or progression of the disease.

**Lung cancer** is related to the amount of fibre that is breathed in and the risk of lung cancer is greatly increased in those who also smoke tobacco.

**Mesothelioma** is a cancer of the pleura (outer lung lining) or the peritoneum (the lining of the abdominal cavity). The risk of mesothelioma is less with chrysotile than with other types of asbestos. Both pleural and peritoneal mesothelioma can result from exposure to amosite and crocidolite. Exposure of humans to chrysotile alone has caused few pleural mesotheliomas, and has never produced peritoneal mesothelioma without exposure to either amosite or crocidolite. Mesothelioma rarely occurs in less than 15 years from first exposure, and most cases occur over 30 years after first exposure.

As for many cancer-causing substances, no safe level of exposure for lung cancer or mesothelioma has been identified. However, the amount of asbestos fibre in the air that people inhale is the important factor in determining the level of health risk. The highest risks involve inhaling air that contains a high concentration of asbestos fibre.

Asbestos fibres may be released into the air whenever they are disturbed, and especially during the following activities:

- any direct action on ACM, such as drilling, boring, cutting, filing, brushing, grinding, sanding, breaking, smashing or blowing with compressed air (State legislation prohibits most of these actions);
- the inspection or removal of ACM from workplaces (including vehicles, plant and equipment);
- the maintenance or servicing of materials from vehicles, plant, equipment or workplaces;
- the renovation or demolition of buildings containing ACM.

Non-friable ACM that has been subjected to extensive weathering or deterioration also has a higher potential to release asbestos fibres into the air.

### 2.1.2 Asbestos Classification

Under NSW OHS legislation, material that contains asbestos is referred to as friable or non-friable.

#### *2.1.2.1 Non-friable Asbestos Material*

Non-friable asbestos material is any material that contains asbestos in a bonded matrix. It may consist of Portland cement or various resins/binders, and cannot be crushed by hand when dry. Asbestos cement (AC) products and electrical meter boards in good condition are examples of non-friable asbestos material.

A large number of products made from non-friable asbestos material are still found in Australian buildings, motor vehicles and plant components. These products include:

- flat (fibro), corrugated or compressed asbestos cement sheeting
- asbestos cement pipes such as electrical, water, drainage and flue pipes
- brake and clutch linings.

#### *2.1.2.2 Friable Asbestos Material*

Friable asbestos material is any material that contains asbestos and is in the form of a powder, or can be crumbled, pulverized or reduced to powder by hand pressure when dry. Examples of friable asbestos include:

- sprayed limpet
- asbestos cloth and rope
- millboard
- pipe lagging
- boiler lagging.

Any asbestos cement products that have been subjected to weathering, or damaged by hail, fire or water blasting, are considered to be friable asbestos and an asbestos removal contractor with a Safework licence for friable asbestos is required for its removal.

### 2.1.3 Control Measures

The ultimate goal is for all workplaces to be free of ACM. Where practicable, consideration should be given to the removal of ACM during renovation, refurbishment, and maintenance, rather than other control measures such as enclosure, encapsulation or sealing.

The control measures required for identified and presumed ACM should be determined from the risk assessment and should follow the following principles:

**Control Measure 1 - Immediate Elevated Risk Level**
Friable material which, due to its present condition and location, presents an immediate health risk. Immediate control measures are required and the area containing this material should be isolated from personnel. Abatement of this particular hazard is strongly recommended at the earliest practicable time.

**Control Measure 2 - Potential Elevated Risk Level**
Damaged or unstable material, which if disturbed is likely to present an immediate health risk, with the likelihood that contamination may be spread to other areas. Control measures to stabilise this material should be initiated immediately, with formal abatement of the hazard being considered.

**Control Measure 3 - Low Risk**
Non-friable or stable material that has some minor areas of damage requiring remedial action or is likely to be subject to damage or to degrade due environmental conditions. It is recommended that maintenance work be performed to stabilise and repair damaged areas. Controls should be implemented to protect these materials from further damage or degrading factors.

**Control Measure 4 - Negligible Risk under Present Conditions**
Non-friable or stable material that is unlikely to present a risk to health unless damaged, tooled, cut, sanded, abraded or machined. It is recommended that these materials be maintained in good order. Reassessment of the control measure rating will be required if planned works are likely to have an impact on these materials.

These control measures reflect the following hierarchy of controls:

1 - Elimination/removal (most preferred);

2 - Isolation/enclosure/sealing;

3 - Engineering controls;

4 - Safe Work Practices (administrative controls); and

5 - Personal Protective Equipment (PPE) (least preferred).

ACM need to be removed before demolition, partial demolition, renovation or refurbishment if they are likely to be disturbed by those works in accordance with the Code of Practice: How to Safely Remove Asbestos [October 2018] Safe Work Australia.

## 2.2 LEAD

Lead in any form is toxic to humans when ingested and inhaled. Repeated inhalation or ingestion of lead dust or paint particles may produce the cumulative effects of lead poisoning.

### 2.2.1 Lead Paint

White lead (lead carbonate) was once the principle white pigment in paints for houses and public buildings.

Lead paint, as defined by the AS/NZS 4361.2:2017 Guide To Hazardous Paint Management Part 2: Lead Paint In Residential, Public And Commercial Buildings is that which contains in **excess of 0.1% lead by weight or** levels **exceeding 0.5 mg/cm²** as the XRF result is a combined value for all layers of paint on the surface.

Many older homes and buildings still contain lead paint, even though it may be covered with layers of more recent paint. It was used mainly on exterior surfaces and to a lesser extent on interior doors and architraves, especially in undercoats and primers where concentrations of up to 20% lead were commonly used. Interior walls were not commonly painted with paint with paint containing white lead, but some colours did contain red, yellow or orange lead-chrome pigments.

Although all paints manufactured for non-industrial use, from the 1970s onwards, contain less than 1% lead, it is possible that industrial paints, having higher concentrations of lead, may have been applied to residential, public and commercial buildings. Paints manufactured since 1997 contain less than 0.1% of lead by mass, and this limit has been adopted for the definition of lead-containing paint in the Standard.

Lead paint removal methods give rise to two potential health problems, i.e. inhalation or ingestion of lead paint by the workers and public in the vicinity of the structure and the deposition of lead paint on nearby footpaths, streets or soil where they may be resuspended, tracked into houses or buildings where it can be inhaled or ingested.

The control measures required for identified and presumed Lead Paint should be determined from the risk assessment and should follow the following principles:

**Control Measure L1: Immediate Elevated Risk Level**

Damaged or deteriorated paint membrane, which due to its present condition and location, presents an immediate health risk. Immediate control measures are required and the area containing this material should be isolated from personnel. Abatement of this particular hazard is strongly recommended at the earliest practicable time.

**Control Measure L2: Potential Elevated Risk Level**

Paint membrane showing signs of deterioration and weathering which if left will continue to deteriorate and require abatement that is more extensive. Control measures to stabilise this material should be initiated as a priority, with formal abatement of the hazard being considered.

**Control Measure L3: Negligible Risk under Present Conditions**

Stable paint membrane that is in good condition and/or covered by a lead-free paint membrane, which is also in a good condition. Unlikely to present a risk to health unless damaged or deterioration occurs. It is recommended that these materials be maintained in good order. Reassessment of the priority rating will be required if planned works are likely to have an impact on these materials.

### 2.2.2 Lead in Ceiling Dust

The presence of lead deposits within ceiling spaces may result from renovation of that building or may emanate from other external sources such as; atmospheric deposits caused by leaded petrol used in motor vehicles; residues from nearby industrial sites, such as smelters; or other lead paint removal projects being performed in the vicinity of the building.

-

### 2.3 SMF

Synthetic Mineral Fibre (SMF) is a generic term used to describe a number of fibrous material made from glass, rock, alumina and silica.

SMF has been widely used as alternatives to asbestos in insulation and fire-rating products and as reinforcement in cement, plaster and plastic materials. SMF products are used extensively in commercial and residential buildings for insulation from temperature and sound.

Short term exposure to SMF can result in skin and eye irritation, and upper respiratory tract irritation.

Long term exposure to SMF was shown to be associated with a slightly increased risk of lung cancer among exposed workers in early SMF industries.

Provided SMF work is carried out in accordance with the *National Code of Practice for the Safe Use of Synthetic Mineral Fibres* [NOHSC: 2006 (1990)] and compliance is maintained with the exposure standards then there is a negligible health risk associated with exposure to SMF under present-day manufacturing and usage patterns.

SMF can be classified into three groups:

1. **Glasswool:** is manufactured by melting glass into a fibrous 'wool'
   - used as thermal and acoustic insulation in the manufacturing and construction industry
   - does not include fibreglass used in boatbuilding, surfboards and other industrial applications because they contain catalysts and resins which require different work practices.
2. **Rockwool:** is manufactured by melting volcanic rock (usually basalt) into a fibrous 'wool'
   - also known as slagwool
   - used as thermal and acoustic insulation in the manufacturing and construction industry.
3. **Refractory ceramic fibres (RCF):** are made from kaolin (a naturally occurring alumino-silicate clay or a synthetic mix of alumina) used as:
   - high temperature, high performance thermal insulation, eg: in furnaces, kilns and other industrial heaters
   - insulation in the automotive, marine, petrochemical, steel, aluminium, ceramic, glass and construction industries.

There are two basic forms of glasswool and rockwool insulation and the procedures to be applied to remove the product depend on the form of the original glasswool or rockwool insulation installed.

**Bonded** insulation contains binding agents (such as adhesives or cements) that have been cured in the manufacturing process prior to packaging and delivery and the products have a specific shape, such as in a batt or blanket form or as compressed boards. Additionally, some bonded materials may be clad in various coverings on one or more sides. The advantage of the presence of binding agents is that they significantly reduce fibre release during handling.

Typical examples of the use of bonded glasswool and rockwool materials include:
- preformed insulation batts in ceilings and cavity walls
- insulation blankets or batts around air conditioning ducts, and
- preformed pipe sections as lagging around steampipes and hot or chilled water pipes.
-

**Unbonded** insulation has no adhesives or cements and is loose material packed into a package. This type of material can be packed loose or mixed with adhesives or cements before, or during, installation.

There are three main types of unbonded glasswool and rockwool materials:
- **wet spray:** where the fibres are mixed with cement and sprayed as fire protection in multi-storey buildings
- **loose-fill:** where the material is sprayed into ceiling and cavity spaces of buildings, and
- **dry spray:** where densely packed material is blown dry into a closed stud cavity.This method should only occur where the target area is enclosed to prevent the release of loose fibres. Typical examples of the use of dry spray include cavity-wall and loose fill in existing construction undergoing an insulation retrofit.

The control measures required for identified and presumed SMF should be determined from the risk assessment and should follow the following principles:

**Control Measure S1: Elevated Risk Level**

Unbonded synthetic mineral fibre material or damaged bonded material which due to its present condition and/or location is likely to be further damaged resulting in fibre release. It is recommended that maintenance work be performed to stabilise and repair damaged areas. Controls must be implemented to protect these materials from further damage or degrading factors.

**Control Measure S2: Negligible Risk under Present Conditions**

Bonded or sealed stable friable material that is unlikely to present a risk to health unless damaged, tooled, cut, sanded, abraded or machined. It is recommended that these materials be maintained in good order. Reassessment of the priority rating will be required if planned works are likely to have an impact on these materials.

### 2.4 PCBs

PCBs is the common name for polychlorinated biphenyls. These synthetic compounds are chemically stable, have good insulating properties and do not degrade appreciably over time or with exposure to high temperatures. These properties made PCBs very useful in electrical devices such as capacitors.

If these chemicals are released into the environment, they do not readily break down and can accumulate in fatty tissues of animals. The longevity of PCBs and their affinity for fatty tissue can result in PCBs moving up and concentrating though the food chain.

PCBs can enter the body in three ways; absorption through the skin, inhalation of vapour, or ingestion. The likelihood of becoming sick from PCB exposure increased with the length of time and the amount of material that a person might come in contact with. The most commonly observed symptom in people exposed to high levels of PCBs is an acne-like rash known as chloracne. PCBs may also cause damage to the liver and the nervous system, with the possibility of causing cancer.

The major use of PCBs in the electrical industry has been as an insulating fluid inside transformers and capacitors. These transformers and capacitors have ranged in size from the very large transformers, which contain several thousand litres of PCBs and were typically used by electrical supply businesses and heavy industries, to the small capacitors which may only contain several milliliters of PCBs and were used in farming equipment and on commercial premises. Capacitors containing PCBs were installed in various types of equipment including fluorescent light fittings during the 1950's, 60's and 70's.

The control measures required for identified and presumed PCB's should be determined from the risk assessment and should follow the following principles:

**Control Measure P1: Immediate Elevated Risk Level**

PCB oil leaking from the component item under consideration. Immediate control measures are required to prevent exposure of personnel and potential damage to the environment. Abatement of this particular hazard is strongly recommended at the earliest practicable time.

**Control Measure P2: Negligible Risk under Present Conditions**

The component item is in good condition and no remedial works are required at this stage. Unlikely to present a risk to health unless capacitor is damaged or deteriorates.

# 3 RESULTS

| Site Details | | Audit Details | |
|---|---|---|---|
| **Full Address:** | 796-868 Mamre Road, Kemps Creek | **Survey Date:** | 27 & 28 November 2019 |
| **Property Id:** | 48777 | **Inspected By:** | John Stephens |
| **Client Name:** | Arcadis Australia Pacific | **Inspection Date:** | 27 & 28 November 2019 |

## 3.1 ASBESTOS REGISTER

| Lot 54 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Sample ID** | **Sample Status** | **Photo No.** | **Asbestos Classification** | **Condition** | **Accessibility** | **Re-Inspect** | **Current Label** | **Control Measure** | **Extent** | **Action Required** | **Action Taken** |
| Building External – Chicken Sheds - Walls | Fibreboard | 48777 - 1 | Positive | 1 | Non-Friable | Fair | High | Dec 2024 | Not Labelled | Control Measure 3 | - | Seal Exposed Edges, Leave, Label and Maintain | |
| Building External – Chicken Sheds – Electrical Boxes | Electrical Backing Boards | 48777 - 2 | Negative | - | - | - | - | - | - | - | | - | |
| Building External – Main House – Eaves – Eave Lining | Fibreboard | 48777 - 3 | Negative | - | - | - | - | - | - | - | | - | |
| Building External – Secondary House – Eaves – Eave Lining | Fibreboard | 48777 - 4 | Negative | - | - | - | - | - | - | - | | - | |

| Lot 54 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Sample ID** | **Sample Status** | **Photo No.** | **Asbestos Classification** | **Condition** | **Accessibility** | **Re-Inspect** | **Current Label** | **Control Measure** | **Extent** | **Action Required** | **Action Taken** |
| Building External – Broken Sheeting – Rear of property | Fibreboard | Similar to 48777 - 1 | Presumed Positive | 2 | Non-Friable | Good | High | Dec 2024 | Not Labelled | Control Measure 3 | | Removal Preferred, Label and restrict access | |

| Lot 55 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Sample ID** | **Sample Status** | **Photo No.** | **Asbestos Classification** | **Condition** | **Accessibility** | **Re-Inspect** | **Current Label** | **Control Measure** | **Extent** | **Action Required** | **Action Taken** |
| House 1/844 – Internal – Bathroom – Bathroom Walls | Fibreboard | 48778 - 1 | Positive | 3 | Non Friable | Good | High | Dec 2024 | Not Labelled | Control Measure 4 | | Leave, Label and Maintain | |
| House 1/844 – Internal – Laundry - Walls | Fibreboard | 48778 - 2 | Positive | 4 | Non Friable | Good | High | Dec 2024 | Not Labelled | Control Measure 4 | | Leave, Label and Maintain | |
| House 1/844 - Internal – Ceiling Void - Insulation | Fibrous Insulation | 48778 - 3 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 1/844 – External – Electrical Box | Electrical Backing Board | 48778 - 4 | Positive | 5 | Non Friable | Good | High | Dec 2024 | Not Labelled | Control Measure 4 | | Leave, Label and Maintain | |
| House 1/844 – External – Eaves – Eave Lining | Fibreboard | 48778 - 5 | Positive | 6 | Non Friable | Good | High | Dec 2024 | Not Labelled | Control Measure 4 | | Leave, Label and Maintain | |
| House 1/844 – External – Rear veranda - Fascia | Fibreboard | 48778 - 6 | Positive | 7 | Non Friable | Good | High | Dec 2024 | Not Labelled | Control Measure 4 | | Leave, Label and Maintain | |

| Lot 55 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Sample ID** | **Sample Status** | **Photo No.** | **Asbestos Classification** | **Condition** | **Accessibility** | **Re-Inspect** | **Current Label** | **Control Measure** | **Extent** | **Action Required** | **Action Taken** |
| House 2/844 - Internal– Bathroom/Toilet – Dividing Wall | Fibreboard | 48778 - 7 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 2/844 – Internal – Laundry - Walls | Fibreboard | 48778 – 8 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 2/844 – External – Gym - Walls/Ceiling | Fibreboard | 48778 – 9 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 2/844 – External – Eaves – Eave Lining | Fibreboard | 48778 - 10 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 2/844 – Internal – Ceiling – ceiling void - Insulation | Fibrous Insulation | 48778 – 11 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 2/844 - Internal – Manhole – Manhole cover | Fibreboard | 48778 – 12 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 2/844 – External – Old Dog house - sheeting | fibreboard | 48778 – 13 | Negative | - | - | - | - | - | - | - | - | - | - |

| Lot 55 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Sample ID** | **Sample Status** | **Photo No.** | **Asbestos Classification** | **Condition** | **Accessibility** | **Re-Inspect** | **Current Label** | **Control Measure** | **Extent** | **Action Required** | **Action Taken** |
| House 2/844 – External – Electrical Box | Electrical Backing Board | 48778 – 14 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 862 – External – Eaves – Eave Lining | Fibreboard | 48778 – 15 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 862 – External -Electrical Box | Electrical Backing Board | 48778 – 16 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 862 – External – Rear of houses - – Junk Pile - Sheeting | Fibreboard | 48778 – 17 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 862 – Internal – Bathroom - Walls | Fibreboard | 48778 – 18 | Negative | - | - | - | - | - | - | - | - | - | - |
| House 2/844 – Internal – Music Room - Walls | Fibreboard | 48778 - 19 | Negative | - | - | - | - | - | - | - | - | - | - |

| Lot 56 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Material | Sample ID | Sample Status | Photo No. | Asbestos Classification | Condition | Accessibility | Re-Inspect | Current Label | Control Measure | Extent | Action Required | Action Taken |
| Building External – Rear Shed – Upper Wall Sheeting | Fibreboard | 48779 - 1 | Positive | 8 | Non Friable | Fair | High | Dec 2024 | Not Labelled | Control Measure 3 | | Seal Exposed Edges, Leave, Label and Maintain | |
| Building External – Rear Shed – Lower Wall Sheeting - Corrugated | Fibrous Cement Sheet | 48779 - 2 | Positive | 9 | Non Friable | Fair | High | Dec 2024 | Not Labelled | Control Measure 3 | | Seal Exposed Edges, Leave, Label and Maintain | |
| Building External – Rear Shed- Old Chicken coup - sheeting | Fibreboard | 48779 - 3 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building External – Rear Shed – Electrical Box | Electrical Backing Board | 48779 - 4 | Positive | 10 | Non Friable | Good | High | Dec 2024 | Not Labelled | Control Measure 4 | | Leave, Label and Maintain | |
| Building External – Eaves – Eave Lining | Fibreboard | 48779 - 5 | Negative | - | - | - | - | - | - | - | - | - | - |

| Lot 57 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Sample ID** | **Sample Status** | **Photo No.** | **Asbestos Classification** | **Condition** | **Accessibility** | **Re-Inspect** | **Current Label** | **Control Measure** | **Extent** | **Action Required** | **Action Taken** |
| Building Internal – Adjoined Residence – Bathroom/Toilet Wall | Fibreboard | 48780 - 1 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building Internal - Insulation | Fibrous insulation | 48780 – 2 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building External – Front Eaves – Eave Lining | Fibreboard | 48780 – 3 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building External – Rear of House - Fascia | Fibreboard | 48780 – 4 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building External – Rear Eaves – Eave Lining | Fibreboard | 48780 – 5 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building External – House – Electrical backing Board | Fibreboard | 48780 – 6 | Negative | - | - | - | - | - | - | - | - | - | - |

| Lot 57 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Sample ID** | **Sample Status** | **Photo No.** | **Asbestos Classification** | **Condition** | **Accessibility** | **Re-Inspect** | **Current Label** | **Control Measure** | **Extent** | **Action Required** | **Action Taken** |
| Building External – Telegraph pole – Electrical backing Board | Electrical Backing Board | 48780 – 7 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building internal – Rear Shed – Bathroom - Walls | Fibreboard | 48780 – 8 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building External - Rear Shed – Ground Fragments | Fibreboard | 48780 – 9 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building External – Rear Shed – Back Room – Wall/Ceiling Sheeting | Fibreboard | 48780 – 10 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building External – Shed at back of property – Weather boarding | Fibreboard | 48781 – 11 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building External – Machine Shed – Electrical Box | Electrical Backing Board | 48780 – 12 | Negative | - | - | - | - | - | - | - | - | - | - |
| Building External – Drainage pipe | Fibrous Cement Sheet | 48780 - 13 | Positive | 11 | Non Friable | Good | High | Dec 2024 | Not Labelled | Control Measure 3 | | Seal Exposed Edges, Leave, Label and Maintain | |

| Lot 58 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Material | Sample ID | Sample Status | Photo No. | Asbestos Classification | Condition | Accessibility | Re-Inspect | Current Label | Control Measure | Extent | Action Required | Action Taken |
| External – Driveway - Fragments | Fibrous Cement Sheet | 48781 - 1 | Positive | 12 | Non Friable | Fair | High | Dec 2024 | Not Labelled | Control Measure 3 | | Removal Preferred, Label and Maintain | |
| External – Electrical Box | Electrical backing Board | Negative | Negative | - | - | - | - | - | - | - | - | - | - |

### 3.2 LEAD

### 3.2.1 Lead Paint

| Lot 54 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Sample ID** | **Lead in paint per unit area (mg/cm²)** | **Photo No.** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| Building External – Small House – Eaves - White | 48802 - 1- | Below LOD | - | - | - | Not lead-containing paint | |
| Building External – Main House – Eaves - White | 48802 - 2 | Below LOD | - | - | - | Not lead-containing paint | |

