Douglas Partners
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Integrated Practical Solutions

Report on
Detailed Site Investigation Contamination

Proposed Multi-Purpose School Hall
38-54 and 66 Eton Street, Sutherland

Prepared for
School Infrastructure NSW

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	Signature	Date
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Executive Summary

Douglas Partners Pty Ltd (DP) has been engaged by School Infrastructure NSW (SINSW) to prepare this detailed site investigation contamination (DSIC) for a proposed multi purpose school hall at Sutherland Public School (SPS) at 38-54 and 66 Eton Street, Sutherland (the site). The hall is proposed to be located in one of three options as shown on Drawing 1, Appendix A (Option 1 is preferred).

DP previously prepared a preliminary site investigation (PSI) for the whole school grounds. The site history information suggested that the northern part of the site was developed into the school as early as 1888 (based on historical titles), with the central and southern portions also being developed into the school by 1950. A search of properties with EPA notices and licences and review of the Section 10.7 Planning Certificate did not identify the site to be notified to the EPA as contaminated, regulated under the CLM Act, hold a licence, or have received any EPA notices.

Potential sources of contamination identified from the site history information reviewed and the site walkover included fill (including potential impacts from previously demolished buildings), the degradation of hazardous building materials in the current site buildings, and the application of herbicides. The PSI suggested intrusive investigations to target the three location options for the proposed multi-purpose hall development.

The intrusive investigation was undertaken concurrently with a geotechnical investigation and included the opportunistic sampling from twelve boreholes (BH1 to BH12) positioned across the three option areas, as shown on Drawing 1, Appendix A. Selected samples from the boreholes were analysed for contaminants of concern identified in the PSI report.

Based on the findings presented herein, it is considered that each of the option areas are suitable or can be made suitable for the proposed hall. The results of the DSIC, and subsequent recommendations, for each option area are as follows:

Option 1

The asbestos register identifies asbestos in the buildings within the Option 1 area. PAH and TRH have been found to exceed either human health or ecological criteria in a number of the fill samples in this area. It is considered likely that these concentrations are inherent in existing asphalt and / or ash in fill soils in this area, to depths typically of around 0.5 m bgl. The remaining analyte concentrations were below the adopted SAC in all samples.

The Option 1 location can be made suitable for the proposed hall development, from a contamination perspective, subject to the following:

- The removal of identified asbestos and other hazardous materials in buildings within this area;
- Clearance of the building by a qualified occupational hygienist following the removal of hazardous materials, and then of the ground surface post demolition;
- The removal of the asphalt pavement from the area subject to construction and validation; and
- The excavation, waste classification and off-site disposal of observed asphalt and / or ash impacted soils from the area subject to construction and validation; or
- Capping of the contaminated fill with the proposed building slab, noting that this option will require notification and to be managed under a long term environmental management plan; or

- Further site specific risk assessment of the contaminants through potentially additional sampling and testing and assessment of likely exposure scenarios (note that the outcome may still be that a form of remediation is required); and
- Preparation of a remediation action plan (RAP) to document the above options and the preferred option; and
- Validation of the remedial works implemented, confirming that the area subject to validation is suitable for the land use from a contamination perspective.

Option 2

Sampling was limited in this area due to the presence of a sports court, and given that the option is not the preferred option.

The Option 2 location can be made suitable for the proposed hall development, from a contamination perspective, subject to the following:

- Further assessment of the footprint following removal of the sports court by a suitably qualified environmental consultant. The assessment can be initially visual and then, if required, supported through appropriate additional sampling and testing of soils; and
- Preparation and implementation of an unexpected finds protocol to address any finds of potential contamination during the civil and construction works.

Option 3

Sampling was limited in this area due to the presence of a sports court that could not be drilled through, and given that the option is not the preferred option. In addition, lead was encountered in soil at one location (BH12) exceeding the health investigation level, and zinc at the same location exceeding the ecological investigation level. It is noted, however, that this location may sit outside of the actual development area, should this option be selected.