AIRSAFE

| Lot 55 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Sample ID** | **Lead in paint per unit area (mg/cm²)** | **Photo No.** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| House 1/844 – Internal – Walls - White | 48803 - 1 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 1/844 – Internal – Garage – Walls - Pink | 48803 - 2 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 1/844 – External - White | 48803 - 3 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 1/844 – External - Cream | 48803 - 4 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 1/844 – External – Trim – Dark Brown | 48803 - 5 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 2/844 – Internal – Music Room White | 48803 - 6 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 2/844 – Internal – Walls - Grey | 48803 - 7 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 862 – Internal – Walls – White | 48803 - 8 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 862 – Internal- Back Room – Walls - Blue | 48803 - 9 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 862 – External – Walls - Grey | 48803 - 10 | Below LOD | - | - | - | Not Lead Containing Paint | |

| Lot 56 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Sample ID** | **Lead in paint per unit area (mg/cm²)** | **Photo No.** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| House 1/56 – Building Internal – Walls - Cream | 48804 - 1 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 1/56 – Building Internal – Upstairs Office - Green | 48804 - 2 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 1/56 – Building Internal Down Stairs - Green | 48804 - 3 | Below LOD | - | - | - | Not Lead Containing Paint | |
| House 1/56 – Building Internal – Walls - Cream | 4880 - 5 | Below LOD | - | - | - | Not Lead Containing Paint | |

| Lot 57 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Sample ID** | **Lead in paint per unit area (mg/cm²)** | **Photo No.** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| Attached House – Building Internal - White | 48805 - 1 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Attached House – Building Internal – Trim - White | 48805 – 2 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Main House – Building Internal - White | 48805 - 3 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Main House – Internal – Trim - Brown | 48805 – 4 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Main House – Internal – Trim - White | 48805 – 5 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Building External – Walls - Cream | 48805 – 6 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Building External – Rear Shed - Cream | 48805 – 7 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Building Internal – Rear Shed - Grey | 48805 – 8 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Building Internal – Rear Shed – Walls - White | 48805 – 9 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Building External – Rear Shed – Trim - White | 48805 – 10 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Building Internal – Rear Shed – Rear Section – Walls - Cream | 48805 – 11 | Below LOD | - | - | - | Not Lead Containing Paint | |
| Building External – Machine Shed – Walls - Green | 48805 – 12 | Below LOD | - | - | - | Not Lead Containing Paint | |

| Lot 58 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Sample ID** | **Lead in paint per unit area (mg/cm²)** | **Photo No.** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| Building External – Shed at Rear – Corrugated Sheets - White | 48806 - 1 | Below LOD | - | - | - | Not Lead Containing Paint | |

**NOTES:**

Note 1: Lead paint is defined as any paint, varnish, shellac, or other coating that contains levels **exceeding 0.5 mg/cm².**

### 3.2.2 Lead in Ceiling Dust

| Lot 54 | | | | | | |
|---|---|---|---|---|---|---|
| **Location** | **Sample ID** | **Sample Status** | **Photo No.** | **Disturbance Potential** | **Recommendations and Comments** | **Action Taken** |
| No lead in dust suspected | | | | | | |

| Lot 55 | | | | | | |
|---|---|---|---|---|---|---|
| **Location** | **Sample ID** | **Sample Status** | **Photo No.** | **Disturbance Potential** | **Recommendations and Comments** | **Action Taken** |
| No lead in dust suspected | | | | | | |

| Lot 56 | | | | | | |
|---|---|---|---|---|---|---|
| **Location** | **Sample ID** | **Sample Status** | **Photo No.** | **Disturbance Potential** | **Recommendations and Comments** | **Action Taken** |
| No lead in dust suspected | | | | | | |

| Lot 57 | | | | | | |
|---|---|---|---|---|---|---|
| **Location** | **Sample ID** | **Sample Status** | **Photo No.** | **Disturbance Potential** | **Recommendations and Comments** | **Action Taken** |
| No lead in dust suspected | | | | | | |

| Lot 58 | | | | | | |
|---|---|---|---|---|---|---|
| **Location** | **Sample ID** | **Sample Status** | **Photo No.** | **Disturbance Potential** | **Recommendations and Comments** | **Action Taken** |
| No lead in dust suspected | | | | | | |

**NOTES:**

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### 3.3 SMF

| Lot 54 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Photo No.** | **Form** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| No Access at time of Inspection. Presumed to be Onsite | | | | | | | |

| Lot 55 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Photo No.** | **Form** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| House 1/844 – Ceiling Void | Fibrous Insulation | 13 | Bonded | Stable / Accessible | S2 | Minimise disturbance. Encapsulate or remove. | |
| House 2/844 – Ceiling Void | Fibrous Insulation | 14 | Bonded | Stable / Accessible | S2 | Minimise disturbance. Encapsulate or remove. | |
| Car Shed behind house 2/844 - Insulation | Fibrous Insulation | 15 | Bonded | Stable / Accessible | S2 | Minimise disturbance. Encapsulate or remove. | |

| Lot 56 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Photo No.** | **Form** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| House 1/56 – Ceiling Void | Fibrous Insulation | - | Bonded | Stable / Accessible | S2 | Minimise disturbance. Encapsulate or remove. | |
| House 2/56 – Ceiling Void | Fibrous Insulation | - | Bonded | Stable / Accessible | S2 | Minimise disturbance. Encapsulate or remove. | |

| Lot 57 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Photo No.** | **Form** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| House Internal – Ceiling Void | Fibrous Insulation | 16 | Bonded | Stable / Accessible | S2 | Minimise disturbance. Encapsulate or remove. | |

| Lot 58 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Material** | **Photo No.** | **Form** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| No Synthetic Mineral Fibres Suspected | | | | | | | |

## 3.4 PCBs

| Lot 54 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Specification** | **Sample Status** | **Photo No.** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| No polychlorinated biphenyls suspected | | | | | | | |
| **Lot 55** | | | | | | | |
| **Location** | **Specification** | **Sample Status** | **Photo No.** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| No polychlorinated biphenyls suspected | | | | | | | |

| Lot 56 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Specification** | **Sample Status** | **Photo No.** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| No polychlorinated biphenyls suspected | | | | | | | |

| Lot 57 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Specification** | **Sample Status** | **Photo No.** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| No polychlorinated biphenyls suspected | | | | | | | |

| Lot 58 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location** | **Specification** | **Sample Status** | **Photo No.** | **Condition** | **Control Measure** | **Action Required** | **Action Taken** |
| No polychlorinated biphenyls suspected | | | | | | | |

# 4 RECOMMENDATIONS

## 4.1 ASBESTOS

### 4.1.1 Warning Signs and Labels

Any areas of a workplace, which contain asbestos containing materials, should be signposted with warning signs to ensure that the asbestos is not unknowingly disturbed without the correct precautions being taken.

All identified or presumed asbestos containing material – or their enclosures if the asbestos containing materials are inaccessible – should be clearly labelled. A competent person should determine the number and positions of the labels required. Labels used for this purpose must identify the material as containing asbestos. If a risk assessment suggests an asbestos containing material might be disturbed or persons might be exposed and it is not practical to label the asbestos containing material (e.g. floor tiles or friable asbestos containing material such as lagging), a prominent warning sign, specifying the asbestos containing material, should be posted in the immediate vicinity.

Appendix C shows examples of warning signs and labels that provide an indication of the words that may be used to alert persons to the presence of the asbestos containing material and asbestos hazards. *The wording is not mandatory*. Other warning signs and labels may be used, provided they meet the requirements of AS 1319-1994 *Safety Signs for the Occupational Environment*.

### 4.1.2 Controlling Maintenance Work

The person with control of the premises should develop a system to control any maintenance work that contains ACM.

Particular attention should be paid to controlling work activities that affect inaccessible areas listed in the register of ACM, such as wall cavities and ceiling spaces.

The control system may take one of several forms, depending on the size and complexity of the organisation. For example,

- smaller organisations may prefer in-house controls, with one person being nominated to control all work carried out by maintenance workers and all contractors; and

- formal, written safe systems of work, incorporating permits-to-work, may be used to control both maintenance workers and contractors.

Whatever the method used, it should be effective in making all maintenance workers and contractors aware of the presence of ACM and preventing any work activity that might expose them, or others nearby, to airborne asbestos fibres.

There should be full consultation concerning any maintenance and service work that might disturb ACM. All people performing the work should receive all necessary training, and the work should be documented and supervised.

The asbestos work area must be isolated and access restricted to essential workers only. Barriers and warning signs may be required.

Personal protective equipment needs to be selected to prevent the contamination of clothing and provide adequate respiratory protection. The level of respiratory protection required will depend on the risk assessment. Respirators should be selected, used and maintained according to the relevant Australian Standard.

Thorough decontamination of PPE, equipment and the asbestos work area should be carried out at the completion of the tasks.

Under the asbestos prohibition, wherever an asbestos component requires replacement the replacement product must be non-asbestos. It is illegal to reinstall or reuse any ACM.

All ACM must be disposed of correctly, in accordance with State laws. PPE used during maintenance and service work must also be disposed of in this way.

### 4.1.3 Awareness Training

If ACM are present or thought to be present in a workplace, there must be full consultation, information-sharing and involvement by everyone in the workplace, including employers, workers, contractors and other, throughout the processes of identifying ACM, developing an asbestos management plan, assessing the risks and developing and implementing control measures.

Information and training must be provided to workers, contractors and others who may come into contact with ACM in a workplace, either directly or indirectly.

Depending on the circumstances this asbestos training may include:

- the purpose of the training;
- the health risks of asbestos;
- the types, uses and occurrence of ACM in buildings, plant and/or equipment in the workplace;
- the trainees' roles and responsibilities under the workplace's asbestos management plan;
- where the workplace's register of ACM is located and how it can be accessed;
- the timetable for removal of ACM from the workplace;
- the processes and procedures to be followed to prevent exposure, including exposure from any accidental release of asbestos dust into the workplace;
- where applicable, the correct use of maintenance and control measures, protective equipment and work methods to minimise the risks from asbestos, limit the exposure of workers and limit the spread of asbestos fibres outside any asbestos work area;
- the NES and control levels for asbestos; and
- the purpose of any air monitoring or health surveillance that may occur.

The provision of this information on the occupational health and safety consequences of exposure to asbestos and appropriate control measures should be recorded.

### 4.1.4 Reviewing Risk Assessments

The register of ACM, including any risk assessments, should be reviewed every 12 months or earlier where:

- there is evidence that the risk assessment is no longer valid;
- there is evidence that any control measures are not effective;
- a significant change is proposed for the workplace or for work practices or procedures relevant to the risk assessment.

A visual inspection of identified ACM should be undertaken to assess if there is a change in the condition of the ACM or if the ACM has been removed, enclosed or sealed. The review should ensure the asbestos materials are not deteriorating or otherwise contributing to an unacceptable health risk.

### 4.1.5 Air Monitoring

To ensure control measures are effective, air monitoring should be carried out in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC: 3003 (2005)] by a NATA accredited laboratory on a regular basis until the material is completely removed.

The NES of 0.1 fibres/mL should never be exceeded, and control measures should be reassessed whenever air monitoring indicates the 'control level' of 0.01 fibres/mL ha been reached.

### 4.1.6 Responsibilities and Licensing

Persons in adjoining properties that might be affected by the asbestos removal activities must be consulted.

Safework NSW requires that certain asbestos removal work be licensed under the *Work Health and Safety Regulation 2017*.

The client is responsible for ensuring an asbestos removalist carries out the removal of ACM. The client should request details of the contactor's asbestos removal license prior to any removal of ACM. A copy of the notification must be displayed at the place of work.

Safework must be notified before undertaking any asbestos removal work where a licence is required. A copy of the notification must be displayed at the place of work.

The asbestos removalist must ensure the removal is adequately supervised and is carried out in a safe manner by ensuring that a nominated supervisor recognised by Safework is on site at all times when licensed work is being carried out.

All persons involved in the removal of ACM must be competent for the tasks allocated to them. The licence holder must ensure asbestos workers have had training in safe work methods in asbestos work.

### 4.1.7 Site Preparation

Preparation activities include minimising the number of people present and gathering the correct tools, PPE, decontamination materials, barricades, warning signs, etc at the workplace before any work commences.

The responsible person should ensure the security and safety of the asbestos removal site and asbestos work area at all times, particularly if the removal process is to take place over several days or an extended period of time.

The asbestos removal site should be clearly defined to ensure that non-essential people do not enter and to clearly delineate the removal site and warn persons that asbestos removal work is being carried out (e.g. through the placement of barriers and signs or other warning devices). All barriers and warning signs should remain in place until a clearance to re-occupy has been granted.

Before removal tasks commence plastic sheeting (for containment) may need to be placed on the floor or other surfaces that may be contaminated with asbestos dust. If the removal work is not being carried out in an enclosure, the surfaces to be worked on should be cleaned, by either wet wiping or vacuuming, to minimise exposure from the disturbance of asbestos fibres that might be on the surfaces prior to the commencement of removal tasks.

### 4.1.8 General Requirements for Asbestos Removal

Asbestos removal works should be carried out in accordance with the requirements of the Code of Practice: How to Safely Remove Asbestos [Safe Work Australia, 2018]

Wherever possible, dry ACM should not be worked on.

Techniques that prevent the generation of airborne asbestos fibres should be used.

### 4.1.9 Asbestos Removal Equipment

Care should be taken in selecting tools for asbestos removal tasks.

In addition to having to be suitable for these tasks, all tools should prevent or minimse the generation and dispersion of airborne asbestos fibres as much as possible.

The use of power tools in asbestos removal work should be avoided because of the possibility of internal contamination, which commonly occurs with such devices.

In general, manually operated hand tools are preferred.

A constant low-pressure water supply is required for wetting down asbestos. This can be achieved with a mains-supplied garden hose fitted with a pistol grip. If no water supply is readily available, a portable pressurised vessel, such as a pump-up garden sprayer, may be able to be used.

Asbestos vacuum cleaners should comply with the requirements of AS/NZS 60335.2.69:2017 Household and Similar Electrical Appliances—Safety Part 2.69 and AS 4260-1997 *High Efficiency Particulate Air Filters (HEPA) – Classification, Construction and Performance*.

**Warning:** Domestic vacuum cleaners are unsuitable and should never be used, even if they have a HEPA filter.

Asbestos vacuum cleaners should only be used for collecting small pieces of asbestos dust and debris. Larger pieces should never be broken into smaller sizes so they can be vacuumed.

### 4.1.10 Personal Protective Equipment (PPE)

All persons engaged in asbestos removal work should wear respiratory protective equipment (RPE) conforming with the requirements of AS/NZS1716-2012 *Respiratory Protective Devices*.

The selection, use and maintenance of respirators should be in accordance with AS/NZS1715-2009 *Selection Use and Maintenance of Respiratory Protective Devices*.

Protective clothing should be provided and worn at all times during all work in the asbestos work area prior to the final clearance inspection.

Protective clothing should be made from materials which provide adequate protection against fibre penetration. Coveralls should not have external pockets or Velcro fastenings because these features are easily contaminated and difficult to decontaminate.

Disposable coveralls are preferred. They should never be reused, and must be disposed of as asbestos waste.

### 4.1.11 Decontamination

The type of decontamination required will depend on the type of asbestos (i.e. friable or non-friable); the work method used, and site conditions.

Decontamination must include the asbestos work area, all tools and equipment and personal decontamination.

All contaminated materials, including cleaning rags, plastic sheeting and PPE etc, must be disposed of as asbestos waste.

Some asbestos removal work necessitates the use of decontamination units.

### 4.1.12 Waste Removal

Loose asbestos waste should not be allowed to accumulate within the asbestos work area.

Asbestos waste should be collected in heavy-duty 200 µm (minimum thickness) polythene bags that are no more than 1200 mm long and 900 mm wide.

The bags should be labelled with an appropriate warning, clearly stating that they contain asbestos and that dust creation and inhalation should be avoided.

If it is not feasible to use asbestos waste bags, drums or bins, because of the volume or size of the asbestos wastes, a waste skip, vehicle tray or similar container that has been double lined with heavy-duty plastic sheeting (200 µm minimum thickness) may be used. Once the skip is full, its contents should be completely sealed with the plastic sheeting.

### 4.1.13 Disposal of Asbestos Waste

All asbestos waste should be removed from the workplace by a competent person and transported and disposed of in accordance with all relevant State legislation and guidelines for the transport and disposal of asbestos waste.

All asbestos waste must be transported in a covered leak-proof vehicle and:

- not mixed with general building waste;

- not taken to a waste facility for recycling.

Only vehicles licensed by the EPA NSW can transport friable asbestos waste in the metropolitan area.

Asbestos in any form must be disposed of in a manner approved by the EPA NSW and at a waste facility licensed by the EPA NSW to accept asbestos waste.

NSW licensed landfills that accept asbestos waste from the public are listed by region on the EPA NSW website.

Vehicles and their containers must be cleaned before leaving the waste facility.

All asbestos containing material is to be placed into trucks or bins for transport to a landfill site licensed to accept Special Waste – Asbestos in accordance with the requirements of the NSW Protection of the Environment Operations (General) Regulation 2009. Asbestos waste shall be transported in accordance with NSW EPA Waste Tracking Requirements, including but not limited to Part 4 of the Protection of the Environment Operations (Waste) Regulation 2014: ie Waste-locate to be used for more than 100kg of asbestos waste in a single load.

The transport of the asbestos contaminated waste is to be undertaken in covered leak proof vehicles and is to be disposed of at a landfill site that can lawfully receive this waste in accordance with the NSW Protection of the Environment Operations (Waste) Regulation 2014.

Contact the EPA NSW and/or the local council for details of waste facilities that can accept asbestos waste.

To demonstrate proof of proper disposal, copies of asbestos waste disposal receipts are to be kept for inspection by Safework, the EPA NSW or the local council.

#### 4.1.14 Air Monitoring

Air monitoring should be performed whenever ACM are being removed, to ensure the control measures are effective.

Air monitoring should be performed in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres* [NOHSC: 3003 (2005)].

#### 4.1.15 Clearance to Reoccupy

A visual inspection involving an examination of the asbestos work area should be carried out, prior to the resumption of normal work in the area by unprotected personnel, to confirm that the asbestos removal work has been completed and there is no visual evidence of dust and debris.

Particular attention should be paid to ledges, the tops of air-conditioning ducts, cracks in the floor, folds in plastic sheeting and crevices or other areas which may have been overlooked during the initial clean-up.

The clearance inspection must be conducted by a competent person who is independent from the person responsible for the removal work.

## 4.2 LEAD

### 4.2.1 Responsibilities

The owners of the building should manage the property in such a manner as to effectively control any health risk to occupants, contractors and others arising from lead dust. They should ensure occupants are sufficiently informed about and protected from the hazards associated with lead paint in the property.

Where lead management work is to be undertaken by contractors, the owner should use only accredited contractors for the work, who understand the hazards associated with lead paint and follow the procedures outlined in this document. The contracted work should be undertaken in such a way as to protect employee health and safety, in addition to that of tenants and the general public.

Occupants should be informed of the hazards associated with the lead management works.

#### *4.2.1.1 Notification*

The contractor must notify Safework of proposed lead risk work for each work site, 60 days before the work is commenced.

#### *4.2.1.2 Compliance Program*

Contractors should develop and implement a written compliance plan prior to the commencement of the job where employee exposure to lead, without respect to respiratory protection, may be in excess of the NES.

### 4.2.2 Protection of Personnel

All workers who may be exposed to lead on the project should be protected to avoid personal injury or harm, as well as to prevent lead dust or debris from being carried off the work site to potentially affect others.

#### *4.2.2.1 Training*

All contractors who undertake lead management work for buildings should ensure that employees have the required level of specialized training for that class of work.

#### *4.2.2.2 Exposure*

The employer is required to assure that no employee is exposed to lead at concentrations in excess of the NES of 0.05 mg/m$^3$ as determined by air monitoring as stated in the Workplace Exposure Standards for Airborne Contaminants [Safe Work Australia, 2018].

#### *4.2.2.3 Protective Clothing*

Operatives involved in the lead management work should wear protective clothing suitable for the particular process adopted and observe the following:

(a) Wear a properly fitted particulate respirator when preparing lead paint management work. If using a disposable type, only those with double head straps are suitable. Respirators should meet the requirements of AS/NZS1716-2012 *Respiratory Protective Devices*.
(b) Maintain respirator filters in accordance with AS/NZS1715-2009 *Selection Use and Maintenance of Respiratory Protective Devices* and ensure that all protective equipment is cleaned and stored properly.
(c) Wear overalls and a head covering to prevent dust accumulation in clothing and hair. Contaminated overalls should not be worn offsite as this can spread lead contamination and put family members and the public at risk.
(d) Wear disposable booties and gloves.

The employer is required to provide protective clothing and equipment appropriate to the hazard. Lead contaminated clothing should not be removed from the work site by the employee. Clean work clothing is to be provided daily to the employees whose exposure levels are above the NES. The employer is required to provide for the cleaning, laundering, or disposal of protective clothing and equipment, and is to repair or replace required protective clothing and equipment as needed to maintain effectiveness. The employer should ensure that all protective clothing is removed at the completion of a work shift.

#### *4.2.2.4 Personal Hygiene*

Operatives involved in paint removal work are to observe the following:

(a) Do not smoke while removing paint, as hand to mouth contact may increase the risk of swallowing or inhaling lead paint dust.
(b) Wash hands before eating, drinking, personal hygiene or smoking. Do not eat or smoke in the work area.
(c) Place contaminated overalls in clean polyethylene bags before removing them from the work area, as they are a significant source of contamination to others.
(d) All work clothes worn underneath disposable overalls should be changed daily and laundered separately from other domestic clothing and linen. When laundering contaminated clothes, store them away from other clothes. Do not shake prior to laundering. Disposable overalls provide a simple and safe method of protection.
(e) Clean equipment thoroughly of dust and paint fragments before it leaves the work area. A HEPA filter vacuum clean followed by a wet wipe is normally sufficient.
(f) HEPA filter vacuum then wash or wet wipe clean boots and gloves with a damp cloth at the end of each work day.

#### *4.2.2.5 Responsible Person*

A responsible person should be on-site at all times during lead exposure producing operations to implement and maintain the compliance program.

#### *4.2.2.6 Medical Surveillance*

Employees who are exposed to lead concentrations should receive medical examinations by an authorized medical practitioner in accordance with the Guide *Health Monitoring For Exposure To Hazardous Chemicals* [Safework Australia, 2013]. The employee's blood lead level should be examined prior to commencement, within the first month of being engaged, again one month later, and then at intervals relevant to the lead level achieved.

### 4.2.3 Site Preparation

#### *4.2.3.1 Regulated Area*

A regulated area should be established at the work site to identify areas, outside of which airborne concentrations of lead can reasonably be expected not to exceed the NES. The regulated area should be identified by appropriate signs and barriers, such as rope, tape, or other visual or physical means.

Workers within the regulated area should be required to wear nominated protective clothing and equipment and will be subject to lead exposure assessment.

Residents, members of the public and other workers should not be allowed access to areas undergoing lead management work until completion of the work and all necessary clean-up procedures.

#### *4.2.3.2 Signs*

Sign posting should be erected to adequately inform employees and the public of the presence of lead and the possible need to utilize respirators and other appropriate protective equipment. Signs should be in accordance with AS 1319, be clearly visible during all hours and be maintained in a clean and legible condition.

Phrases to be placed on the sign may include 'Warning', 'Lead Work Area', 'Authorized Personnel Only', and 'Respirators and Protective Clothing Required in this Area'.

#### *4.2.3.3 Containment of Lead Bearing Dust and Debris*

Measures that will ensure that lead dust, fumes and debris will be contained within the area include the following:

(a) Place ground sheets below the work area, ensuring they are large enough to contain all the dust generated. Disposable polyethylene sheeting should be used and the edges sealed using heavy duty tape. The plastic ground sheets should be maintained so that as soon as a tear is detected, the ground sheet is repaired or replaced.

(b) Work in such a way as to minimize dust and fume generation and the transfer of debris away from the immediate work area. Avoid working when wind or draughts could cause debris to be blown away from the work area.

(c) Remove accumulated dust frequently to prevent it spreading from the immediate work area. As a minimum, do this on a daily basis using a vacuum cleaner fitted with a HEPA filter for dust and particulate removal.
(d) Wipe down all surfaces. After vacuum removal, there are still likely to be dust traces remaining. Remove these by wiping surfaces with a damp cloth, which is disposed of after use. It is important to use a detergent in the water as this improves cleaning efficiency.

### 4.2.4 Procedures for Removal

#### *4.2.4.1 Lead in Paint*

Lead paint abatement involves the suppression, reduction or elimination of the hazard from a building. All work should be carried out in accordance with the requirements of the AS/NZS 4361.2:2017 Guide To Hazardous Paint Management Part 2: Lead Paint In Residential, Public And Commercial Buildings and National Code Of Practice For The Control And Safe Use Of Inorganic Lead At Work [NOHSC:2015(1994)].

**Replacement of painted items** is the least hazardous way of dealing with lead paint. In this process components with lead paint on them are removed in large pieces and replaced with new materials. This may be a viable option for articles such as timber architraves, doors and windows, cupboards, gutters and downpipes, and exterior cladding weatherboards.

Other advantages are that labour requirements are reasonable and work can often be completed quickly. Current regulations in most States would allow disposal of these components as regular construction waste. The cost of supplying replacement materials and components may be high, especially with items such as doors and windows.

The care and skill level of the renovator needs to be high or other components may be damaged during the removal processes. Renewal costs may be reduced by labour savings when the replacement of items, such as windows, is an intended part of the renovation.

When dealing with historical buildings, replacement of components may not be possible.

Removal of building materials or components may generate or disturb lead contaminated dust accumulated in void spaces. However, the option of removal and replacement is considered a moderate-risk procedure.

**Removal of lead paint** is the least favoured because it has the greatest potential to generate hazardous dust. Recommended methods for the removal of lead paint that minimize the quantities of dust generated include the following:

(a) *Wet scraping and wet sanding*

These are the safest methods for the removal of lead paint.

Wet scraping involves moistening the paint with water from an atomizing bottle or similar device and then removing it from the surface using a scraper, usually hand-held. Drop sheets of thick, impervious plastic are used to catch the debris for collection and disposal. This method generates a minimum of dust. Scraping can be slow and further cleaning or smoothing may be needed to remove residues or to feather edges. Scraping may also lead to damage of soft substrates such as plaster or softwood.

Wet sanding is accomplished by dipping the abrasive paper in water before use. Only manual sanding can be performed and care should be taken near electrical outlets.

The run-off from wet sanding and scraping will carry suspended particles which should be collected with sponges or mops. If run-off is allowed to escape between floor-boards, into or under floor coverings or behind architraves, it will dry out and regenerate the dust hazard.

(b) *On-site chemical stripping*

Chemical paint strippers will soften and swell the paint, allowing it to be easily removed with a scraper. The residue is usually a gel-like paste that is easily contained and handled. Stripping is suitable for most surfaces such as timber, render or steel.

Some water-borne strippers are caustic and require skin, face and eye protection during use, as well as protection of non-target surfaces. Some chemical strippers contain flammable or hazardous volatile solvents and most require good ventilation through open windows and exhaust fans. Strippers containing methylene chloride should only be used in well ventilated areas. Some chemical strippers can cause surface damage to particular substrates. Stripped wastes should not be allowed to enter the sewer or stormwater drains.

(c) *Off-site chemical stripping*

This involves removing components and shipping them to a paint stripping establishment where they are immersed in baths of chemicals. The lead residue is retained at the establishment for controlled disposal. The stripped components are then returned to the site for re-installation.

Care needs to be exercised when adopting some immersion-type chemical stripping processes as the technique may be inappropriate for some component materials which could be damaged or suffer a shortened life.

The advantage of this process is that removal of hazardous material is nearly complete and neither the renovator nor the occupants will be exposed to chemical by-products. Some dust may be generated when the component is removed from the building, but this would be less than for other paint removal methods. Removal can be considered a moderate risk renovation procedure.

This method is limited to removable components such as windows, doors and trim. There is some potential for damage to components during the removal and reinstallation procedures, and building skills may be required. There may also be some time delay between the removal and re-installation with resulting inconvenience and security problems. Both the logistics of removal and the physical limits of the facilities at the stripping shop may also control the size of the components which can be handled.

*(d) Removal by heat gun and scraper*

The application of heat to paint by a stream of heated air softens it and allows removal by scraping. As the operator may be in intimate contact with some airborne lead particles and toxic gases in the breathing zone, the process therefore requires a high degree of care and personal protection. If local overheating is allowed to occur, some of the components of the paint may vaporize and carry lead and other hazardous materials into the air. These vapours may be inhaled or will settled as dust.

NOTE: Toxic fumes may be generated at temperature as low as 200ºC.

When removed, the paint will quickly cool and become brittle and care must be taken that this paint is not unduly crushed or allowed to be carried from the work area on feet. The ‘molten’ paint formed during the heating operation should be scraped into a suitable container before it rehardens, to avoid subsequent abrading of the paint surface which could generate paint flakes or dust.

This method of removal is not recommended for use in poorly ventilated areas. Occupants and members of the public should not be present when heat guns are used to remove lead paint.

#### *4.2.4.2 Lead in Ceiling Dust*

All traces of lead dust should be removed from the ceiling space in accordance with the requirements of the AS/NZS 4361.2:2017 Guide To Hazardous Paint Management Part 2: Lead Paint In Residential, Public And Commercial Buildings and National Code Of Practice For The Control And Safe Use Of Inorganic Lead At Work [NOHSC:2015(1994)].

Large disposable items and debris should be placed in plastic bags and sealed. All surfaces in the work area should be vacuumed using a HEPA filter vacuum until no residue of dust remains.

### 4.2.5 Waste Management

#### *4.2.5.1 Waste Collection*

Collection of lead containing waste from the work area should be performed at least once per day. The removal of debris from the work area to storage containers should be performed without releasing lead or other potentially hazardous materials into the environment. The preferred method of collection is a vacuuming system that provides a completely closed pathway for conveyance of debris. If it cannot be avoided, shoveling or sweeping should be minimized and performed with care.

Consumable supplies such as disposable clothing, rags and brushes, as well as worn out reusable items, such as tarpaulins and air filters contaminated with lead should collected and disposed of accordingly.

#### *4.2.5.2 Wastewater*

All wastewater from equipment decontamination and worker hygiene practices such as showers and laundry facilities should be collected and send to a liquid waste treatment plant.

#### *4.2.5.3 Waste Containers*

All waste containing lead should be stored in a manner to prevent the entry of any hazardous material into the environment. Leak-proof drums, bins and skips are generally acceptable. Drum lids or bin covers should be firmly secured on the containers and the containers should be clearly marked to identify its contents.

#### *4.2.5.4 Waste Storage*

Waste storage sites should be located on well-drained ground which is away from areas where water run-off may occur. Waste storage sites should be adequately protected and displayed with warning signs.

Waste should not be stored at temporary storage areas for long periods of time. Waste should be disposed of appropriately as soon as practically possible.

#### *4.2.5.5 Waste Transport*

During waste moving operations, precautions should be taken to prevent damage to containers that could result in the spillage of the contents, or entry into waters, air or land.

Movement of waste from the job site is to be performed by a properly licensed carrier. The carrier should ensure that the waste received is properly packaged and meets all transportation regulations. Transporters should also ensure that the manifest/dockets are properly completed and the containers labelled as to their contents.

#### *4.2.5.6 Waste Disposal*

In accordance with the Waste Classification Guidelines – Part 1: Classification of waste [NSW Environmental Protection Authority, 2014] waste contaminated with lead (including lead paint waste) from residential premises or educational or child care institutions has been pre-classified as General Solid Waste (Non-Putrescible).

### 4.2.6 Air Monitoring

The time-weighted average exposure standard for lead is 0.05 $mg/m^3$ as stated in the Workplace Exposure Standards for Airborne Contaminants [Safe Work Australia, 2018]. In situations where there are no legislated thresholds for emissions, the following acceptance criterion should be applied in accordance with the AS/NZS 4361.2:2017 Guide To Hazardous Paint Management Part 2: Lead Paint In Residential, Public And Commercial Buildings. Unacceptable emissions will be considered to have occurred if the moving average concentration in air exceeds 0.5 $\mu g/m^5$ or if it exceeds the background concentration by a factor of 10, whichever is the greater.

The ambient air surrounding a hazardous paint removal project will be considered to have been impacted by project activities where test data exceeds the specified requirements.

### 4.2.7 Clearance Testing

After completion of all work and after appropriate clean-up of all relevant areas both inside and outside the building, a clearance inspection should be carried out to determine if there has been a significant impact on the property and surrounding areas from the work and if the building is safe for normal use.

## 4.3 SMF

### 4.3.1 Responsibilities

#### *4.3.1.1 Consultation*

When SMF materials are to be removed from a workplace, there must be full consultation, information-sharing and involvement by everyone in the workplace, including employers, workers and contractors, at each step of the SMF removal process, using the established consultative mechanisms.

Persons in adjoining areas that might be affected by the asbestos removal activities must also be consulted.

#### *4.3.1.2 Responsibilities of Clients*

The client is responsible for ensuring a suitably qualified contractor carries out the removal of SMF.

The client should nominate one or more persons to liase with the contractor.

The client should request details of the contactor’s qualifications prior to any removal of SMF.

#### *4.3.1.3 Responsibilities of Contractors*

The employer shall provide appropriate instruction, training and supervision to enable employees to safely perform their tasks. Employees shall be instructed in safe work practices for handling SMF materials and, where necessary, correct procedures for the selection, wearing and maintenance of personal protective clothing and equipment. The extent of instruction and training shall be appropriate to the duties of the individual within the organisation and be sufficiently detailed to ensure that the individual understands not only the procedural and safety requirements, but also the reasons for these requirements. Employers should ensure appropriate site maintenance, follow proper procedures to minimise the creation and spread of fibres and/or dust and ensure that the disposal of SMF waste is carried out in accordance with the requirements of the local waste disposal authority.

Employees shall ensure that work is carried out so as to incorporate the work practices as instructed. Employees shall wear, when required, and in the manner instructed, the personal protective equipment which is supplied. Employees shall report to the employer any observed malfunctions in the work practices. Employees shall take part in any jointly agreed instruction or training program provided by the employer.

The contractor must develop a SMF removal control plan, specific to the site, before commencing any SMF removal work. The SMF removal control plan should be based on the removal requirements contained within this technical specification. The contractor should consult with the client to finalise the SMF removal control plan, and the client should be provided with a final copy of this plan. The presence or likelihood of other hazards associated with the SMF removal work should be assessed by the contractor (e.g. work at heights, work in confined spaces, electrical safety and heat stress).

The contractor must ensure the removal is adequately supervised and is carried out in a safe manner by ensuring that a nominated supervisor is on site at all times when work is being carried out. The contractor should ensure all supervisory personnel have a detailed knowledge of the precautions and procedures outlined in this technical specification. The supervisory personnel should ensure that the client is reliably and regularly informed of the progress of the removal work.

All persons involved in the removal of SMF must be competent for the tasks allocated to them. The contractor must ensure workers have had training in safe work methods in SMF work.

Supervisors and employees who work with SMF shall be provided with adequate information, instruction and training about working safely with SMF. This should include:

(a) any health information relating to SMF handling and/or exposure;
(b) the importance of controlling the creation of SMF and/or fibrous dust in the atmosphere to the lowest workable levels;
(c) the probable exposure levels associated with the type of job;
(d) how safe work practices, such as control measures, respiratory protective equipment and protective clothing, can be used effectively;
(e) the role and significance of air monitoring;
(f) employer responsibilities; and
(g) employee responsibilities.

### 4.3.2 Site Preparation

The removal area should be clearly designated and barriers erected to prevent casual access. Persons not involved in the removal should not be within 3 metres of the designated area.

Where workable, the removal area should be contained to minimise the transfer of dust to other work areas.

Potential entry points to the asbestos work area should be signposted or labelled in accordance with AS1319-1994 *Safety Signs for the Occupational Environment*. An example of an appropriate sign is as follows:

*SMF WORK AREA*
*FOLLOW SAFETY INSTRUCTIONS*

### 4.3.3 General Requirements for Removal

All work practices should be designed to minimise the release of any airborne fibre or dust.

SMF materials should be removed wet where possible to suppress dust generation.

Hand tools should always be used in preference to power tools in any removal works.

Work areas should be cleaned regularly to remove any build up of fibres and/or dust. Visible waste materials should be removed promptly to avoid being trampled and spread about.

#### *4.3.3.1 Removal of bonded Material*

Any physical abrasion, including cutting, should be kept to a minimum during removal. Such removal can be performed in a dry condition is there is minimal physical abrasion. Only in circumstances where heat or other causes have made the bonded SMF attach itself to the substrate should physical abrasion take place. If this occurs, removal should be performed as for unbonded SMF removal.

#### *4.3.3.2 Removal of Unbonded Material*

Removal of unbonded material is more dusty and difficult. The unbonded material should be thoroughly wet down before removal takes place. Dry removal may be necessary when there are electrical and heat hazards. Increased respiratory protection may be necessary when working in enclosed or poorly ventilated spaces or where the insulation has undergone physical change.

**Wet Spray:** The following additional handling and installation procedures are recommended for wet-spray rockwool material:

- place bags into a hopper before slitting open
- avoid excess shaking of bags and the production of unnecessary dust
- fold used bags and store in waste container
- take care to ensure that the material is sprayed only in the desired area, and
- a cleaning and maintenance program for the machine and adjacent area, including vacuuming or wet mopping and wiping, should be available.

**Loose Fill:** Work with loose fill has the potential of creating relatively high airborne fibre levels, therefore the product should be handled more carefully. The following additional handling and installation procedures are recommended for loose-fill rockwool material:

- avoid unnecessary disturbance, eg: tearing, of the product
- where packing down is required, it should be done only to the required degree so as to minimise the disturbance of the product
- fold empty bags and store in a waste container
- ensure adequate sealing of the application site for overhead applications or protection of workers below, and

- remove excess material from the work area at completion of job.

**Dry Spray:** This work has a potential of creating relatively high fibre levels and therefore these additional recommended work practices should be closely followed.

- avoid unnecessary disturbance, eg: excess shaking of bags; tearing of the product
- place bags into a hopper before slitting open
- fold used bags and store in waste container
- no spraying to commence until the nozzle is securely in the target area and the spray is to be terminated before the nozzle is removed from the target area
- no material should be left in the machine unless the machine is adequately covered
- cleaning and maintenance of the machine and adjacent area should be carried out at the completion of the job.

### 4.3.4 Personal Protective Equipment (PPE)

#### *4.3.4.1 Respiratory Protective Equipment*

Class P1 and Class P2 efficiency is adequate for virtually all aspects of work involving glasswool and rockwool to ensure a worker's exposure is kept to a a time weighted average (TWA) of < 2 mg/m³ inhalable dust. The choice of Class P1 and P2, and disposable or non-disposable, is often determined by practical considerations such as worker comfort or preference and the reliability of maintenance.

Information about the selection, maintenance and performance of all types of respirators is found in AS/NZS1715-2009 *Selection Use and Maintenance of Respiratory Protective Devices* and AS/NZS1716-2012 *Respiratory Protective Devices.*

Respirators should be correctly fitted. The actual protection provided is very much determined by the quality of the facial seal and the degree of any resultant leakage from, eg: beards and the wearing of glasses or goggles.

Respirators should be maintained in good condition and kept in clean storage when not in use. Replaceable filters and cartridges should be replaced regularly, in accordance with guidelines issued by the manufacturer.

#### *4.3.4.2 Protective Clothing*

Disposable coveralls or long sleeve, loose fitting clothing and gloves should be used by all personnel directly involved in the removal work to minimise skin irritation. To avoid undue heat stress and general discomfort to the wearer, consideration should be given to the type of material chosen for this clothing. Launderable clothing should be washed regularly, separate from other laundry to avoid cross-contamination and subsequent skin irritation of non-workers.

Where overhead work is involved, goggles and head covering should be worn to avoid eye irritation or injury.

### 4.3.4 Decontamination

#### *4.3.4.1 Workplace Decontamination*

On completion of the job, the work area should be cleaned using an industrial vacuum cleaner. Wet mopping and wiping can be utilized if an industrial cleaner is not available.

Once visible dust has been cleaned up, containment material should be removed in a manner that minimises the liberation of any trapped dust.

#### *4.3.4.2 Personal Hygiene*

Adequate washing facilities shall be available, on site, to wash and treat both skin and eye irritation. Separate change areas should be provided to minimise the transfer of dust to general work areas.

PPE must be removed and hand and face washed thoroughly with soap and water before eating or smoking.

Amenity rooms shall be kept free of any fibres and/or dust as far as is workable.

### 4.3.5 Waste Removal

Prior to removal from the designated work area, all waste material should be sealed in containers, plastic bags or other methods, which prevent fibre and/or dust emission.

Packaging and transport of SMF should be done so as to minimise the release of fibres and/or dust.

If the removal of SMF materials is not immediately possible, they should be stored in low traffic areas, and in intact containers or under plastic sheet covers.

### 4.3.6 Disposal of SMF Waste

In accordance with the *Waste Classification Guidelines Part 1: Classifying Waste* [EPA NSW, 2008], synthetic fibre waste from materials such as fiberglass, polyesters and other plastics, being waste that is packaged securely to prevent dust emissions, has been pre-classified as General Solid Waste (Non-Putrescible).

### 4.3.7 Air Monitoring

Air monitoring should be performed during SMF removal to ensure the control measures are effective.

Air monitoring should be performed in accordance with the *Guidance Note on the Membrane Filter Method for the Estimation of Airborne Synthetic Mineral Fibres* [NOHSC: 3006 (1989)].

### 4.3.8 Clearance to Reoccupy

A visual inspection involving an examination of the SMF work area should be carried out, prior to the resumption of normal work in the area by unprotected personnel, to confirm that the SMF removal work has been completed and there is no visual evidence of debris.

Particular attention should be paid to ledges, the tops of air-conditioning ducts, cracks in the floor, folds in plastic sheeting and crevices or other areas which may have been overlooked during the initial clean-up.

The clearance inspection must be conducted by a competent person who is independent from the person responsible for the removal work.

# APPENDIX A - PHOTOGRAPHS

## Asbestos

**Photo No. 1**

Lot 54

Chicken Sheds – Upper Wall Section

## Asbestos

**Photo No. 2**

Lot 54

Fragments and broken sheeting at rear of property

## Asbestos

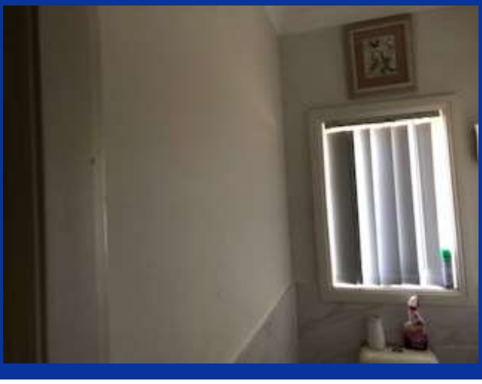

**Photo No. 3**

Lot 55

House 1/844- Bathroom Walls

## Asbestos

**Photo No. 4**

Lot 55

House 1/844 – Laundry - Walls

**Asbestos**

**Photo No. 5**

Lot 55

House 1/844 - Electrical Backing Board - electrical backing board

**Asbestos**

**Photo No. 6**

Lot 55

House 1/844 – Rear Veranda - Fascia

**Asbestos**

**Photo No. 7**

Lot 55

House 1/844 – Eaves – Eave Lining

**Asbestos**

**Photo No. 8**

Lot 56

Rear Shed – Upper Wall Sheeting

## Asbestos

**Photo No. 9**

Lot 56

Rear Shed – Lower Section – Corrugated Sheeting

## Asbestos

**Photo No. 10**

Lot 56

Rear Shed – Electrical Backing Board

## Asbestos

**Photo No. 11**

Lot 57

Drainage Pipe

## Asbestos

**Photo No. 12**

Lot 58

Driveway to property – Fragments

## Synthetic Mineral Fibres

**Photo No. 13**

Lot 55

House 1/844 – Ceiling Void – Fibrous Insulation

## Synthetic Mineral Fibres

**Photo No. 14**

Lot 55

House 2/844 – Ceiling Void – Fibrous insulation

## Synthetic Mineral Fibres

Photo No. 15

Lot 55

Car Shed behind 2/844 – Fibrous Insulation

## Synthetic Mineral Fibres

**Photo No. 16**

Lot 57

Ceiling Void – Fibrous Insulation

# APPENDIX B – ANALYSIS RESULTS

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**TEST REPORT**

December 2, 2019

**Arcadis**
Level 16/580 George Street
SYDNEY NSW 2000

Your Reference: Lot 54 - Mamre Road, Kemps Creek
Job Number: 48777

**Attention:** James Vonder Helm

Dear James,

In accordance with your instructions, Airsafe tested samples from the above site for asbestos content.

The following samples were processed on the dates indicated.

| | |
|---|---|
| Samples: | 4 Samples |
| Date of Sample Receipt: | 02/12/19 |
| Date of Sample Analysis: | 02/12/19 |
| Date of Preliminary Report Sent: | Not Issued |

The results are contained in the following pages of this report.

Should you have any queries regarding this report please contact the undersigned.

Yours faithfully
AIRSAFE OHC PTY LTD

Matthew Shaw
Approved Identifier and Signatory

**PROJECT: Lot 54 - Mamre Road, Kemps Creek** **JOB NO: 48777**

| Sample No | Location/Reference | Sample Description | Asbestos ID - Material |
|---|---|---|---|
| 48777-1 | Chook sheds - walls | 50x30x4mm fibreboard fragment | Chrysotile asbestos detected, Organic fibres detected |
| 48777-2 | Chook sheds - electrical backing board | <1g electrical backing board | No asbestos detected, Organic fibres detected |
| 48777-3 | Main house eaves | 20x10x3mm fibreboard fragment | No asbestos detected, Organic fibres detected |
| 48777-4 | Small house eaves | 25x15x5mm fibreboard fragment | No asbestos detected, Organic fibres detected |

**Method:** Samples have been analysed using polarised light microscopy including dispersion staining in accordance with the AS 4964 – 2004 Method for the qualitative identification of asbestos in bulk samples and in-house method AS102 - Method for the Qualitative Identification of Asbestos in Bulk Samples.