The Option 3 location can be made suitable for the proposed hall development, from a contamination perspective, subject to the following:

- Further assessment of the footprint following removal of the sports court by a suitably qualified environmental consultant. The assessment must be a combination of visual supported through appropriate additional sampling and testing of soils;
- Assessment of the visual and analytical finds against the SAC such that any remediation requirements are documented. This may require the development of a RAP;
- If the elevated lead level at BH12 is determined to be within the site, the delineation, excavation, waste classification and off-site disposal of the lead impacted soils from the area subject to construction and validation; or
- Capping of the contaminated fill with the proposed building slab, noting that this option will require notification and to be managed under a long term environmental management plan; or
- Further site-specific risk assessment of the contaminants through potentially additional sampling and testing and assessment of likely exposure scenarios (note that the outcome may still be that a form of remediation is required); and

- Validation of the remedial works implemented, confirming that the area subject to validation is suitable for the land use from a contamination perspective.

It is noted that the PAH, TRH and lead contaminated soils are currently present beneath asphalt surfacing or appropriately 0.5 m of soil overburden. As such, the contamination is not considered to pose a risk of exposure to students at the site. However, the presence of the contamination should be documented in the school's register of hazardous materials, such that any future intrusive works in these areas appropriate consider the exposure to the contaminants.

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Report on Detailed Site Investigation Contamination
Proposed Multi-Purpose School Hall
38-54 and 66 Eton Street, Sutherland

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by School Infrastructure NSW (SINSW) to prepare this detailed site investigation contamination (DSIC) report for a proposed multi purpose school hall at Sutherland Public School (SPS) at 38-54 and 66 Eton Street, Sutherland (the site). The report applies to three areas within the school grounds selected by SINSW as options for the proposed hall, as shown in Drawing 1, Appendix A.

The investigation was carried out under the Short Form Work Order DDWO05264/23, dated 22 April 2023 and in conjunction with a geotechnical investigation reported separately.

The objective of this DSIC is to assess the potential for contamination across the three proposed option areas based upon the findings and recommendations made within the preliminary site investigation (PSI) report prepared by DP (DP, 2023 – refer Section 7) and to assess the suitability for each option area to support the proposed development from a contamination perspective. To assist in project planning the DSIC also presents a preliminary waste classification for soils with the Investigation (option) areas.

This report must be read in conjunction with all appendices including the notes provided in Appendix B.

The following key guidelines were consulted in the preparation of this report:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013); and
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

2. Proposed Development

It is understood that the development comprises the construction of a multi-purpose school hall on grade. Further details on the proposed hall were not known at the time of preparing this report, however it is understood that it will likely house a stage, toilets and canteen. It will also likely be utilised by the general public as a community hall.

Three options have been proposed for the development, as shown on Drawing 1, Appendix A, with Option 1 being the preferred location option.

3. Scope of Work

The scope of works for the DSIC comprised the following:

- Review of DP (2023);
- Opportunistic soil sampling from twelve (12) boreholes drilled as part of the concurrent geotechnical investigation within the three Option areas as follow:
  - Five boreholes (BH01 to BH05) were drilled across the proposed Option 1 area to depths ranging between 2.55 m to 2.9 m below ground level (bgl). A higher number of boreholes were positioned at this location given it is the preferred option;
  - Four boreholes (BH06 to BH09) were drilled across or close to the proposed Option 2 area to depths ranging between 2.8 m to 4 m (bgl), noting some access limitations; and
  - Three boreholes (BH10 to BH12) were drilled at the peripheries of the proposed Option 3 area to depths ranging between 2.1 m to 3.1 m (bgl), noting no access for drilling within the existing play court.
- Dispatched fourteen (14) selected primary samples (including four QA / QC samples) to a National Association of Testing Authorities (NATA) accredited laboratory for the analysis of;
  - Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury nickel, zinc);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Total recoverable hydrocarbons (TRH);
  - Benzene, toluene, ethylbenzene, xylene (BTEX);
  - Phenols;
  - Organochlorine pesticides (OCP);
  - Organophosphate pesticides (OPP);
  - Polychlorinated biphenyls (PCB);
  - Asbestos (FA/AF); and
  - Toxicity characteristic leaching procedure (TCLP).
- Development of a conceptual site model (CSM); and
- Preparation of this DSIC report.

4. Site Information

Site Address	38-54 and 66 Eton Street, Sutherland
Legal Description	Lots 5 to 10 in Deposited Plan 802 Lots 1 to 10 in Deposited Plan 6600 Lots 1 to 4 in Deposited Plan 376201 Lot 3 in Deposited Plan 104516 Lot 1 in Deposited Plan 433017
Approximate Area	Total school grounds occupy approximately 22,970 m^2. Each of the three option areas occupy approximate 850 m^2
Zoning	Zone SP2 Infrastructure (Educational Establishment)

Local Council Area	Sutherland Shire Council
Current Use	Primary School
Surrounding Uses (surrounding the school)	North – Flora Street and then a Centrelink office and residential dwellings East – Merton Street and then residential dwellings, and St. Patricks College to the Southeast South – President Ave and then 66 Eton Street (southern part of site) followed by Minerva School West – Eton Street followed by commercial / retail buildings

The school boundary and option areas are shown on Figure 1 below and also on Drawing 1, Appendix A.

Figure 1: SPS boundary - - - - - - - , Proposed Options Locations ———

5. Environmental Setting

5.1 Topography

Regional topography is generally elevated (>100 AHD), sloping downwards towards the northwest into Woronora River, and gently slopes in the south westerly direction towards Savilles Creek, that eventually flows into Hacking River.

The site topography is generally flat, and slopes down towards the south and southwest, towards Savilles Creek, approximately 600 m south of the site. The NSW elevation contours map indicates a ground surface level of approximately 114 m AHD at the north-west of the site, gently sloping down to approximately 102 m AHD at the southern boundary of the site.

5.2 Site Geology

Reference to the Sydney 1:100 000 Geological Series Map indicates that the site is underlain by Hawkesbury Sandstone and mudstone, fluvially deposited laminated siltstone. The Hawkesbury Sandstone comprises medium to coarse-rained quartz sandstone, very minor shale and laminite lenses.

Reference to the Sydney 1:100 000 Soil Landscape Series map indicates that the site is underlain by a landscape group known as the Gymea soil landscape, comprising of an erosional soil landscape with very low soil fertility, and is characterised by topography of undulating to rolling hills on Hawkesbury Sandstone, with local relief of 20 m to 80 m and slope gradients of 10% to 20%.

5.3 Acid Sulphate Soils

Reference to the 1:25 000 Acid Sulphate Soils (ASS) Risk map indicates that the site is in an area of no known occurrence of acid sulphate soils.

The Section 10.7 Planning Certificates also indicate that the site is not affected by the occurrence of acid sulfate soils.

5.4 Salinity Potential

Dryland salinity risk and hazard mapping was undertaken in 2000 by the former NSW Government Departments of Land and Water Conservation to show the broad distribution of areas considered as having either a high salinity risk or a high salinity hazard.

The school site is not located within, or close to, mapped areas with high salinity risk or high salinity hazard. The nearest areas mapped as having high salinity risk / hazard are in Western Sydney.

5.5 Surface Water and Groundwater

The closest watercourse to the site is Savilles Creek, located approximately 600 m south of the site. The surface water from the site is expected to run in a south and south westerly direction towards Savilles Creek and be collected by the regional stormwater system.

A search of the Water NSW publicly available registered database indicated that there are seventeen (17) registered groundwater bores located within 500 m of the site, and three additional groundwater bores located within 1 km of the site. The five closest groundwater bores and their purposes are as summarised below in Table 1. The majority of the wells are associated with remediation and monitoring of the United Service Station.

Table 1: Summary of Groundwater Bore Records

Bore ID Authorised Purpose Completion Year Status	Location Relative to Site	Final Depth (m)	Standing Water Level (m bgl)
GW016096 Waste Disposal Bore 1958 Unknown	107 m northwest	76.5	2.70
GW110814 Monitoring bore 2009 Unknown	293 m northwest	5.00	2.90
GW110812 Monitoring bore 2009 Unknown	300 m northwest	6.00	3.64
GW110813 Monitoring bore 2009 Unknown	298 m northwest	6.00	3.03
GW110815 Monitoring bore 2009 Unknown	303 m northwest	5.60	3.70

Based on the regional topography, the anticipated flow direction of groundwater beneath the site is to the south or south-west. The likely receiving surface water body is Savilles Creek located to the south side of the site which eventually flows into Hacking River and Port Hacking.