**Sampling:** Samples have been analysed on an "as received" basis. All sampling conducted by the customer. All data supplied by the customer. Airsafe cannot confirm its validity

**Comment:** Even after disintegration of certain bulk samples (vinyl tiles and bituminous type materials), the detection of fibres may be difficult when using Polarised Light Microscopy and Dispersion Staining Techniques. This may be due to the matrix of the sample (uneven distribution), or fine fibres that are difficult to detect and positively identify.

**Disclaimer:** Approximate sample weights and size only – not covered as part of the scope of accreditation.

**Note:** The results relate only to the samples tested.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Airsafe shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Airsafe be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report.

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# TEST REPORT

3 December 2019

**Arcadis**
Suite 15201
2 Locomotive Street,
EVERLEIGH NSW 2015

| | |
|---|---|
| Your Reference: | Lot 55 - Mamre Road, Kemps Creek |
| Job Number: | 48778 |

**Attention:** John Van Der Helm

Dear John,

In accordance with your instructions, Airsafe tested samples from the above site for asbestos content.

The following samples were processed on the dates indicated.

| | |
|---|---|
| Samples: | 19 samples |
| Date of Sample Receipt: | 03/12/19 |
| Date of Sample Analysis: | 03/12/19 |
| Date of Preliminary Report Sent: | Not Issued |

The results are contained in the following pages of this report.

Should you have any queries regarding this report please contact the undersigned.

Yours faithfully
AIRSAFE OHC PTY LTD

Calvin Yung
Approved Identifier and Signatory

PROJECT: Lot 55 - Mamre Road, Kemps Creek JOB NO: 48778

| Sample No | Location/Reference | Sample Description | Asbestos ID - Material |
|---|---|---|---|
| 48778-1 | House 1/844 - Bathroom wall | <1g fibreboard fragment | Chrysotile asbestos detected Organic fibres detected |
| 48778-2 | House 1/844 - Laundry wall | <1g fibreboard fragment | Chrysotile asbestos detected Organic fibres detected |
| 48778-3 | House 1/844 - Insulation | <1g fibrous insulation | No asbestos detected Synthetic mineral fibres detected |
| 48778-4 | House 1/844 - Electrical backing board | <1g electrical backing board | Chrysotile asbestos detected |
| 48778-5 | House 1/844 - Eaves | <1g fibreboard fragment | Chrysotile asbestos detected Organic fibres detected |
| 48778-6 | House 1/844 - Rear fascia | <1g fibreboard fragment | Chrysotile asbestos detected Organic fibres detected |
| 48778-7 | House 2/844 - Bathroom/Toilet wall | <1g fibreboard fragment | No asbestos detected Organic fibres detected |
| 48778-8 | House 2/844 - Laundry walls | <1g fibreboard fragment | No asbestos detected Organic fibres detected |
| 48778-9 | House 2/844 - Gym walls/ceiling | 45x20x8mm fibreboard fragment | No asbestos detected Organic fibres detected |
| 48778-10 | House 2/844 - Eaves | <1g fibreboard fragment | No asbestos detected Organic fibres detected |
| 48778-11 | House 2/844 - Insulation | 2g fibrous insulation | No asbestos detected Synthetic mineral fibres detected |
| 48778-12 | House 2/844 - Existing manhole cover | 20x20x5mm fibreboard fragment | No asbestos detected Organic fibres detected |
| 48778-13 | House 2/844 - Doghouse | 150x60x8mm fibreboard fragment | No asbestos detected Organic fibres detected |
| 48778-14 | House 2/844 - Electrical backing board | <1g electrical backing board | No asbestos detected Organic fibres detected |
| 48778-15 | 862 - Eaves | 30x20x5mm fibreboard fragment | No asbestos detected, Organic fibres detected |
| 48778-16 | 862 - Electrical backing board | <1g electrical backing board | No asbestos detected Organic fibres detected |
| 48778-17 | 844 - Sheet, junk pile | 115x95x6mm fibreboard fragment | No asbestos detected Organic fibres detected |
| 48778-18 | 862 - Bathroom wall | 4g fibreboard fragment | No asbestos detected Organic fibres detected |
| 48778-19 | 2/844 - Music room walls | <1g fibreboard fragment | No asbestos detected Organic fibres detected |

**Method:**

Samples have been analysed using polarised light microscopy including dispersion staining in accordance with the AS 4964 – 2004 Method for the qualitative identification of asbestos in bulk samples and in-house method AS102 - Method for the Qualitative Identification of Asbestos in Bulk Samples.

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| | |
|---|---|
| **Sampling:** | Samples have been analysed on an "as received" basis. |
| **Comment:** | Even after disintegration of certain bulk samples (vinyl tiles and bituminous type materials), the detection of fibres may be difficult when using Polarised Light Microscopy and Dispersion Staining Techniques. This may be due to the matrix of the sample (uneven distribution), or fine fibres that are difficult to detect and positively identify. |
| **Disclaimer:** | Approximate sample weights and size only – not covered as part of the scope of accreditation. |
| **Note:** | The results relate only to the samples tested. |

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

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# TEST REPORT

December 2, 2019

**Arcadis**
Level 16/580 George Street
SYDNEY NSW 2000

| | |
|---|---|
| Your Reference: | Lot 56 - Mamre Road, Kemps Creek |
| Job Number: | 48779 |

**Attention:** James Von Der Helm

Dear James,

In accordance with your instructions, Airsafe tested samples from the above site for asbestos content.

The following samples were processed on the dates indicated.

| | |
|---|---|
| Samples: | 5 Samples |
| Date of Sample Receipt: | 02/12/19 |
| Date of Sample Analysis: | 02/12/19 |
| Date of Preliminary Report Sent: | Not Issued |

The results are contained in the following pages of this report.

Should you have any queries regarding this report please contact the undersigned.

Yours faithfully
AIRSAFE OHC PTY LTD

Matthew Shaw
Approved Identifier and Signatory

PROJECT: Lot 56 - Mamre Road, Kemps Creek JOB NO: 48779

| Sample No | Location/Reference | Sample Description | Asbestos ID - Material |
|---|---|---|---|
| 48779-1 | Rear shed - upper wall sheet | 130x70x5mm fibreboard fragment | Chrysotile asbestos detected, Organic fibres detected |
| 48779-2 | Rear shed - lower wall sheet, corrugated | 60x35x5mm fibrous cement sheet fragments | Chrysotile asbestos detected Amosite asbestos detected |
| 48779-3 | Rear shed - chicken coup | 70x50x5mm fibreboard fragment | No asbestos detected, Organic fibres detected |
| 48779-4 | Rear shed - electrical backing board | <1g electrical backing board | Chrysotile asbestos detected |
| 48779-5 | Eaves | 25x20x5mm fibreboard fragment | No asbestos detected, Organic fibres detected |

**Method:** Samples have been analysed using polarised light microscopy including dispersion staining in accordance with the AS 4964 – 2004 Method for the qualitative identification of asbestos in bulk samples and in-house method AS102 - Method for the Qualitative Identification of Asbestos in Bulk Samples.

**Sampling:** Samples have been analysed on an "as received" basis.

**Comment:** Even after disintegration of certain bulk samples (vinyl tiles and bituminous type materials), the detection of fibres may be difficult when using Polarised Light Microscopy and Dispersion Staining Techniques. This may be due to the matrix of the sample (uneven distribution), or fine fibres that are difficult to detect and positively identify.

**Disclaimer:** Approximate sample weights and size only – not covered as part of the scope of accreditation.

**Note:** The results relate only to the samples tested.

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**TEST REPORT**

3 December 2019

**Arcadis**
Suite 15201
2 Locomotive Street
EVERLEIGH NSW 2015

| | |
|---|---|
| Your Reference: | Lot 57 - Mamre Road, Kemps Creek |
| Job Number: | 48780 |

**Attention:** James Van Der Helm

Dear James,

In accordance with your instructions, Airsafe tested samples from the above site for asbestos content.

The following samples were processed on the dates indicated.

| | |
|---|---|
| Samples: | 13 samples |
| Date of Sample Receipt: | 02/12/19 |
| Date of Sample Analysis: | 02/12/19 |
| Date of Preliminary Report Sent: | Not Issued |

The results are contained in the following pages of this report.

Should you have any queries regarding this report please contact the undersigned.

Yours faithfully
AIRSAFE OHC PTY LTD

Calvin Yung
Approved Identifier and Signatory

**PROJECT: Lot 57 - Mamre Road, Kemps Creek** **JOB NO: 48780**

| Sample No | Location/Reference | Sample Description | Asbestos ID - Material |
|---|---|---|---|
| 48780-1 | Adjoining residence/Bathroom toilet/wall | <1g fibreboard fragment | No asbestos detected Organic fibres detected |
| 48780-2 | Ceiling insulation | 4g fibrous insulation | No asbestos detected Synthetic mineral fibres detected |
| 48780-3 | Front eaves | <1g fibreboard fragment | No asbestos detected Organic fibres detected |
| 48780-4 | Rear fascia | 3g fibreboard fragment | No asbestos detected Organic fibres detected |
| 48780-5 | Rear eaves | <1g fibreboard fragment | No asbestos detected Organic fibres detected |
| 48780-6 | Main house, electrical backing board | <1g electrical backing board | No asbestos detected Organic fibres detected |
| 48780-7 | Telegraph pole - electrical backing board | <1g electrical backing board | No asbestos detected Organic fibres detected |
| 48780-8 | Rear shed, bathroom wall | <1g fibreboard fragment | No asbestos detected Organic fibres detected |
| 48780-9 | Rear shed - ground fragment | 80x50x5mm fibreboard fragment | No asbestos detected Organic fibres detected |
| 48780-10 | Rear shed - ceiling/wall in back room | <1g fibreboard fragment | No asbestos detected Organic fibres detected |
| 48780-11 | Shed at back of prop. weather board | 45x20x20mm fibreboard fragment | No asbestos detected Organic fibres detected |
| 48780-12 | Machine shed - Electrical Backing Board | <1g electrical backing board | No asbestos detected Organic fibres detected |
| 48780-13 | Drainage pipe | 6g fibrous cement sheet fragments | Chrysotile asbestos detected |

**Method:** Samples have been analysed using polarised light microscopy including dispersion staining in accordance with the AS 4964 – 2004 Method for the qualitative identification of asbestos in bulk samples and in-house method AS102 - Method for the Qualitative Identification of Asbestos in Bulk Samples.

**Sampling:** Samples have been analysed on an "as received" basis. All sampling conducted by the customer. All data supplied by the customer. Airsafe cannot confirm its validity

**Comment:** Even after disintegration of certain bulk samples (vinyl tiles and bituminous type materials), the detection of fibres may be difficult when using Polarised Light Microscopy and Dispersion Staining Techniques. This may be due to the matrix of the sample (uneven distribution), or fine fibres that are difficult to detect and positively identify.

**Disclaimer:** Approximate sample weights and size only – not covered as part of the scope of accreditation.

**Note:** The results relate only to the samples tested.

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# TEST REPORT

2 December 2019

**Arcadis**
Level 16/580 George Street
SYDNEY NSW 2000

| | |
|---|---|
| Your Reference: | Lot 58 - Mamre Road, Kemps Creek |
| Job Number: | 48781 |

**Attention:** James Von Der Helm

Dear James,

In accordance with your instructions, Airsafe tested samples from the above site for asbestos content.

The following samples were processed on the dates indicated.

| | |
|---|---|
| Samples: | 2 samples |
| Date of Sample Receipt: | 02/12/19 |
| Date of Sample Analysis: | 02/12/19 |
| Date of Preliminary Report Sent: | Not Issued |

The results are contained in the following pages of this report.

Should you have any queries regarding this report please contact the undersigned.

Yours faithfully
AIRSAFE OHC PTY LTD

M. Shaw

Matthew Shaw
Approved Identifier and Signatory

NATA
WORLD RECOGNISED ACCREDITATION

**PROJECT:** **Lot 58 - Mamre Road, Kemps Creek** **JOB NO:** **48781**

| Sample No | Location/Reference | Sample Description | Asbestos ID - Material |
|---|---|---|---|
| 48781-1 | Ground fragment | 45x20x5mm fibrous cement sheet fragments | Chrysotile asbestos detected, Amosite asbestos detected, Crocidolite asbestos detected |
| 48781-2 | Electrical backing board | <1g electrical backing board | No asbestos detected, Organic fibres detected |

**Method:** Samples have been analysed using polarised light microscopy including dispersion staining in accordance with the AS 4964 – 2004 Method for the qualitative identification of asbestos in bulk samples and in-house method AS102 - Method for the Qualitative Identification of Asbestos in Bulk Samples.

**Sampling:** Samples have been analysed on an “as received” basis.

**Comment:** Even after disintegration of certain bulk samples (vinyl tiles and bituminous type materials), the detection of fibres may be difficult when using Polarised Light Microscopy and Dispersion Staining Techniques. This may be due to the matrix of the sample (uneven distribution), or fine fibres that are difficult to detect and positively identify.

**Disclaimer:** Approximate sample weights and size only – not covered as part of the scope of accreditation.

**Note:** The results relate only to the samples tested.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Airsafe shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Airsafe be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report.

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Serial Number: 801280

Time : 2019-11-28 11:25:21

Method : Lead Paint

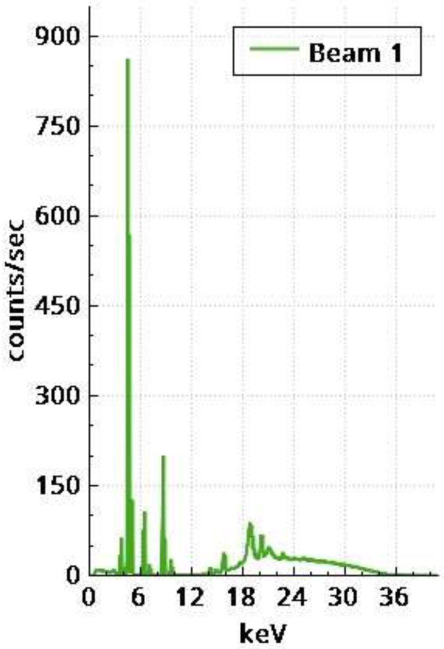
Daily ID : 29-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | SHouseEaWhite |
| Operator:: | JS |
| Project No:: | 48802 |
| Sample ID:: | 1 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 11:25:44

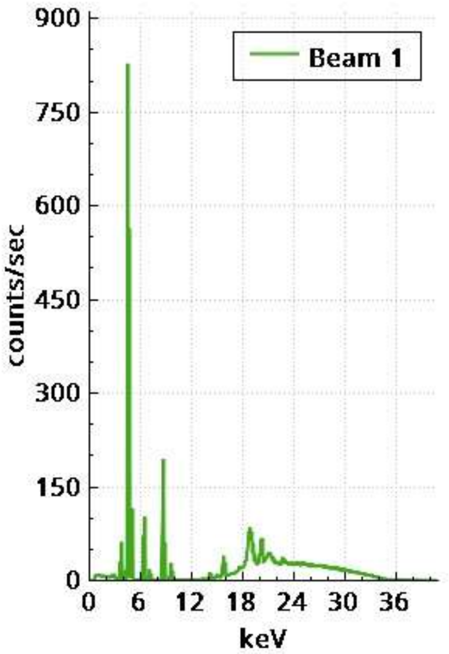
Daily ID : 29-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | SHouseEaWhite |
| Operator:: | JS |
| Project No:: | 48802 |
| Sample ID:: | 1 |

**Signature:** ____________________ **Date:** ____________________

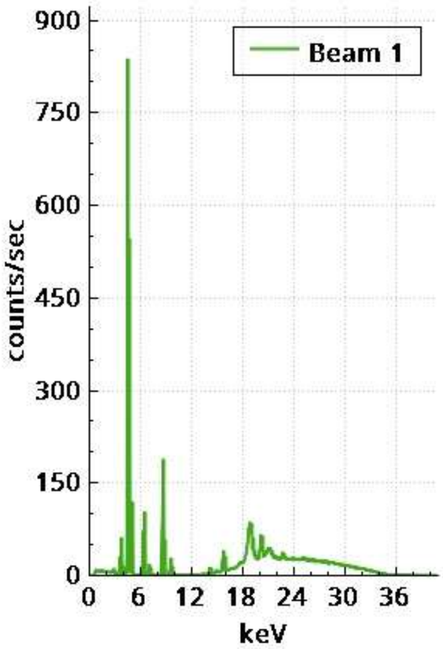
Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 11:26:06
Daily ID : 29-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | SHouseEaWhite |
| Operator:: | JS |
| Project No:: | 48802 |
| Sample ID:: | 1 |

**Signature:** ______________________ **Date:** ______________________

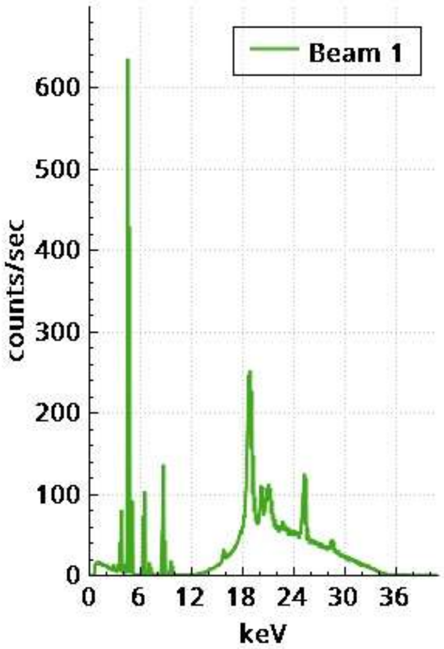
Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 11:26:49
Daily ID : 31-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | MHouseEaWhite |
| Operator:: | JS |
| Project No:: | 48802 |
| Sample ID:: | 2 |

**Signature:** ____________ **Date:** ____________

AIRSAFE

OLYMPUS

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 11:27:11

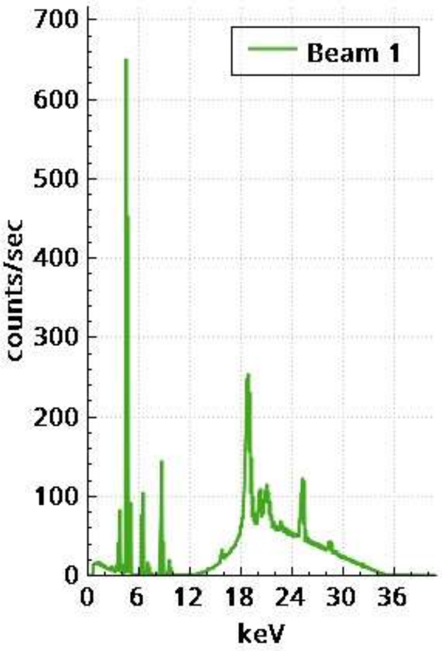
Daily ID : 31-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | MHouseEaWhite |
| Operator:: | JS |
| Project No:: | 48802 |
| Sample ID:: | 2 |

**Signature:** ______________________ **Date:** ______________________

AIRSAFE

OLYMPUS

Serial Number: 801280

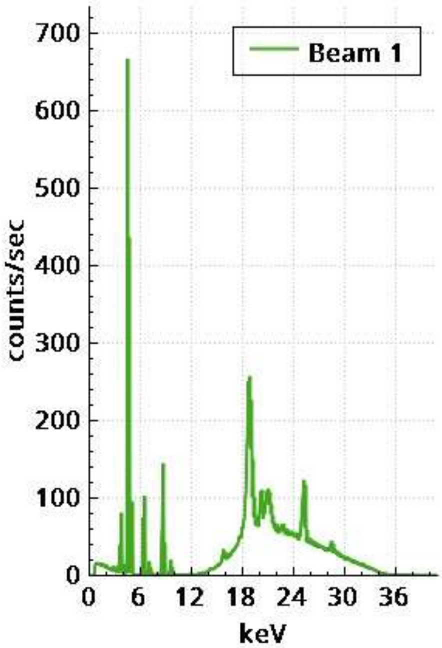
Time : 2019-11-28 11:27:34
Method : Lead Paint
Daily ID : 31-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: MHouseEaWhite

Operator:: JS

Project No:: 48802

Sample ID:: 2

**Signature:** ____________

**Date:** ____________

OLYMPUS

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 07:46:07

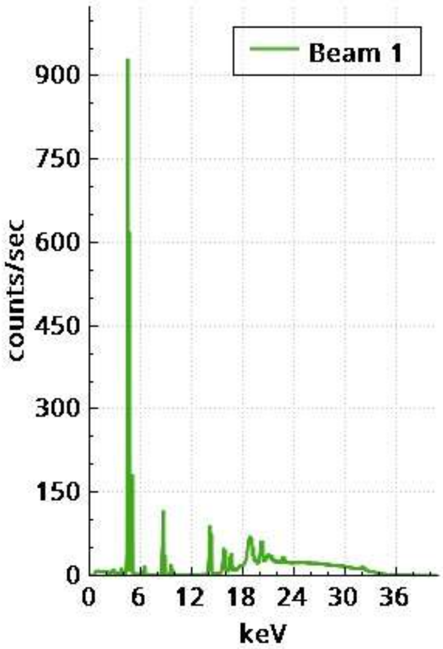
Daily ID : 9-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 844/1IntWhite |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 1 |

**Signature:** ______________ **Date:** ______________

AIRSAFE

OLYMPUS

Your Vision, Our Future

**Serial Number: 801280** **Time Method : 2019-11-28 Lead Paint 07:46:30**

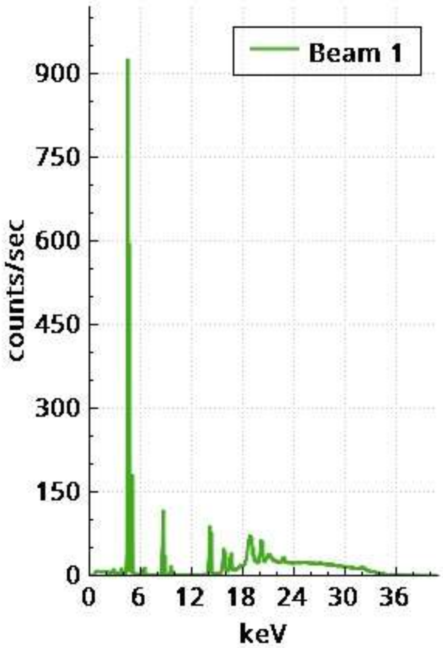
**Daily ID : 9-RP2**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: 844/1IntWhite

Operator:: JS

Project No:: 48803

Sample ID:: 1

**Signature:** ____________________ **Date:** ____________________

**Serial Number:** 801280

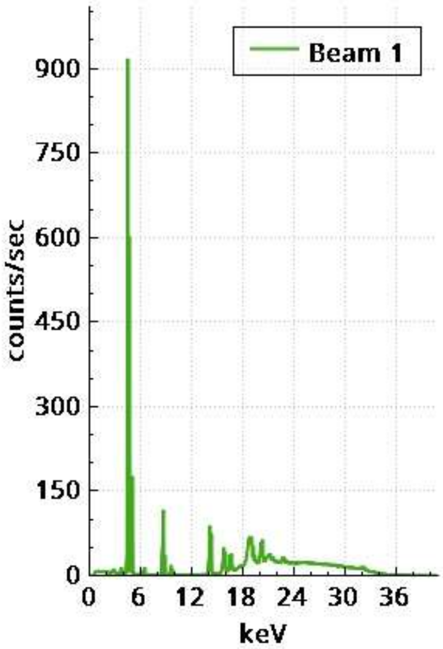
**Time :** 2019-11-28 07:46:52
**Method :** Lead Paint
**Daily ID :** 9-RP3