During the recent geotechnical investigation, groundwater was intersected at 2.4 m depth (RL 117.6 m AHD) during auger drilling at one borehole (BH02). Free groundwater was not observed during auger drilling in any of the other boreholes. The use of drilling fluid during coring at BH01 to BH04 prevented further observations with depth.

DP has conducted investigations for nearby properties. The groundwater monitoring wells installed during the investigations showed water levels between 1 m and 5 m depth. This was considered to be perched seepage within the soil and weathered rock profile rather than the regional water table.

6. Review of Historical Aerial Photographs

A number of historical aerial photographs were reviewed as part of DP (2023). A summary of key features observed for the site and surrounding land is provided below:

The 1943 aerial photograph shows that the proposed Option 1 and Option 2 areas located on the northern part of the Sutherland school, are occupied by rural residential dwellings surrounded by open space. The proposed Option 3 area located in southern portion of the site is occupied by a rural residential dwelling with an open space.

The 1950 aerial photograph shows that additional residential houses were present in proposed Option 1 and Option 2 areas, with the previous residential house observed in the proposed Option 3 area having been demolished.

The 1969 aerial photograph shows that the previously residential houses observed in the proposed Option 1 and Option 2 areas have been demolished now. It appears that a new playing court has been constructed in the proposed Option 3 area of the site.

The 1989 aerial photograph shows that the proposed Option 1 and Option 2 areas are occupied by school structures and grounds, whilst the proposed Option 3 area has remained unchanged since 1969.

The 2005 to 2023 aerial photographs show that the three proposed Option areas appear similar to the 1989 aerial photograph.

7. Previous Reports and Site History

DP has conducted the following investigations and reporting for the school site:

- DP *Report on Preliminary Site Investigation (Contamination) PSI – Proposed Multi-Purpose Medium Hall 38-54 and 66 Eton Street, Sutherland NSW* – Ref: 224456.00, dated 21 September 2023 (DP, 2023); and
- DP *Report on Geotechnical Desktop Study - Proposed Multi-Purpose Medium Hall 38-54 and 66 Eton Street, Sutherland NSW* – Ref: 224456.01, dated 15 September 2023 (DP, 2023a).

7.1 PSI (DP, 2023)

The PSI was undertaken for the whole of the school grounds and comprised a desktop review of site history and information (i.e., NSW EPA public records, historical aerial photographs, title deeds, geology, acid sulfate soil and hydrology) and environs, a site walkover and development of a conceptual site model (CSM). The objective of the PSI was to assess the potential for contamination at the site based on past and present land uses, to assess the suitability of the site for proposed development and to comment on the need for further investigation and/or management of contamination with regard to the proposed development.

The site history information suggests that the northern part of the site was developed into the school as early as 1888 (based on historical titles), with the central and southern portions also being developed into the school by 1950. The part of site to the south of President Ave had residential dwellings until 1977 and was redeveloped into a sports ground as part of the school in the 1989 aerial photograph. During the period from 1943 (first available aerial photograph) it is clear that some buildings have been constructed and demolished at various times, whilst a small number have remained at least since 1943.

A search of properties with EPA notices and licences and review of the Section 10.7 Planning Certificate did not identify the site to be notified to the EPA as contaminated, regulated under the CLM Act, hold a licence, or have received any EPA notices.

Potential sources of contamination identified from the site history information reviewed and the site walkover included fill (including potential impacts from previously demolished buildings), the degradation of hazardous building materials in the current site buildings, and the application of herbicides.

The PSI suggested intrusive investigations to target the three location options for the proposed multi-purpose hall development. The objective of those investigations was to assess the suitability for each option area to support the proposed development from a contamination perspective.

7.2 Geotechnical Desktop Study (DP, 2023a)

The geotechnical desktop study was undertaken as an initial review of available geotechnical information at the site prior to intrusive investigation. The assessment comprised a visual inspection of the site and review of available information from published maps and reports, and other projects DP has undertaken in the area.

Based on the regional mapping, previous investigations undertaken in the area and the site inspection, it was expected that the subsurface profile on the site may generally comprise the following:

- FILL: possibly sandy or clayey fill on some parts of the site; overlying
- RESIDUAL CLAY: stiff to hard clay to estimated depths of 1 m to 3 m; overlying
- SILTSTONE & SANDSTONE: very low to low strength, weathered rock, typically grading to stronger, less weathered rock with depth.

The residual clays were expected to be moderately reactive, that is, moderately susceptible to shrink swell movements caused by moisture changes.

The regional groundwater table was expected to be much deeper than shallow excavations that might occur during the proposed development at the site. Some minor seepage along the top of clay and bedrock and through joints and partings within the rock mass may occur and mostly after rainfall.

It was recommended that intrusive geotechnical investigations are undertaken on site to obtain specific information on the site.

The intrusive geotechnical investigation was undertaken in conjunction with this DSIC and will be reported separately.

Drainage measures will need to be provided in any subsurface structures or behind retaining walls to allow any seepage to flow around the structures rather than exert hydrostatic pressures against them.

8. Review of Asbestos Register and Asbestos Management Plan

DP reviewed the asbestos register and asbestos management plan for the school as part of DP (2023). According to the asbestos register (last revised in 2014), asbestos containing material may be present in grounds as part of fill material; however, it is noted that no such investigations have been recorded against the school previously.

Within the buildings, asbestos has been detected in a few locations across the school, especially the cement sheeting used for eaves, ceilings and vinyl floor tiles. As per the asbestos register, all instances of asbestos are in good condition and do not require immediate attention for remediation.

The preferred location of the multi-purpose hall (Option 1) would require the demolition of Building J (Pupil Facilities), built in 1984 (refer to asbestos register in Appendix C. Asbestos was detected in the building in several locations, as summarised in Table 2.

Table 2: Asbestos Register - Building J

Location	Material Description	Extent	Result
Interior – Ceiling Structures (Movement – R0001)	Flat Asbestos Cement (AC) sheeting	14m^2	Chrysotile (white asbestos) detected
Interior – Ceiling Structures (Canteen office / store – R0002)	Flat AC sheeting	3m^2	Chrysotile (white asbestos) detected
Interior – Floor Coverings (Canteen office / store – R0002)	Vinyl Tiles	3m^2	Chrysotile (white asbestos) detected
Interior – Ceiling Structures (Canteen office / store – R0003)	Flat AC sheeting	3m^2	Chrysotile (white asbestos) detected
Interior – Floor Coverings (Canteen office / store – R0003)	Vinyl Tiles	3m^2	Chrysotile (white asbestos) detected
Interior – Ceiling Structures (Canteen – R0004)	Flat AC sheeting	18m^2	Chrysotile (white asbestos) detected

Location	Material Description	Extent	Result
Interior – Floor Coverings (Canteen – R0004)	Vinyl Tiles	18m^2	Chrysotile (white asbestos) detected
Interior – Ceiling Structures (Movement – R0005)	Flat AC sheeting	3m^2	Chrysotile (white asbestos) detected
Interior – Ceiling Structures (Staff Toilet – R0006)	Flat AC sheeting	3m^2	Chrysotile (white asbestos) detected

As per the Asbestos Management Plan (AMP) for NSW Government Schools, all asbestos removal and remediation must be administered by Department of Public Works and Services (DPWS) and the Department of Education (DoE). All removals are to be undertaken according to:

- NSW Work Health and Safety Act 2011;
- NSW Work Health and Safety Regulation 2011;
- How to Manage and Control Asbestos in the Workplace: Code of Practice 2011;
- How to Safely Remove Asbestos: Code of Practice 2011; and
- Other relevant documentation issued from time to time by WorkCover NSW or SafeWork Australia.

A copy of the Asbestos Register and AMP are included in Appendix C.

9. Preliminary Conceptual Site Model

Potential sources of contamination based on the review of site history information and the site walkover in DP (2023) are considered to be as follows:

Potential Sources

Based on the desktop information reviewed and the current site features, the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified.