**Elapsed Time :** 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: 844/1IntWhite
Operator:: JS
Project No:: 48803
Sample ID:: 1

**Signature:** ____________________ **Date:** ____________________

AIRSAFE

OLYMPUS

Serial Number : 801280 Time Method : 2019-11-28 Lead Paint 07:54:40

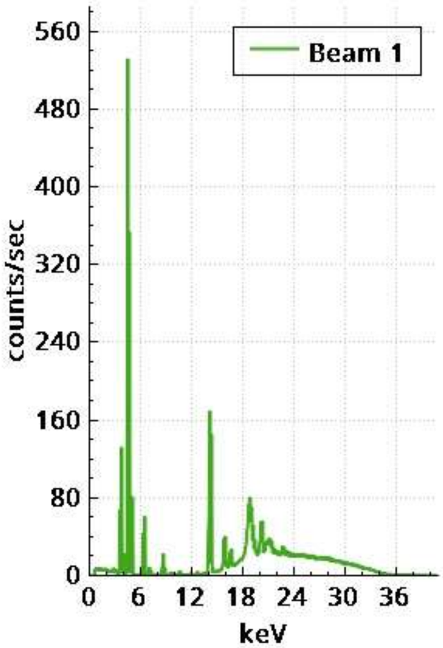
Daily ID : 11-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

Notes:: 844/1GrgePink

Operator:: JS

Project No:: 48804

Sample ID:: 2

**Signature:** ____________________ **Date:** ____________________

**Serial Number: 801280** **Time Method : 2019-11-28 Lead Paint 07:55:02**

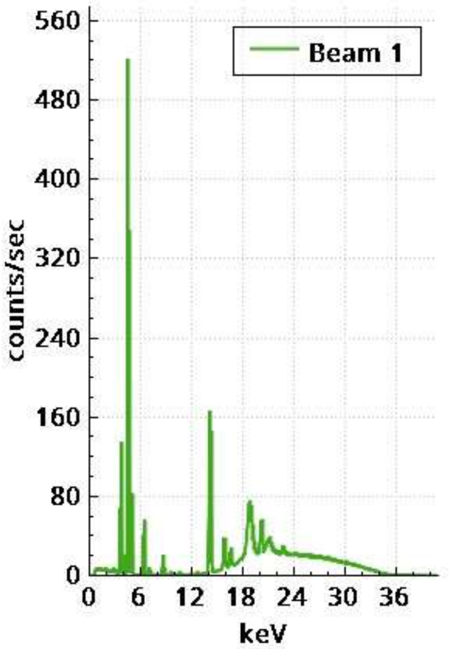
**Daily ID : 11-RP2**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 844/1GrgePink |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 2 |

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280

Time : 2019-11-28 07:55:24

Method : Lead Paint

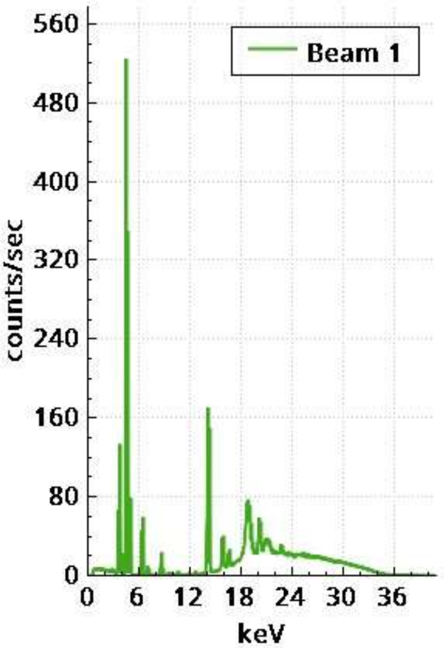
Daily ID : 11-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 844/1GrgePink |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 2 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 08:14:11

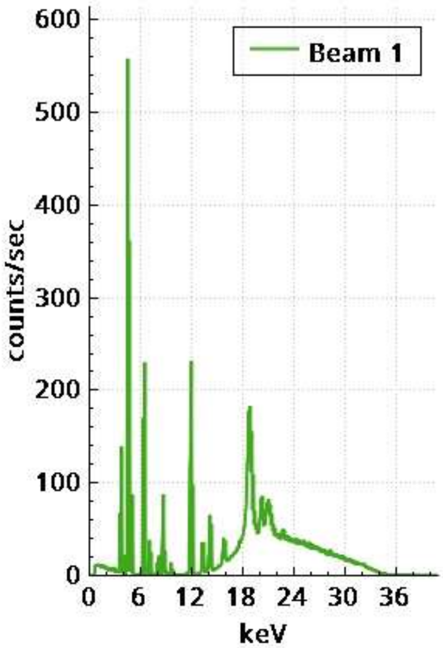
Daily ID : 13-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Ext844/1White |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 3 |

**Signature:** ______________________ **Date:** ______________________

AIRSAFE

OLYMPUS

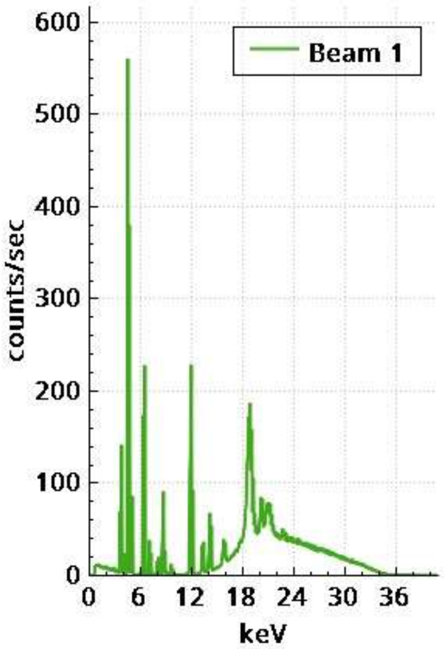
Serial Number: 801280 Time : 2019-11-28 08:14:33
Method : Lead Paint
Daily ID : 13-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Ext844/1White |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 3 |

**Signature:** ______________________ **Date:** ______________________

AIRSAFE

OLYMPUS

Serial Number: 801280

Time : 2019-11-28 08:14:56

Method : Lead Paint

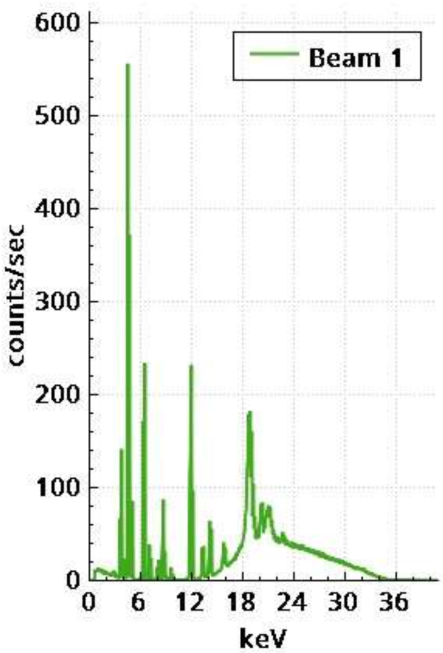
Daily ID : 13-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Ext844/1White |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 3 |

**Signature:** ______________________ **Date:** ______________________

OLYMPUS

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**Serial Number : 801280** **Time Method : 2019-11-28 Lead Paint 08:58:01**

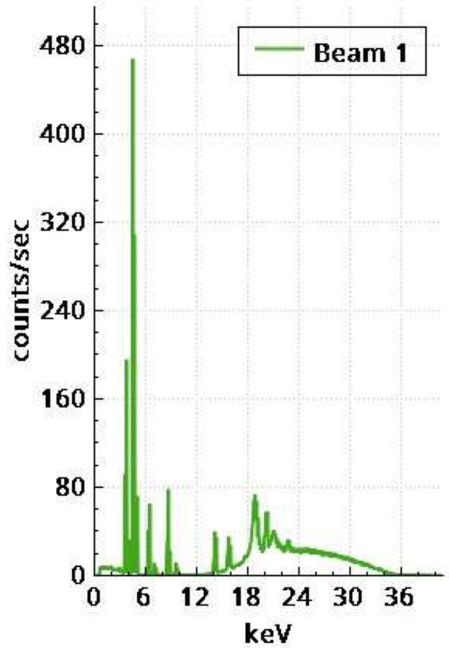
**Daily ID : 15-RP1**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Ext840/1Cream |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 4 |

**Signature:** ______________________ **Date:** ______________________

**Serial Number: 801280** **Time Method : 2019-11-28 08:58:23 Lead Paint**

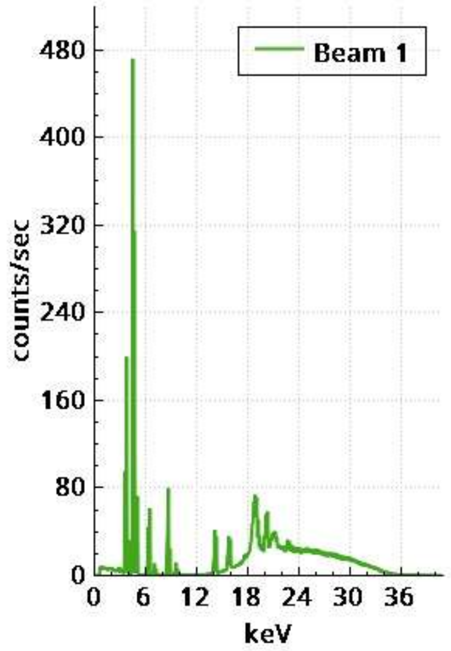
**Daily ID : 15-RP2**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: Ext840/1Cream

Operator:: JS

Project No:: 48803

Sample ID:: 4

**Signature:** ______________________ **Date:** ______________________

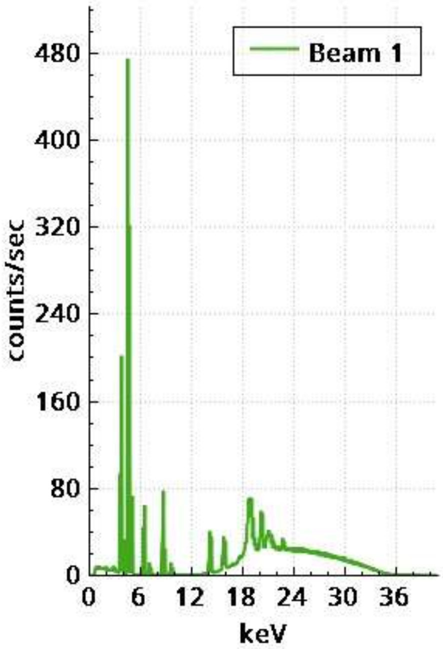
Serial Number : 801280 Time : 2019-11-28 08:58:46
Method : Lead Paint
Daily ID : 15-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

Notes:: Ext840/1Cream
Operator:: JS
Project No:: 48803
Sample ID:: 4

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 09:00:16

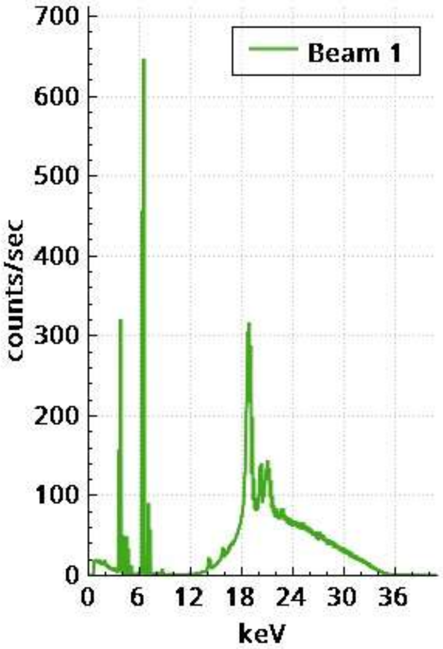
Daily ID : 17-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Ext840/1Dbrown |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 5 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 09:00:38

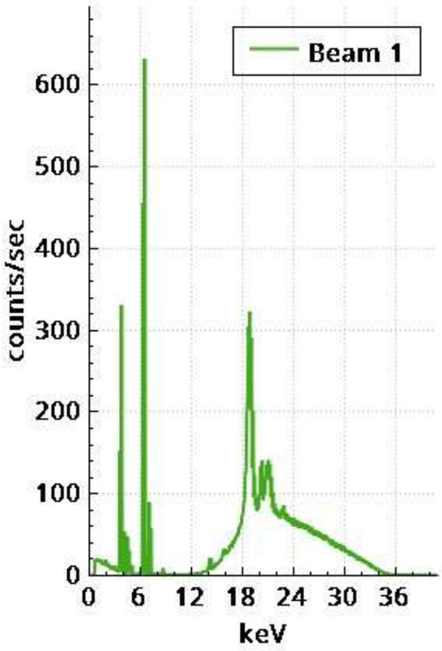
Daily ID : 17-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Ext840/1Dbrown |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 5 |

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 09:01:01

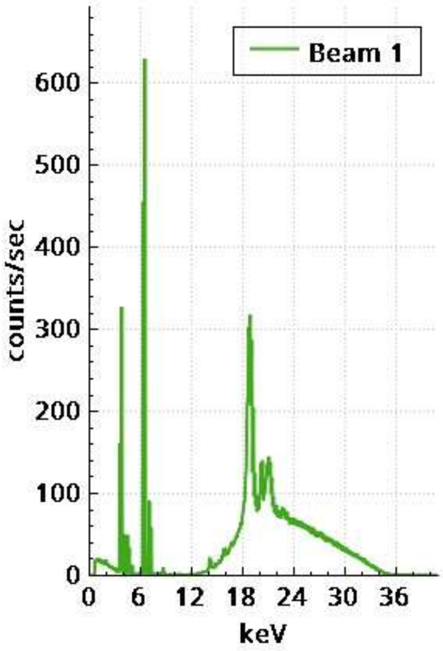
Daily ID : 17-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Ext840/1Dbrown |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 5 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280

Time : 2019-11-28 09:03:06
Method : Lead Paint

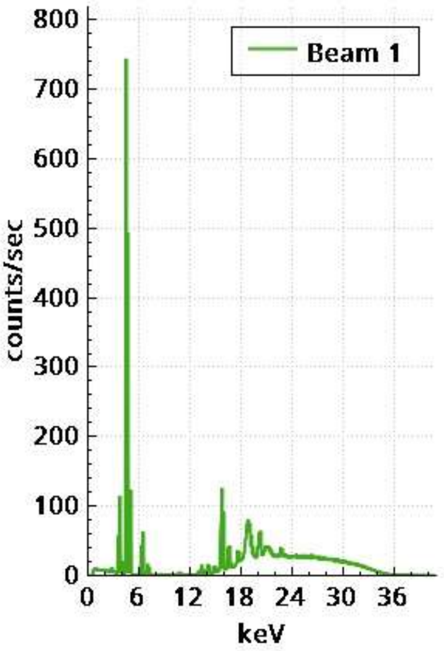
Daily ID : 19-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 840/2MusicWhite |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 7 |

**Signature:** ____________________ **Date:** ____________________

OLYMPUS

Serial Number: 801280 Time Method : 2019-11-28 09:03:28 Lead Paint

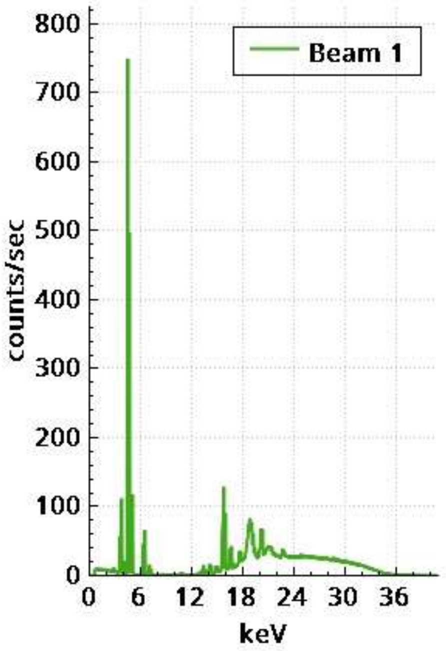
Daily ID : 19-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 840/2MusicWhite |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 7 |

**Signature:** ______________________ **Date:** ______________________

**Serial Number : 801280** **Time Method : 2019-11-28 Lead Paint 09:03:51**

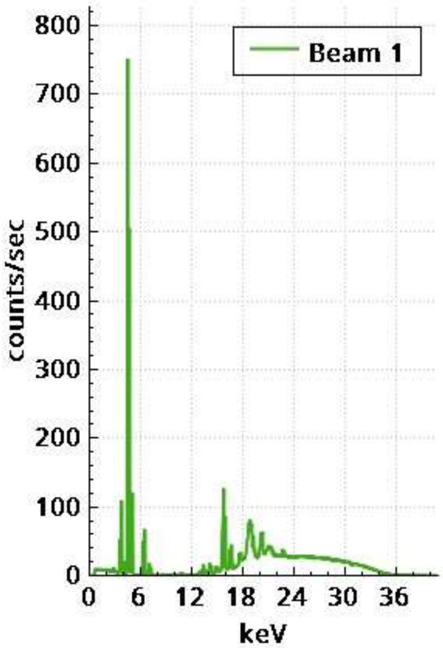
**Daily ID : 19-RP3**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.001 | Pass |

**Spectrum**




**Notes**

Notes:: 840/2MusicWhite

Operator:: JS

Project No:: 48803

Sample ID:: 7

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280 Time Method : 2019-11-28 09:05:21 Lead Paint

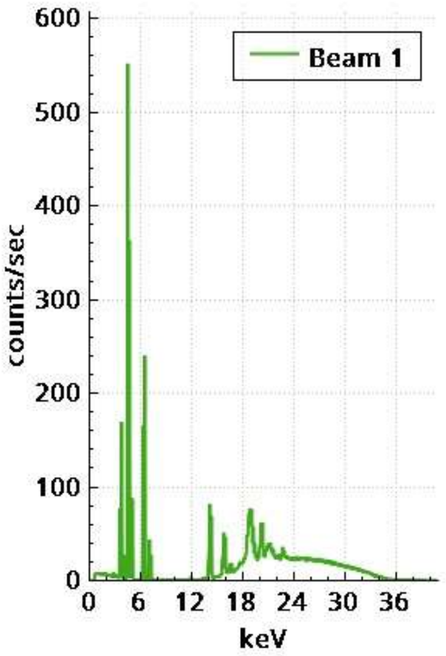
Daily ID : 21-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 840/2IntGrey |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 8 |

**Signature:** ____________________ **Date:** ____________________

AIRSAFE

OLYMPUS

Serial Number: 801280

Time : 2019-11-28 09:05:44

Method : Lead Paint

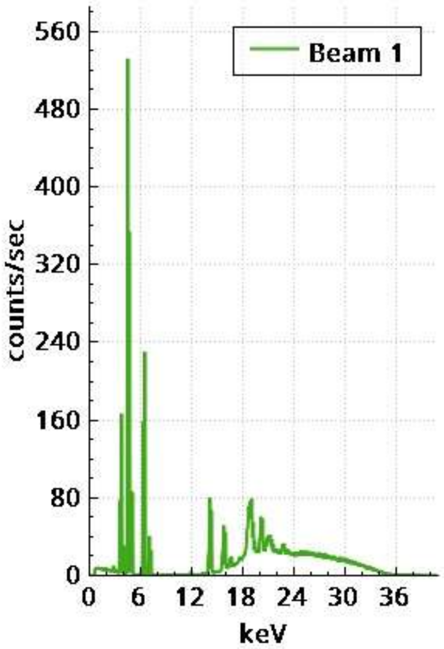
Daily ID : 21-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: 840/2IntGrey

Operator:: JS

Project No:: 48803

Sample ID:: 8

**Signature:** ______________________ **Date:** ______________________

OLYMPUS

Serial Number: 801280

Time : 2019-11-28 09:06:06

Method : Lead Paint

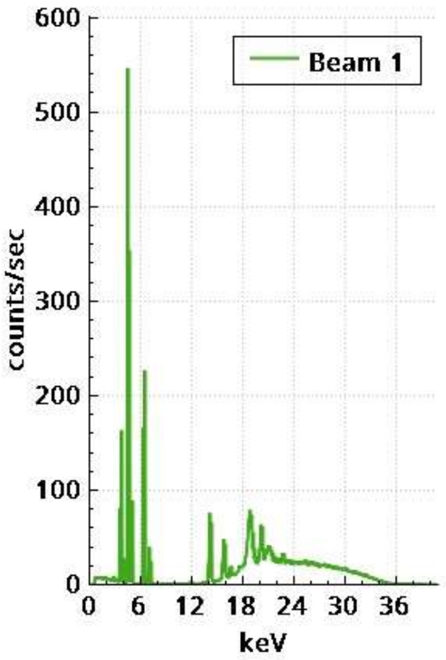
Daily ID : 21-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 840/2IntGrey |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 8 |

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280

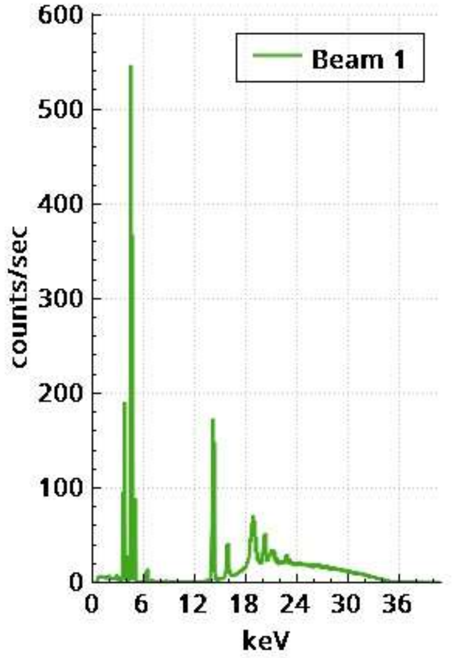
Time : 2019-11-28 09:26:26
Method : Lead Paint
Daily ID : 23-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 862IntWhite |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 9 |

**Signature:** ____________________ **Date:** ____________________

AIRSAFE

OLYMPUS

Serial Number: 801280

Time Method : 2019-11-28 09:26:49 Lead Paint

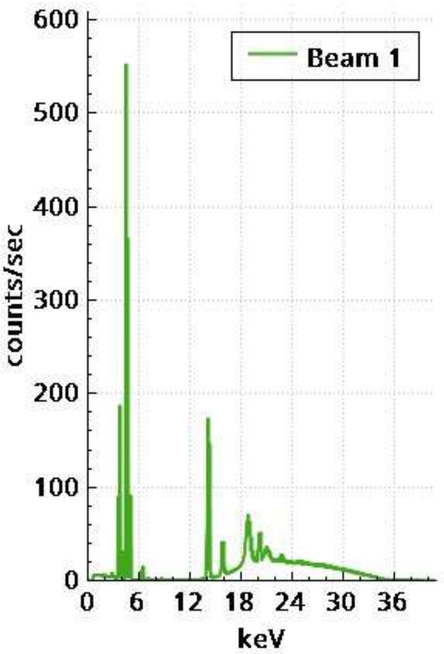
Daily ID : 23-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