- S1: Fill: associated with levelling, potentially impacted by the demolition of former buildings and hardstand on the site. Fill depths ranging between 0.2 m to 1.9 m.
  - COPC include metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), phenols and asbestos.
- S2: Former and current buildings / structures containing hazardous building materials and potentially impacting surface soils in their vicinity.
  - COPC include asbestos, synthetic mineral fibres (SMF), lead and PCB.
- S3: Current and past use of herbicides.
  - COPC include OCP / OPP.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current users [school workers, students and visitors];
- R2: Construction and maintenance workers;
- R3: End users [school workers, students and visitors]; and
- R4: Adjacent site users [commercial / residential / education].

The following potential environmental receptors have been identified:

- R5: Surface water [Savilles Creek];
- R6: Groundwater; and
- R7: Terrestrial ecosystems.

Potential Pathways

The following potential pathways in relation to human receptors have been identified:

- P1: Ingestion and dermal contact; and
- P2: Inhalation of dust and / or vapours.

The following potential pathways in relation to the environmental receptors have been identified:

- P3: Surface water run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies;
- P5: Leaching of contaminants and vertical migration into groundwater; and
- P6: Inhalation, ingestion and absorption.

Summary of Potentially Complete Exposure Pathways

A 'source–pathway–receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S4) and receptors (R1 to R7) are provided in below Table 3.

Table 3: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill: Metals, TRH, BTEX, PAH, OCP and asbestos	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours	R1: Current users [school workers, students and visitors] R2: Construction and maintenance workers	An intrusive investigation is recommended to assess possible contamination

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S3: Current and past use of herbicides		R3: End users [school workers, students and visitors]	including testing of the soils and, if required based on soil testing, groundwater.
	P2: Inhalation of dust and / or vapours	R4: Adjacent site users [residential / commercial].	
	P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies	R5: Surface water	
	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	
	P6: Inhalation, ingestion and absorption	R7: Terrestrial ecosystems	
S2: Former and current buildings / structures, asbestos, SMF, lead (in paint) and PCB	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours	R1: Current users [school workers, students and visitors] R2: Construction and maintenance workers R3: End users [school workers, students and visitors]	A hazardous building material (HBM) survey is required prior to any demolition such that hazardous materials can be appropriately managed.

10. Sampling and Analysis Quality Plan

10.1 Data Quality Objectives

The DSIC was devised with reference to the seven-step data quality objective process which is provided in Appendix B Schedule B2, NEPC (2013). The data quality objective process is outlined in Appendix D.

10.2 Soil Sampling Rationale

Based on the CSM and data quality objectives (DQO) a systematic sampling strategy was adopted for the site, utilising the borehole locations selected for geotechnical investigation purposes to provide a reasonable coverage of each of the three location options. It is noted that drilling within existing play courts was not permitted, so some of the borehole locations are positioned on the peripheries of the option areas, as shown on Drawing 1, Appendix A. Despite that limitation, given the relatively consistency in sub-surface profiles between the boreholes at each option area, it is considered likely that similar conditions exist beneath the play court areas.

Boreholes were drilled utilising a truck mounted rig with 110 mm diameter solid flight augers to the top of the rock generally. Boreholes BH01 to BH05 were drilled in accessible areas inside the proposed Option 1 area to depth ranging between 2.55 m to 2.9 m. Boreholes BH06 to BH09 were drilled across the proposed Option 2 area to depth ranging between 2.6 m to 4 m and boreholes BH10 to BH12 were drilled on the periphery of the proposed Option 3 area to depths ranging between 2.1 m to 3.1 m.

Soil samples were collected directly from the drilling rig solid flight auger at regular depth intervals, or upon signs of contamination, and changes of strata.

The general sampling methods are described in the field work methodology, included in Appendix E.

11. Site Assessment Criteria

The site assessment criteria (SAC) applied in the current investigation are informed by the CSM (Section 9) which identified human and environmental receptors to potential contamination on the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic residential / land use scenario which also captures children's day care centres, preschools and primary schools. The derivation of the SAC is included in Appendix G and the adopted SAC are listed on the summary analytical results tables in Appendix H.

12. Results

12.1 Field Work Results

Details of subsurface conditions encountered are provided in the borehole logs in Appendix F. The following general subsurface profile was encountered in the bores:

- **PAVEMENT:** asphaltic concrete was present at BH01, BH02 and BH03 to depths of 0.1 m; overlying,
- **FILL:** Fill was encountered within all boreholes either from the ground surface or beneath the pavement to depths of between 0.2 m to 1.9 m. The fill included gravelly SAND, SAND, CLAY, Sandy SILT with varying proportions of igneous gravel, trace rootlets, tile fragment, ironstone gravel and possibly road base; overlying
- **RESIDUAL CLAY:** medium to high plasticity clay, red-brown, pale grey, yellow-brown. The consistency of the residual clay was stiff; overlying
- **WEATHERED SHALE / SANDSTONE:** very low strength, highly weathered Hawkesbury Sandstone, dark grey and orange-brown from around 2.3 m.

Fill across the three proposed Option areas was relatively consistent in composition and ranged in depths from 0.2 m to 1.3 m at Option 1; 0.2 m to 1.9 m at Option 2; and 0.2 m to 0.8 m at Option 3.

Building rubble (including trace tile fragments) was recorded only in borehole BH06 (Option 2) which had shallow fill. It was also noted that igneous gravel was recorded in most of the boreholes.

No visual or olfactory evidence (e.g., staining, odours, free phase product) was observed during the investigations to suggest the presence of contamination within the soils at the site.

Groundwater was intersected at 2.4 m depth (RL 117.6 m AHD) during auger drilling at one borehole (BH02). Free groundwater was not observed during auger drilling in any of the other boreholes. The use of drilling fluid during coring at BH01 to BH04 prevented further observations with depth.

12.2 Laboratory Analytical Results

The results of laboratory analysis are summarised in the following tables in Appendix H:

- Table H1: Summary of Results of Soil Analysis; and
- Table H2: Summary of Preliminary Waste Classification Assessment.

The laboratory certificates of analysis together with the chains of custody and sample receipt information are provided in Appendix I.

13. Discussion

13.1 Site Suitability

As shown in Table H1, Appendix H, all analytical results for all soil samples from the current investigation were below the adopted SAC as defined in Section 10 and Appendix G, with the following exceptions:

Option 1: Location

- Benzo(a)pyrene TEQ in samples BH01/0.5-0.6 and BD01 (duplicate sample of BH01) in Option 1 with concentrations of 9.5 mg/kg and 8.6 mg/kg respectively, exceeded HIL A criteria of 3 mg/kg;
- Benzo(a)pyrene (BaP) in samples BH01/0.4-0.5, BD01, BH03/0.4-0.5 m and BH05/0.4-0.5 m (Option 1) with concentrations of 7 mg/kg, 6.4 mg/kg, 1.4 mg/kg and 0.71 mg/kg exceeded the ecological criteria of 0.7 mg/kg; and
- TRH F3(>C10-C34) in samples BH01/0.4-0.5, BD01, BH02/0.1-0.2 m, BH03/0.4-0.5 and BH04/0-0.1 m (Option 1) with concentrations of 940 mg/kg, 390 mg/kg, 490 mg/kg and 330 mg/kg exceeded the ecological criteria.

Option 3: Location

- Lead in sample BH12/0.4-0.5 m (Option 3) with a concentration of 630 mg/kg exceeded health investigation level (HIL A) criteria of 300 mg/ kg; and
- Zinc in sample BH12/0.4-0.5 m (Option 3) with concentration of 550 mg/kg exceeded ecological criteria of 460 mg/kg.

The concentrations of PAH (including BaP) in fill samples from the Option 1 area may be reflective of the asphalt overlay, or possibly an ash component to the fill. As discussed in Section 13.2, the PAH is not leachable which is a characteristic of ash and asphalt. The reported TRH concentrations are also related to the PAH in the same samples. Should Option 1 be selected for the location of the proposed hall, it is likely that the asphalt and other pavement materials will be removed to facilitate construction. The PAH impacts above HIL A criteria will also need to be chased out and removed to landfill, capped with the proposed building slab, or further assessed through a site specific Tier 2 risk assessment.