Notes:: 862IntWhite

Operator:: JS

Project No:: 48803

Sample ID:: 9

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280    Time Method : 2019-11-28 09:27:11 Lead Paint

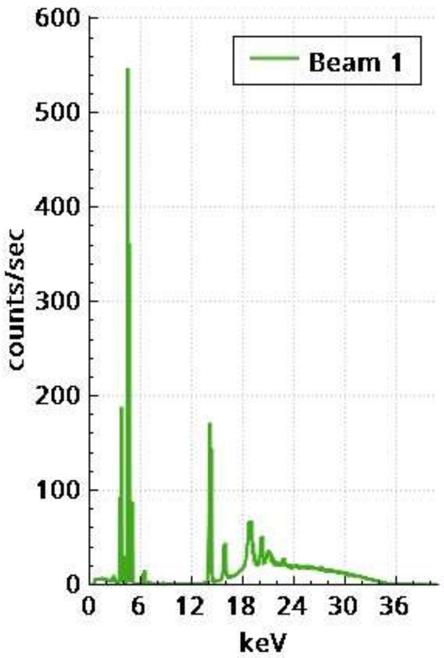
Daily ID : 23-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 862IntWhite |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 9 |

**Signature:** ______________________    **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-28 09:28:15 Lead Paint

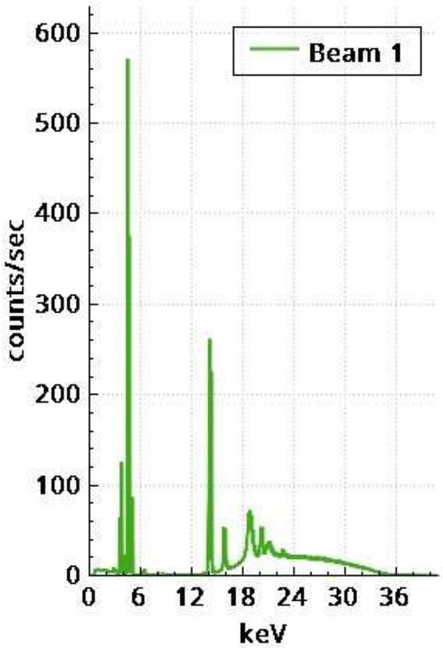
Daily ID : 25-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 862IntBlue |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 10 |

**Signature:** ______________________ **Date:** ______________________

OLYMPUS

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**Serial Number: 801280** **Time : 2019-11-28 09:28:37** **Method : Lead Paint**

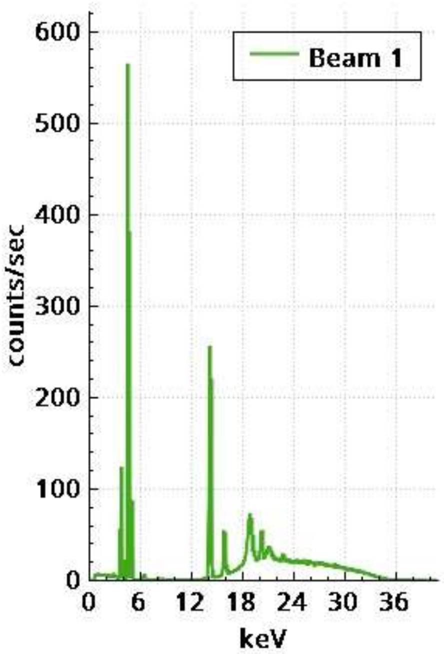
**Daily ID : 25-RP2**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

Notes:: 862IntBlue

Operator:: JS

Project No:: 48803

Sample ID:: 10

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280

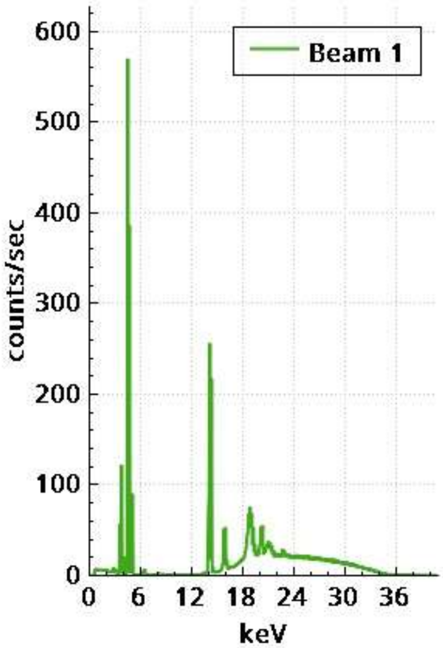
Time : 2019-11-28 09:29:00
Method : Lead Paint
Daily ID : 25-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 862IntBlue |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 10 |

**Signature:** ______________________ **Date:** ______________________

**Serial Number : 801280**

**Time : 2019-11-28 09:30:38**

**Method : Lead Paint**

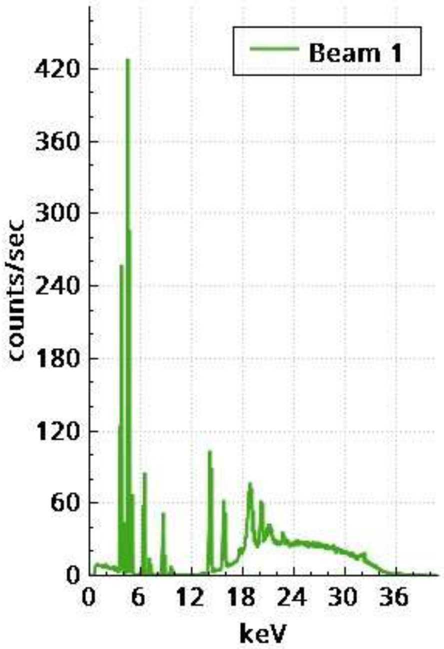
**Daily ID : 27-RP1**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 862ExtGrey |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 11 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time : 2019-11-28 09:31:00

Method : Lead Paint

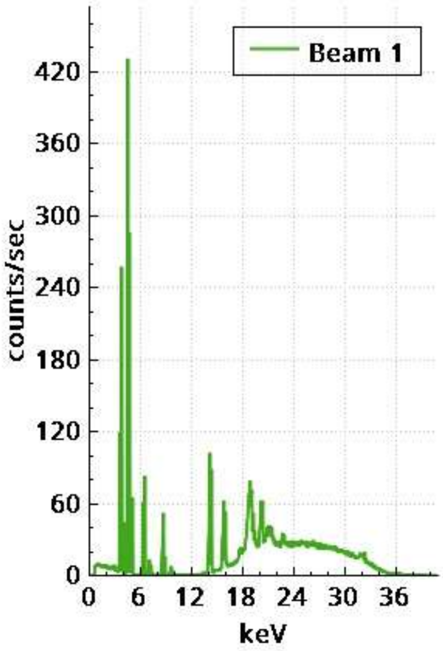
Daily ID : 27-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 862ExtGrey |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 11 |

**Signature:** ______________________ **Date:** ______________________

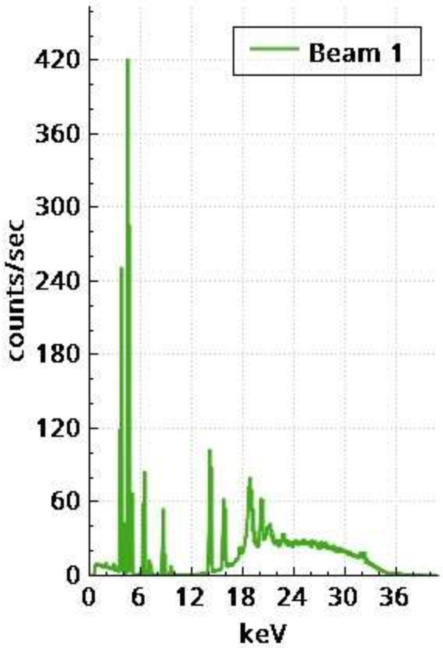
Serial Number: 801280 Time : 2019-11-28 09:31:22
Method : Lead Paint
Daily ID : 27-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 862ExtGrey |
| Operator:: | JS |
| Project No:: | 48803 |
| Sample ID:: | 11 |

**Signature:** ______________________ **Date:** ______________________

**Serial Number: 801280** **Time Method : 2019-11-28 Lead Paint 06:52:54**

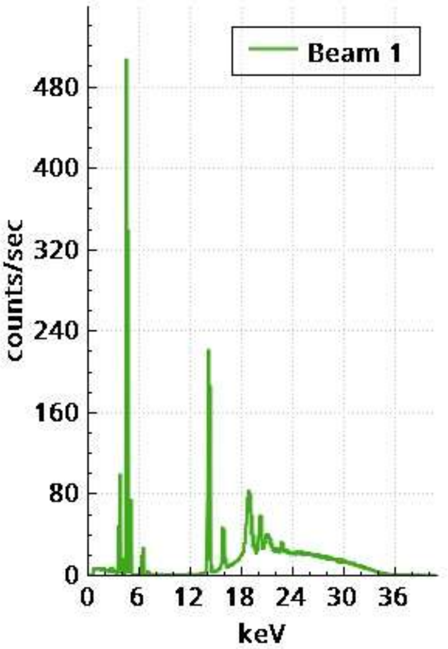
**Daily ID : 1-RP1**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 56/1IntCream |
| Operator:: | Js |
| Project No:: | 48804 |
| Sample ID:: | 1 |

**Signature:** **Date:**

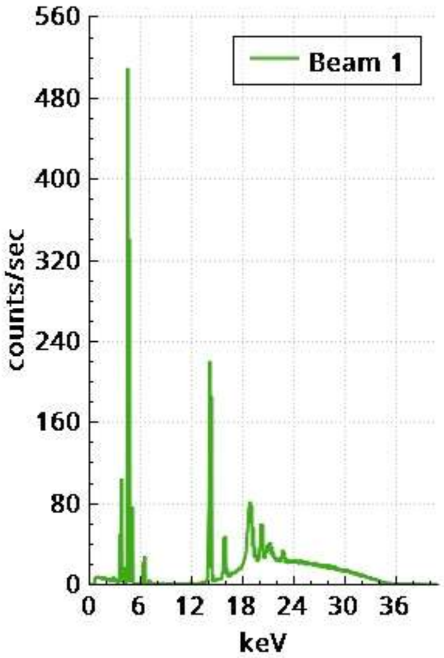
Serial Number : 801280    Time Method : 2019-11-28 Lead Paint 06:53:17
Daily ID : 1-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 56/1IntCream |
| Operator:: | Js |
| Project No:: | 48804 |
| Sample ID:: | 1 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-28 06:53:39 Lead Paint

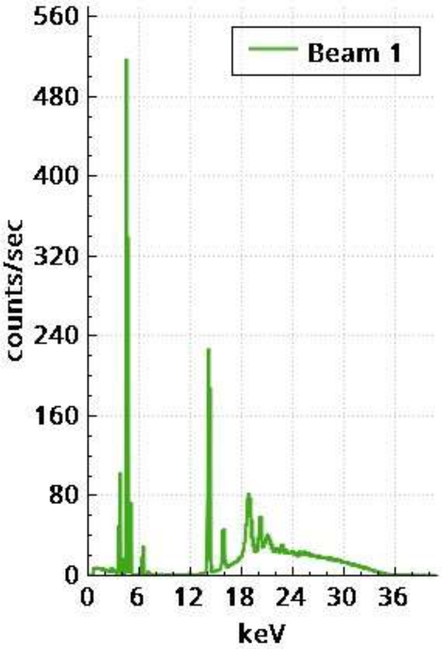
Daily ID : 1-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: 56/1AIntCream

Operator:: Js

Project No:: 48804

Sample ID:: 1

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280

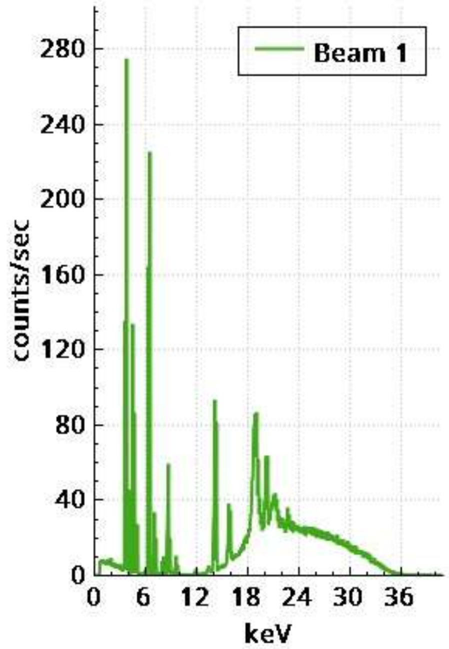
Time : 2019-11-28 06:54:57
Method : Lead Paint
Daily ID : 3-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 56/1IntGreen |
| Operator:: | Js |
| Project No:: | 48804 |
| Sample ID:: | 2 |

**Signature:** ____________________ **Date:** ____________________

**Serial Number: 801280** **Time Method : 2019-11-28 Lead Paint 06:55:20**

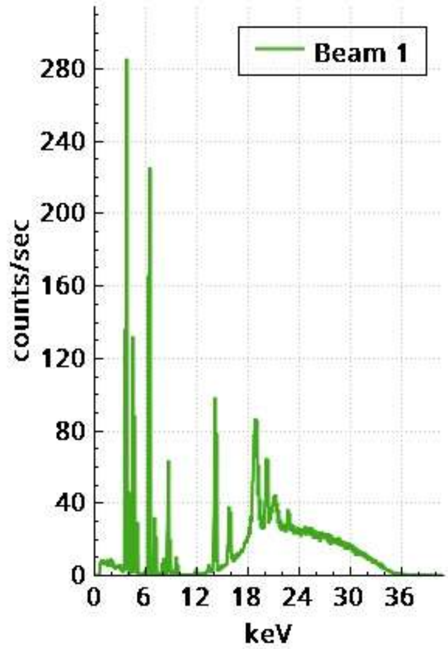
**Daily ID : 3-RP2**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: 56/1IntGreen

Operator:: Js

Project No:: 48804

Sample ID:: 2

**Signature:** ______________________ **Date:** ______________________

AIRSAFE

OLYMPUS

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 06:55:43

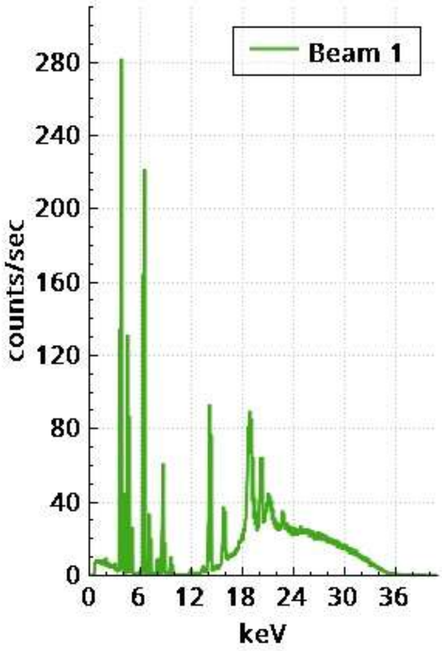
Daily ID : 3-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: 56/1IntGreen

Operator:: Js

Project No:: 48804

Sample ID:: 2

**Signature:** ______________ **Date:** ______________

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 06:58:04

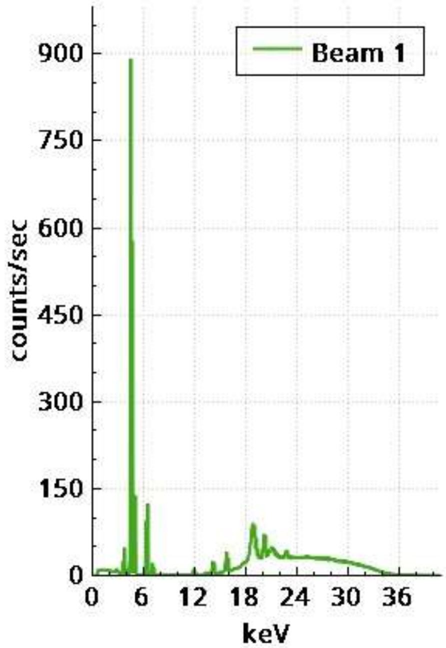
Daily ID : 5-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: 56/1GreenBot

Operator:: Js

Project No:: 48804

Sample ID:: 3

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280    Time Method : 2019-11-28 Lead Paint 06:58:26

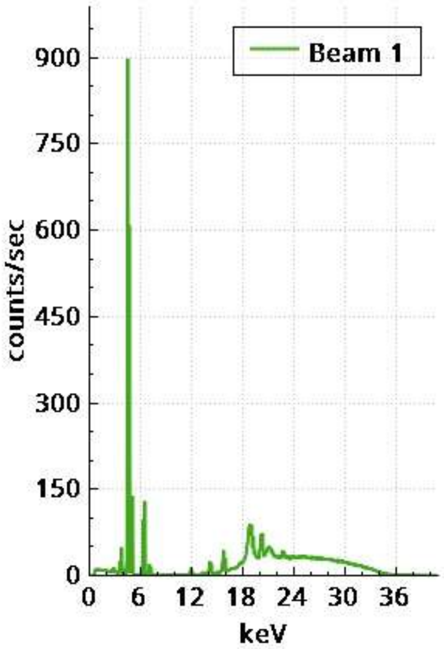
Daily ID : 5-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 56/1GreenBot |
| Operator:: | Js |
| Project No:: | 48804 |
| Sample ID:: | 3 |

**Signature:** ____________________    **Date:** ____________________

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 06:58:49

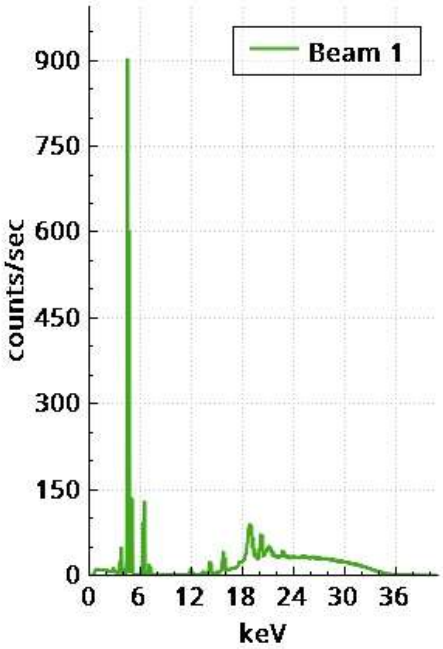
Daily ID : 5-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 56/1GreenBot |
| Operator:: | Js |
| Project No:: | 48804 |
| Sample ID:: | 3 |

**Signature:** ____________________ **Date:** ____________________

Serial Number : 801280

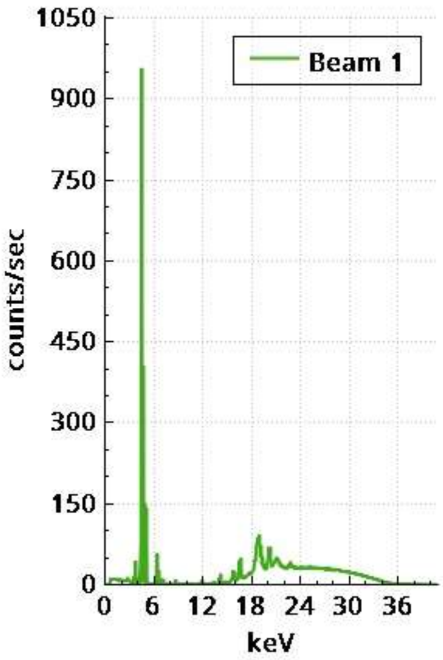
Time : 2019-11-28 07:06:02
Method : Lead Paint
Daily ID : 7-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: 56/2IntCream

Operator:: Js

Project No:: 48804

Sample ID:: 4

**Signature:** ____________ **Date:** ____________

**Serial Number: 801280** **Time Method : 2019-11-28 Lead Paint 07:06:24**

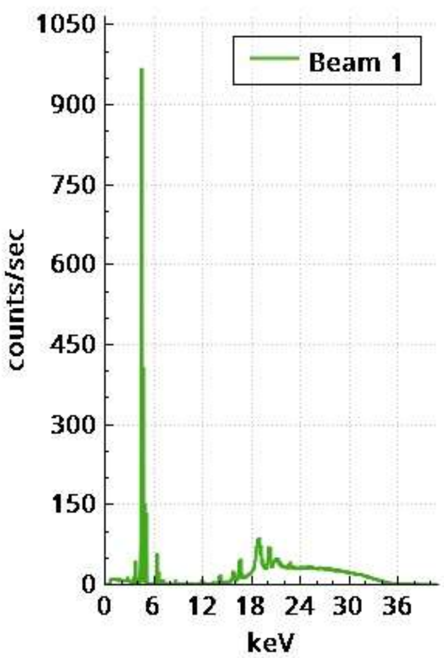
**Daily ID : 7-RP2**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 56/2IntCream |
| Operator:: | Js |
| Project No:: | 48804 |
| Sample ID:: | 4 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-28 Lead Paint 07:06:46

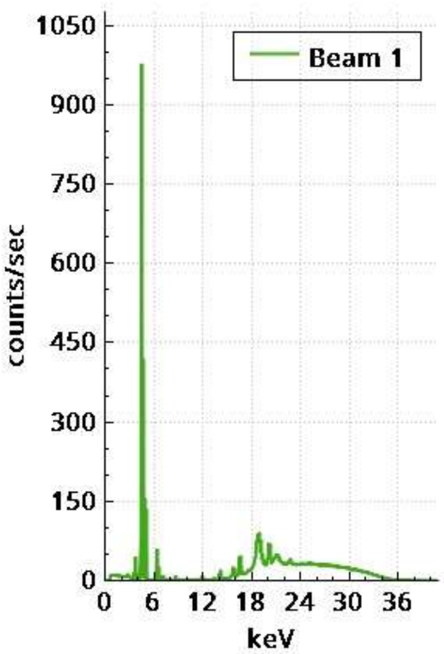
Daily ID : 7-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | 56/2IntCream |
| Operator:: | Js |
| Project No:: | 48804 |
| Sample ID:: | 4 |

**Signature:** ____________________ **Date:** ____________________

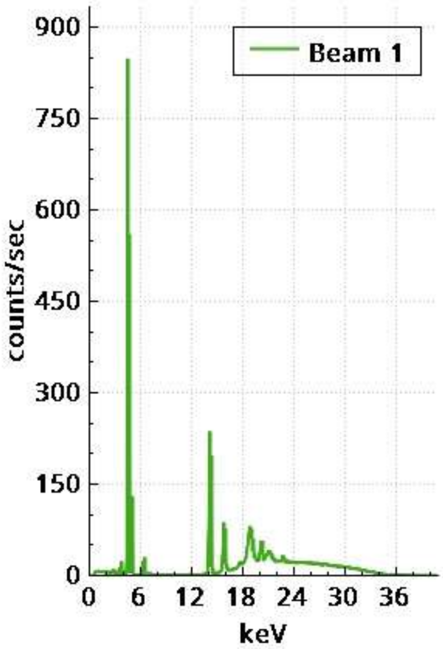
**Serial Number: 801280** **Time Method : 2019-11-27 Lead Paint 10:13:29**
**Daily ID : 4-RP1**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | White |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 1 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-27 Lead Paint 10:13:51

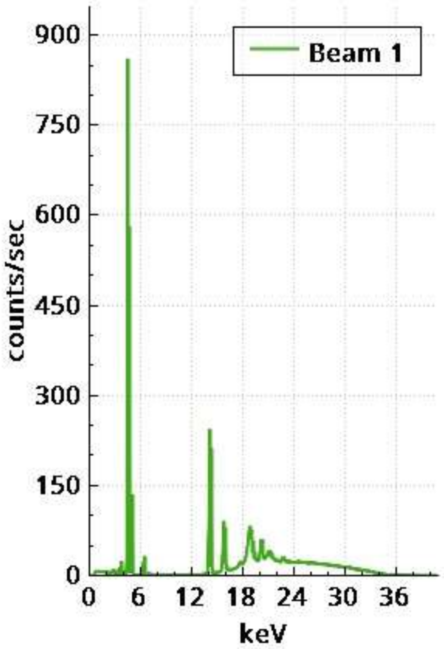
Daily ID : 4-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | White |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 1 |

**Signature:** ____________________ **Date:** ____________________

OLYMPUS

Serial Number: 801280 Time Method : 2019-11-27 10:14:14 : Lead Paint

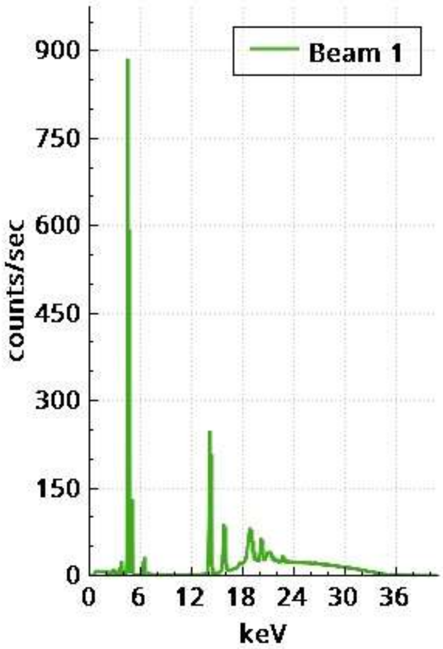
Daily ID : 4-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: White

Operator:: JS

Project No:: 48805

Sample ID:: 1

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-27 Lead Paint 10:16:26

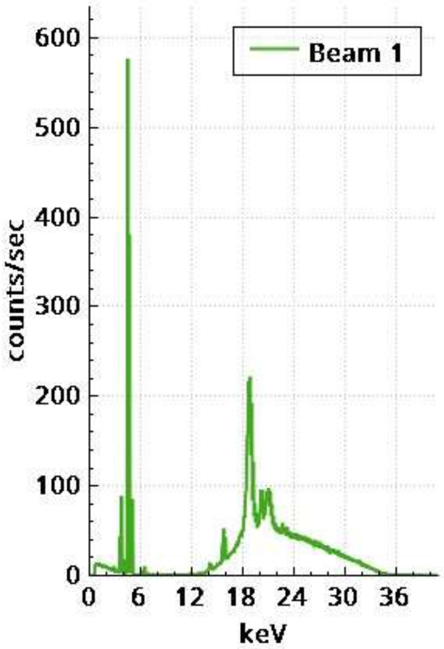
Daily ID : 6-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Trim White |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 2 |

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280 Time Method : 2019-11-27 Lead Paint 10:16:48

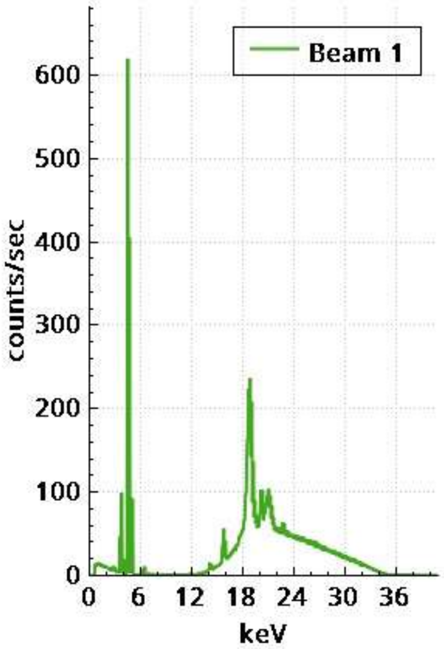
Daily ID : 6-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

Notes:: Trim White

Operator:: JS

Project No:: 48805

Sample ID:: 2

**Signature:** ____________ **Date:** ____________

Serial Number: 801280 Time Method : 2019-11-21 Lead Paint 10:17:11

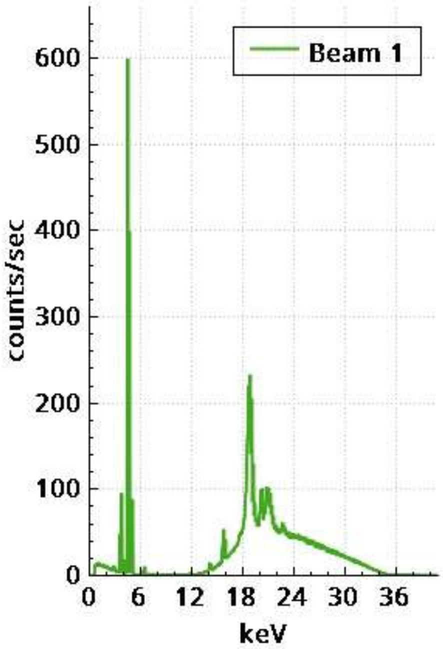
Daily ID : 6-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Trim White |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 2 |

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280 Time Method : 2019-11-27 10:30:45 Lead Paint

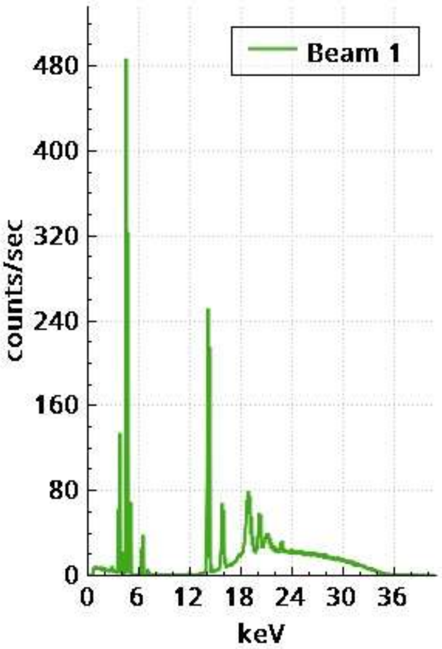
Daily ID : 9-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: MIntWhite

Operator:: JS

Project No:: 48805

Sample ID:: 3

**Signature:** ____________ **Date:** ____________

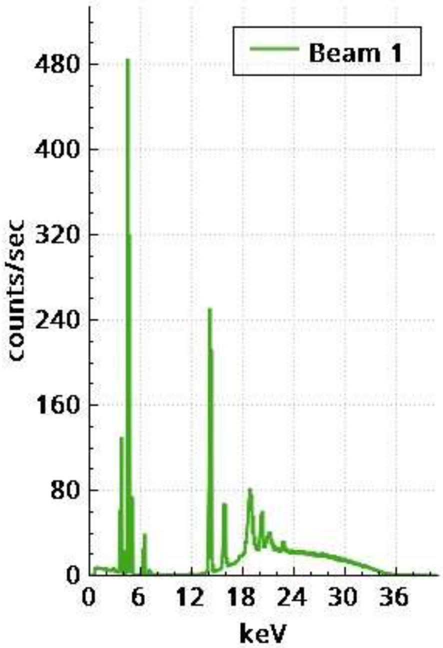
Serial Number: 801280 Time Method : 2019-11-27 Lead Paint 10:31:08
Daily ID : 9-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | IntWhite |
| Operator:: | CY |
| Project No:: | 48805 |
| Sample ID:: | 3 |

**Signature:** ______________ **Date:** ______________

Serial Number: 801280

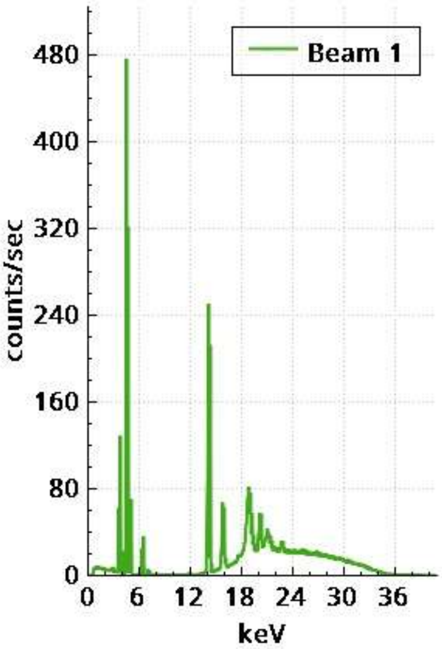
Time : 2019-11-27 10:31:30
Method : Lead Paint
Daily ID : 9-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | MIntWhite |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 3 |

**Signature:** ____________________ **Date:** ____________________

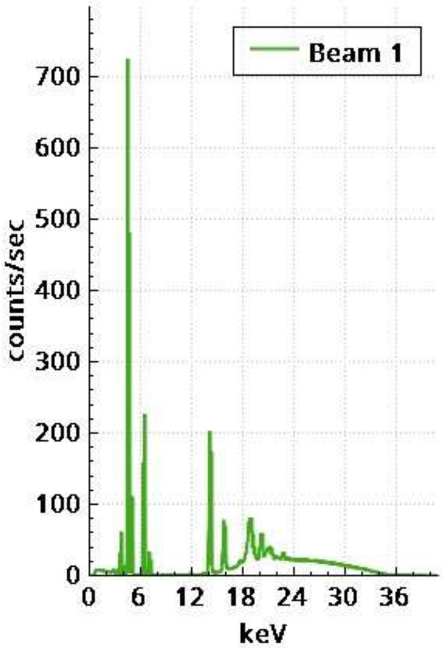
**Serial Number: 801280** **Time : 2019-11-27 10:34:19**
**Method : Lead Paint**
**Daily ID : 11-RP1**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | TrimBrown |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 4 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-27 Lead Paint 10:34:41

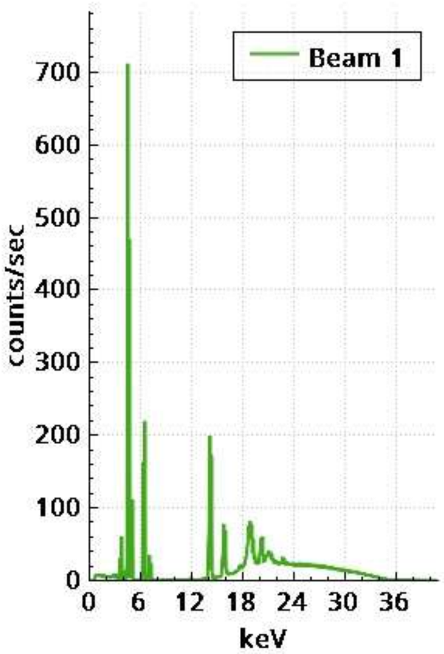
Daily ID : 11-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | TrimBrown |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 4 |

**Signature:** ____________________ **Date:** ____________________

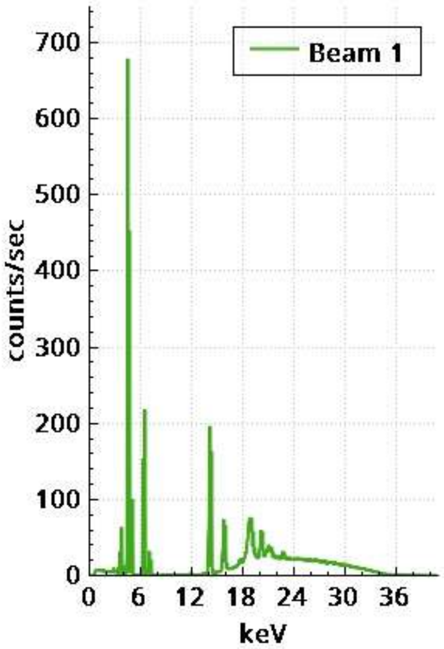
**Serial Number : 801280** **Time : 2019-11-21 10:35:04**
**Method : Lead Paint**
**Daily ID : 11-RP3**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | TrimBrown |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 4 |

**Signature:** ____________________ **Date:** ____________________

**Serial Number: 801280** **Time Method : 2019-11-27 Lead Paint 10:40:49**

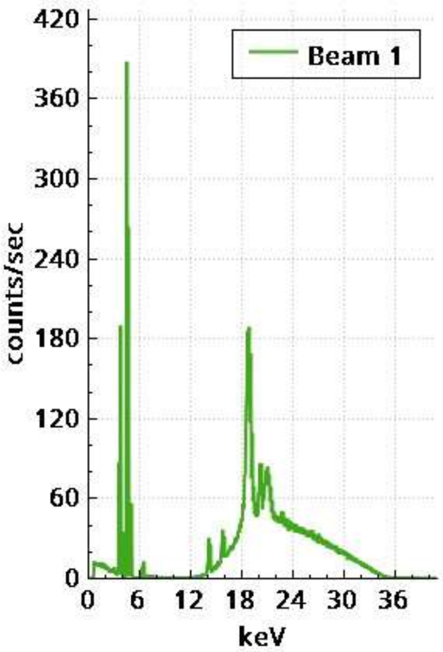
**Daily ID : 14-RP1**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | IntTrimwhite |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 5 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-21 Lead Paint 10:41:11

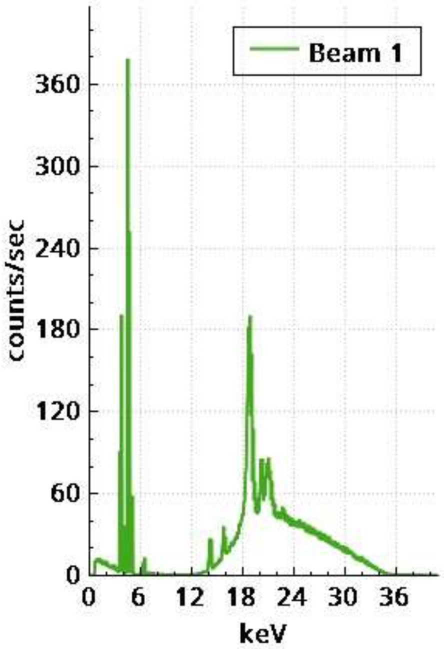
Daily ID : 14-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | IntTrim white |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 5 |

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280 Time Method : 2019-11-21 Lead Paint 10:41:34

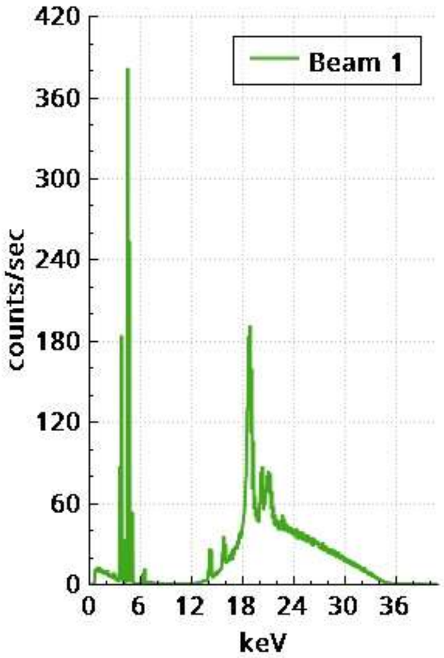
Daily ID : 14-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | IntTrim white |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 5 |

**Signature:** ______________________ **Date:** ______________________

AIRSAFE

OLYMPUS

Serial Number: 801280

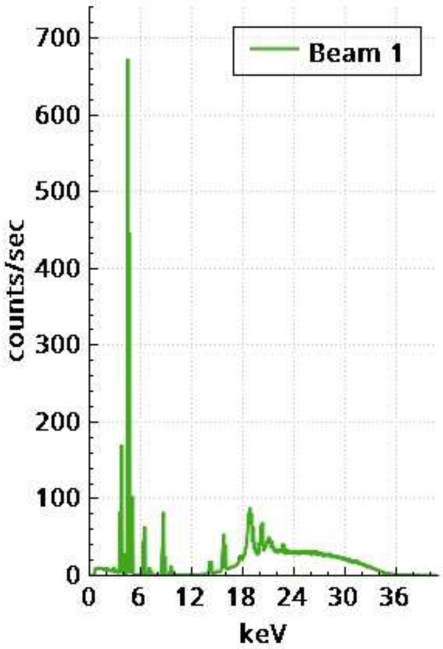
Time : 2019-11-27 10:45:23
Method : Lead Paint
Daily ID : 16-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Ext Cream |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 6 |

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280 Time Method : 2019-11-27 10:45:45 Lead Paint

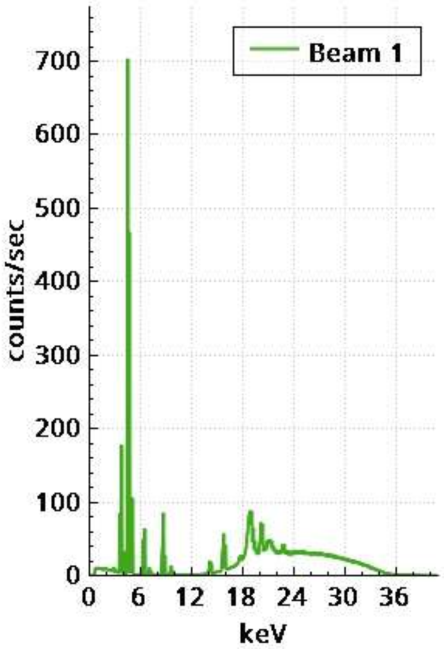
Daily ID : 16-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Ext Cream |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 6 |

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280 Time Method : 2019-11-27 Lead Paint 10:46:08

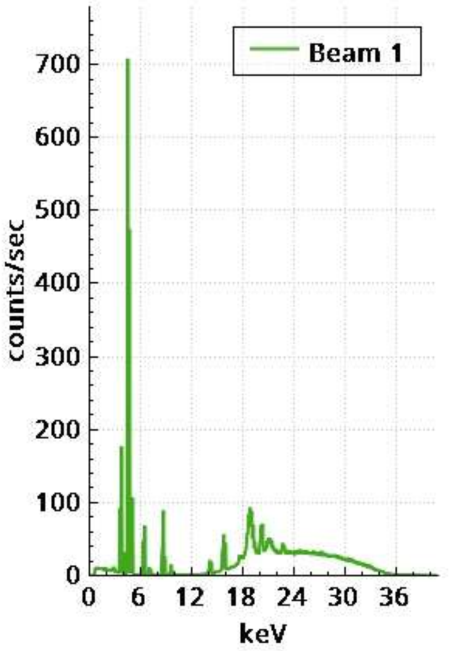
Daily ID : 16-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Ext Cream |
| Operator:: | JS |
| Project No:: | 48805 |
| Sample ID:: | 6 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-21 Lead Paint 12:57:07

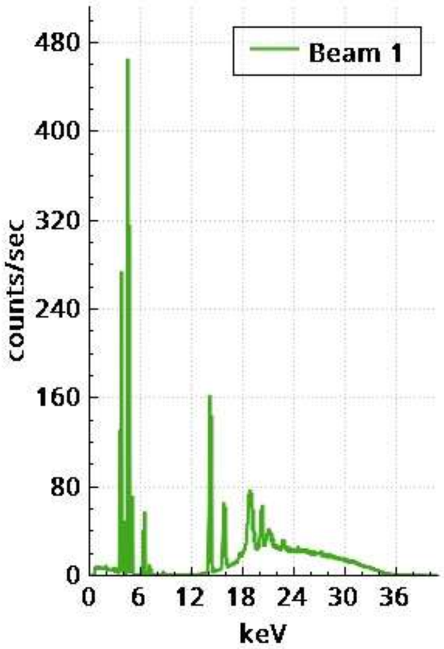
Daily ID : 18-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | ShedDarkcream |
| Operator:: | JS/ MJ |
| Project No:: | 48805 |
| Sample ID:: | 7 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-21 Lead Paint 12:57:29

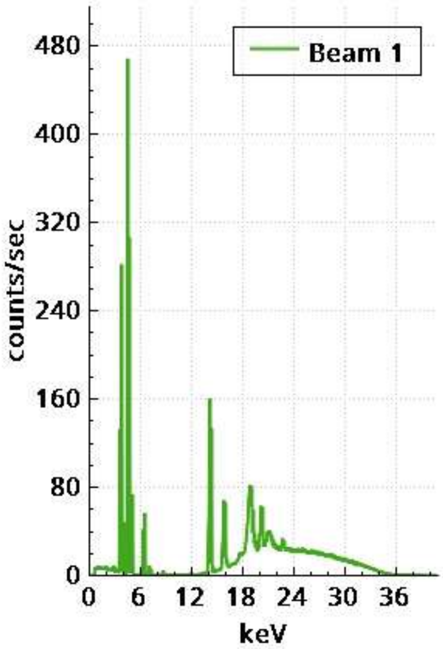
Daily ID : 18-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | ShedDark cream |
| Operator:: | JS/ MJ |
| Project No:: | 48805 |
| Sample ID:: | 7 |

**Signature:** ______________________ **Date:** ______________________

Serial Number : 801280

Time : 2019-11-21 12:57:51

Method : Lead Paint

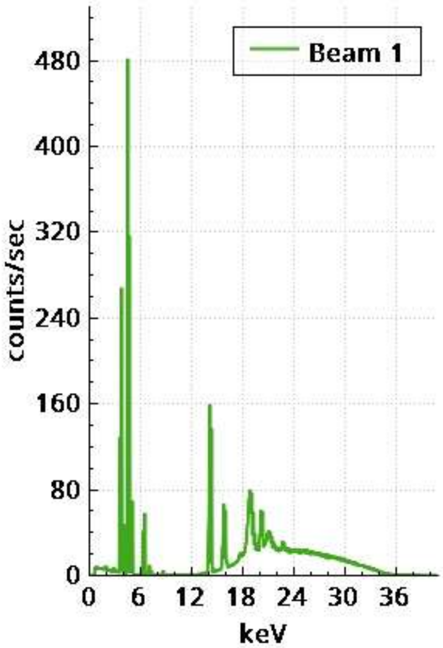
Daily ID : 18-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | ShedDark cream |
| Operator:: | JS/ MJ |
| Project No:: | 48805 |
| Sample ID:: | 7 |

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280 Time Method : 2019-11-21 Lead Paint 12:59:42

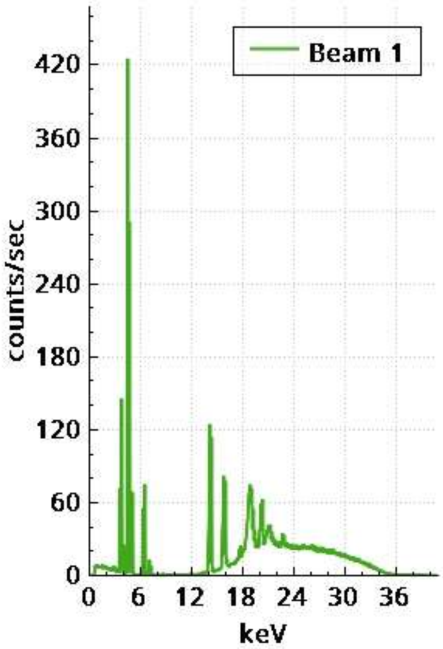
Daily ID : 21-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | Shed IntGrey |
| Operator:: | JS/ MJ |
| Project No:: | 48805 |
| Sample ID:: | 8 |

**Signature:** ____________________ **Date:** ____________________

Serial Number: 801280 Time Method : 2019-11-21 Lead Paint 13:00:05

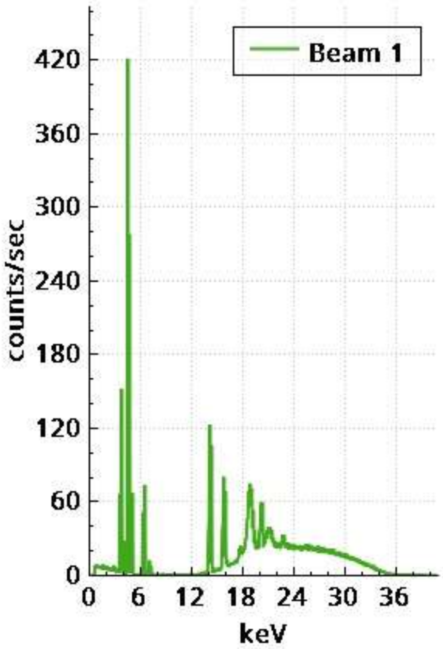
Daily ID : 21-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | ShedIntGrey |
| Operator:: | JS/ MJ |
| Project No:: | 48807 |
| Sample ID:: | 8 |

**Signature:** ________________ **Date:** ________________

**Serial Number: 801280**

**Time : 2019-11-21 13:00:27**

**Method : Lead Paint**

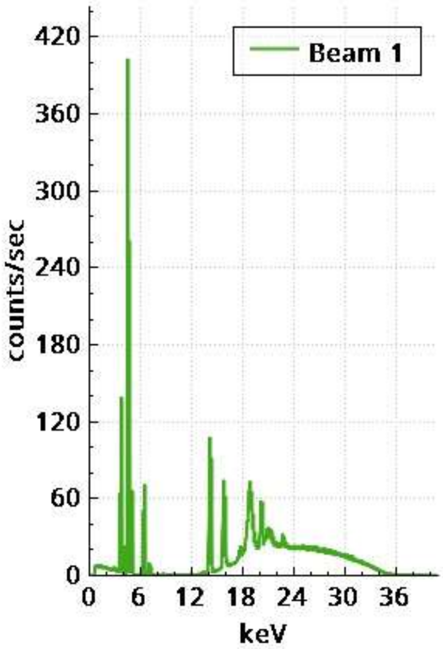
**Daily ID : 21-RP3**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | ShedIntGrey |
| Operator:: | JS/ MJ |
| Project No:: | 48805 |
| Sample ID:: | 8 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-21 Lead Paint 13:01:42

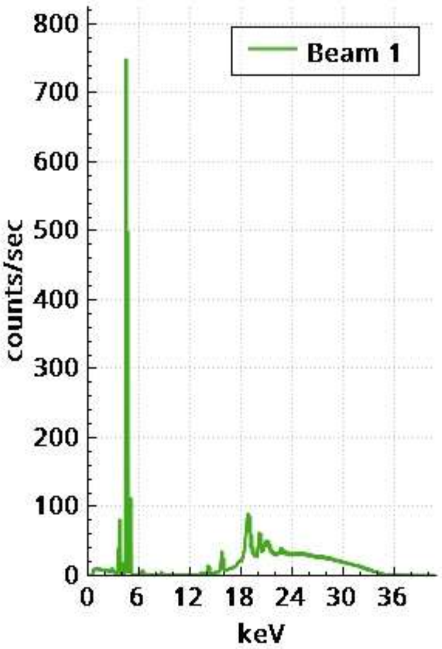
Daily ID : 23-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: ShedIntWhite

Operator:: JS/ MJ

Project No:: 48805

Sample ID:: 9

**Signature:** ____________________ **Date:** ____________________

OLYMPUS

Your Vision, Our Future

**Serial Number : 801280** **Time Method : 2019-11-21 Lead Paint 13:02:05**

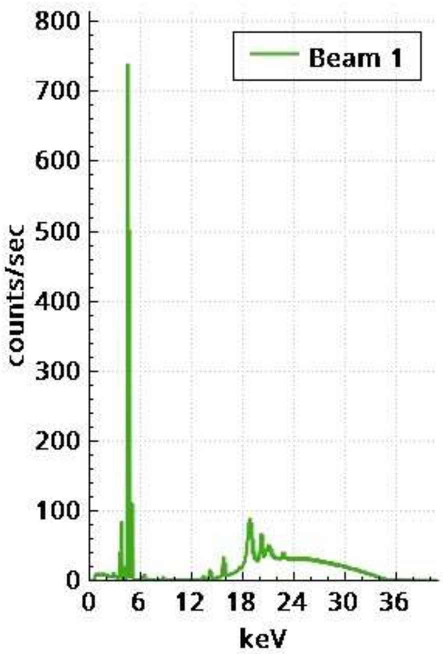
**Daily ID : 23-RP2**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

Notes:: ShedIntWhite

Operator:: JS/ MJ

Project No:: 48805

Sample ID:: 9

**Signature:** ______________________ **Date:** ______________________

**Serial Number : 801280**

**Time : 2019-11-21 13:02:28**

**Method : Lead Paint**

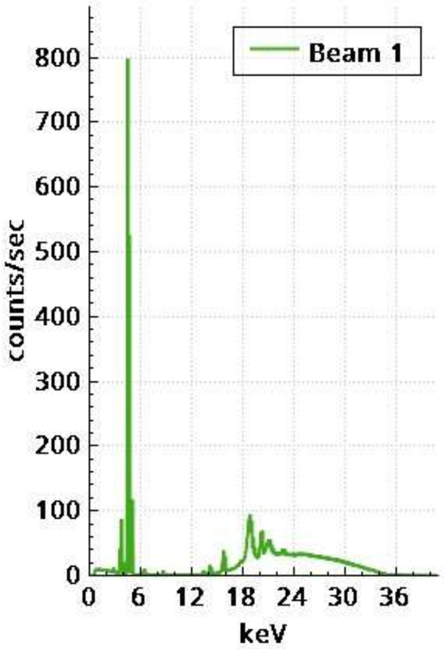
**Daily ID : 23-RP3**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | ShedIntWhite |
| Operator:: | JS/ MJ |
| Project No:: | 48805 |
| Sample ID:: | 9 |

**Signature:** ______________________ **Date:** ______________________

AIRSAFE

OLYMPUS

**Serial Number: 801280**   **Time Method : 2019-11-27 13:04:16 Lead Paint**

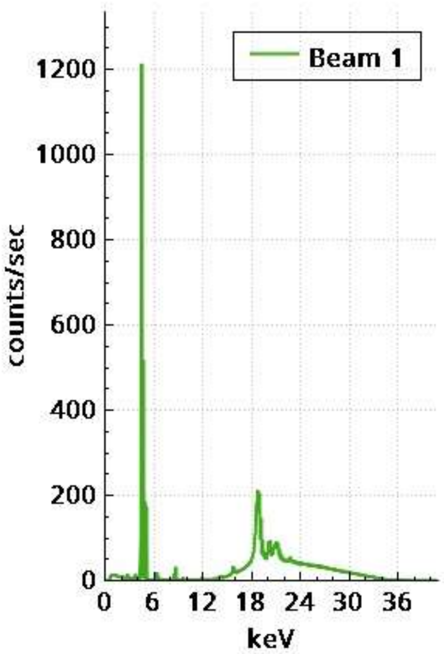
**Daily ID : 25-RP1**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | ShedextWhittrim |
| Operator:: | JS/ MJ |
| Project No:: | 48805 |
| Sample ID:: | 10 |

**Signature:** ____________________ **Date:** ____________________

OLYMPUS

Serial Number : 801280 Time : 2019-11-21 13:04:39 Method : Lead Paint

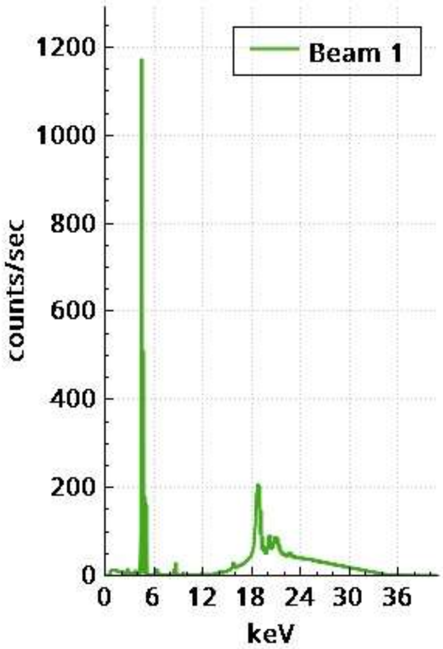
Daily ID : 25-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | ShedExtWhitTrim |
| Operator:: | JS/ MJ |
| Project No:: | 48805 |
| Sample ID:: | 10 |

**Signature:** ______________________ **Date:** ______________________

AIRSAFE

OLYMPUS

Your Vision, Our Future

**Serial Number: 801280**

**Time : 2019-11-2? 13:05:01**

**Method : Lead Paint**

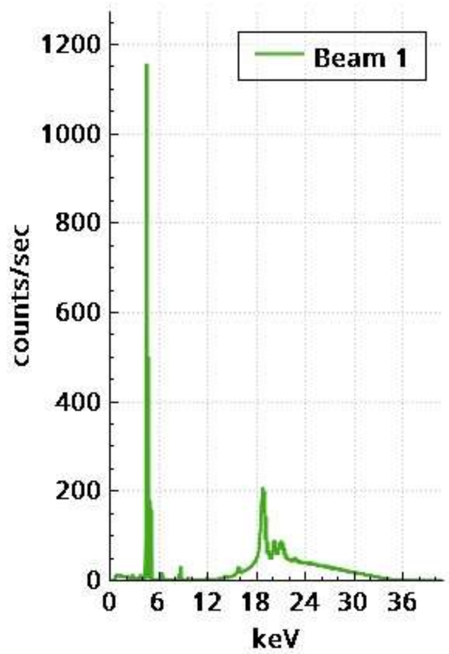
**Daily ID : 25-RP3**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0004 | Pass |

**Spectrum**




**Notes**

Notes:: ShedExtWhitTrim

Operator:: JS/ MJ

Project No:: 48805

Sample ID:: 10

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280 Time Method : 2019-11-27 Lead Paint 13:06:58

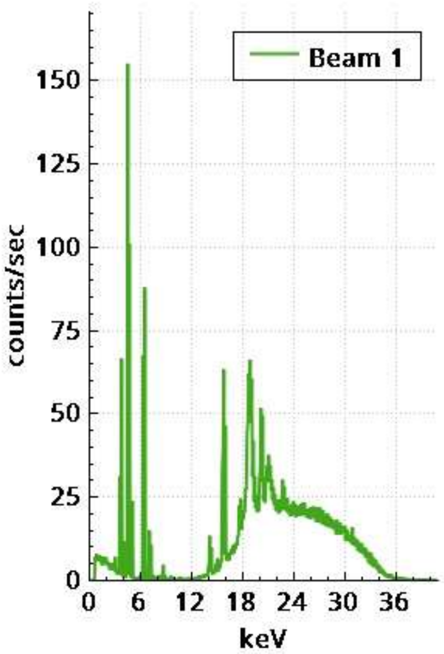
Daily ID : 27-RP1

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | RearofShedCream |
| Operator:: | JS/ MJ |
| Project No:: | 48805 |
| Sample ID:: | 11 |

**Signature:** ____________________ **Date:** ____________________

Serial Number : 801280 Time Method : 2019-11-27 Lead Paint 13:07:21

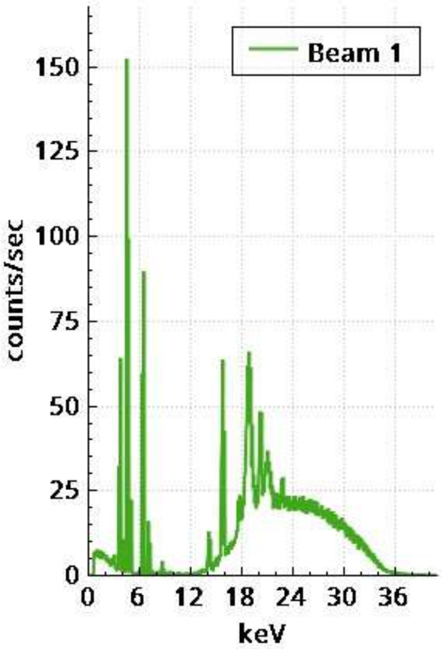
Daily ID : 27-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

Notes:: RearofShedCream

Operator:: JS/ MJ

Project No:: 48805

Sample ID:: 11

**Signature:** ______________________ **Date:** ______________________

**Serial Number : 801280** **Time Method : 2019-11-21 Lead Paint 13:07:43**

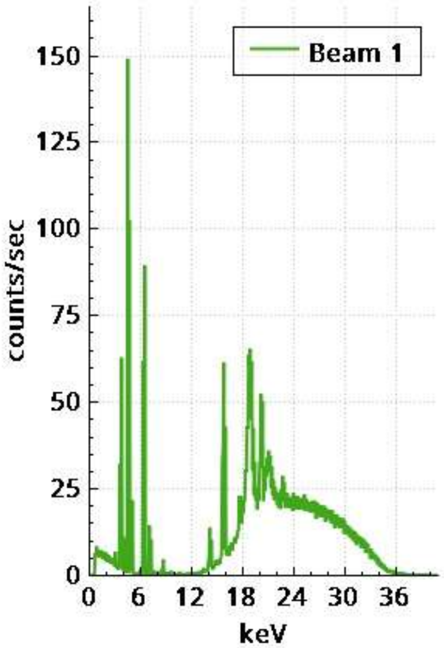
**Daily ID : 27-RP3**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | RearofShedCream |
| Operator:: | JS/ MJ |
| Project No:: | 48805 |
| Sample ID:: | 11 |

**Signature:** ____________________ **Date:** ____________________

**Serial Number : 801280** **Time Method : 2019-11-27 Lead Paint 13:19:58**

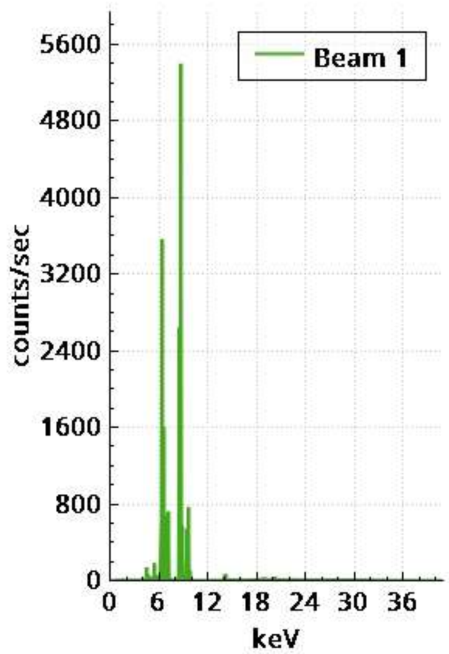
**Daily ID : 29-RP1**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | MachineGreen |
| Operator:: | mjjs |
| Project No:: | 48805 |
| Sample ID:: | 12 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280

Time : 2019-11-21 13:20:20

Method : Lead Paint

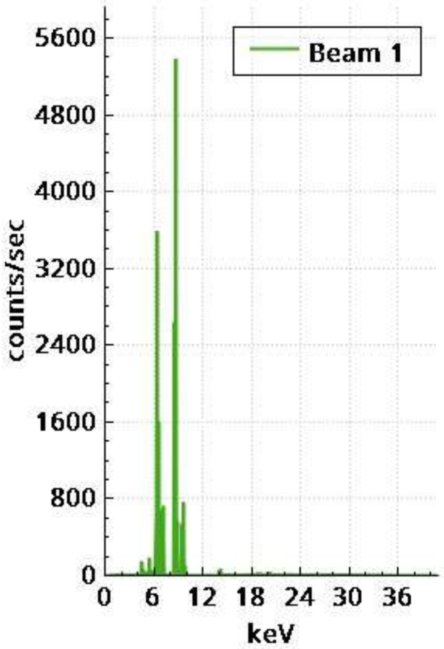
Daily ID : 29-RP2

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | MachineGreen |
| Operator:: | mjjs |
| Project No:: | 48805 |
| Sample ID:: | 12 |

**Signature:** ________________ **Date:** ________________

**Serial Number: 801280** **Time Method : 2019-11-27 Lead Paint 13:20:43**

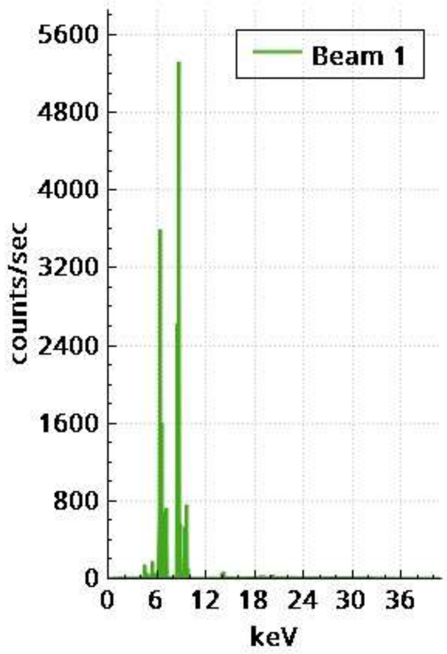
**Daily ID : 29-RP3**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | MachineGreen |
| Operator:: | mjjs |
| Project No:: | 48805 |
| Sample ID:: | 12 |

**Signature:** ____________________ **Date:** ____________________

**Serial Number: 801280** **Time Method : 2019-11-21 Lead Paint 09:45:20**

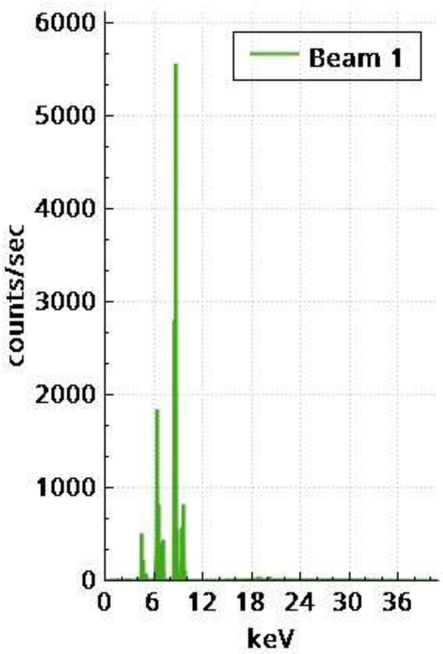
**Daily ID : 2-RP1**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | CoroWhite |
| Operator:: | JS/ MJ |
| Project No:: | 48806 |
| Sample ID:: | 1 |

**Signature:** ____________ **Date:** ____________

AIRSAFE

OLYMPUS

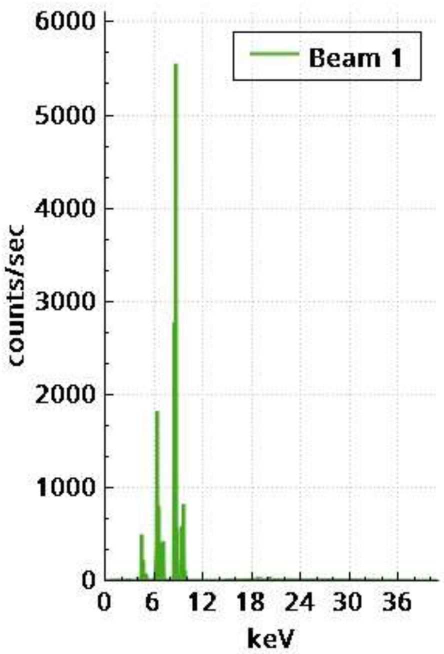
**Serial Number : 801280** **Time : 2019-11-27 09:45:43**
**Method : Lead Paint**
**Daily ID : 2-RP2**

**Elapsed Time : 20 s**

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0002 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | CoroWhite |
| Operator:: | JS/ MJ |
| Project No:: | 48806 |
| Sample ID:: | 1 |

**Signature:** ______________________ **Date:** ______________________

Serial Number: 801280

Time : 2019-11-27 09:46:05

Method : Lead Paint

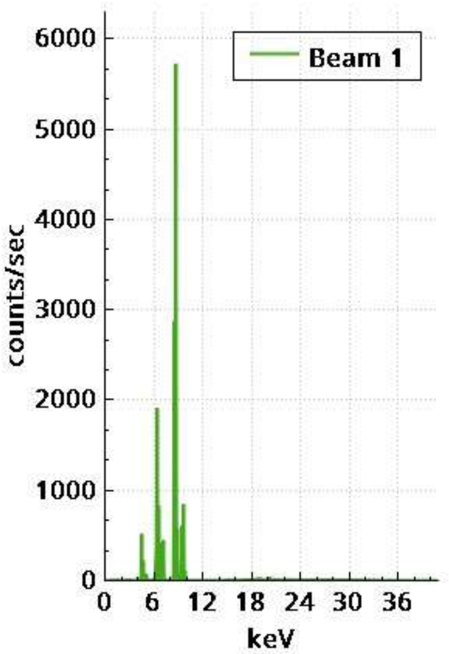
Daily ID : 2-RP3

Elapsed Time : 20 s

**Chemistry**

| El | mg/cm2 | +/- 3σ | |
|---|---|---|---|
| Pb | ND | <0.0003 | Pass |

**Spectrum**




**Notes**

| | |
|---|---|
| Notes:: | CoroWhite |
| Operator:: | JS/ MJ |
| Project No:: | 48806 |
| Sample ID:: | 1 |

**Signature:** ____________________ **Date:** ____________________