The concentration of lead in the sample from BH12 (Option 3) will need to be chased out and removed to landfill or further assessed through a site specific Tier 2 risk assessment, should the Option 3 location be selected for the new hall.

13.2 Preliminary Waste Classification

The following Table 4 presents the results of the six step procedure outlined in NSW EPA (2014) for determining the type of waste and the waste classification. This process applies to the fill (including surface soils) at the site, which do not meet the definition of virgin excavated natural materials (VENM).

Table 4: Six Step Classification Procedure

Step	Comments	Rationale
1. Is the waste special waste?	No *	No asbestos-containing materials (ACM), clinical or related waste, or waste tyres were observed in the boreholes. Asbestos was not detected by the analytical laboratory.
2. Is the waste liquid waste?	No	The fill comprised a soil matrix.
3. Is the waste “pre-classified”?	No	The fill is not pre-classified with reference to NSW EPA (2014).
4. Does the waste possess hazardous waste characteristics?	No	The fill was not observed to contain or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances, corrosive substances, coal tar, batteries, lead paint or dangerous goods containers.
5. Determining a wastes classification using chemical assessment	Conducted	Refer to Table H2, Appendix H.

Step	Comments	Rationale
6. Is the waste putrescible or non-putrescible?	Non-putrescible	The fill does not contain materials considered to be putrescible a.

Note: a wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forestry and crop materials, and natural fibrous organic and vegetative materials (NSW EPA, 2014).

* The use of small diameter boreholes for asbestos sampling is not ideal and there is still a risk that asbestos is present in other parts of the site, between sampling locations.

A shown in the attached Table H2, all contaminant concentrations for the analysed fill samples were below the contaminant thresholds (CT1s) for general solid waste (GSW) with the exception of the following:

- Lead in samples BH05/0.4-0.5 m, BH10/0.4-0.5 m and BH12/0-0.1m, exceeded the CT1 criteria for GSW of 100 mg/kg. TCLP extract and analysis was conducted, and the results were within the SCC1 and TCLP1 thresholds for GSW; and
- Benzo(a)pyrene in samples BH01/BD01-0.5-0.6 and BH03/ 0.4-0.5, exceeded the CT1 criteria for GSW of 0.7 mg/kg. TCLP extract and analysis was conducted, and the results were within the SCC1 and TCLP1 thresholds for GSW.

No asbestos was recorded within the fill samples during the sampling or by the laboratory.

The current results are therefore consistent with a GSW classification as defined in NSW EPA (2014), and the fill across the site is preliminary classified in situ as GSW (non putrescible).

This preliminary classification is not a formal waste classification to inform off-site disposal. It is intended for planning purposes only. It is recommended that further *in situ* or *ex situ* investigation including visual and analytical processes using test pits, be conducted to confirm and formalise the preliminary waste classification, prior to off-site disposal.

13.3 VENM Assessment

Table 5 presents the results of the assessment of natural soils at the site with reference to the VENM definition in the POEO Act and the EPA[1] website.

Table 5: VENM Classification Procedure

Item	Comments	Rationale
1. Is the material natural?	Yes	Natural soil logged in the boreholes as residual clay. These materials underlie the fill at the site.
2. Are manufactured chemicals or process residues present?	Yes	There were no visual indicators of chemical contamination of the soil and rock in the boreholes.
3. Are sulfidic ores or soils present?	No	A review of the published mapping shows the site in an area of no ASS occurrence.

[1] https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material

Item	Comments	Rationale
4. Are there current or previous land uses that have (or may have) contaminated the materials?	Potentially	Previous land uses may have impacted on surface soils overlying the soil. Low chemical concentrations indicate no likely impact on the natural soil and rock.

Two natural samples (BH03/0.4-0.5 m and BH12/0.4-0.5 m) were selected for laboratory analysis as part of this investigation. Benzo(a) pyrene exceeded the CT1 criteria for GSW of 0.7 mg/kg at BH03/0.4-0.5 m as shown in Table H2, Appendix H. Based on this, the natural soil at the BH03 may be impacted in the upper layers by the overlying fill.

Based on the site observations, the natural soils and bedrock across the three option areas are likely to classify as VENM, although this would need be verified *ex situ* at the time of excavation, and following the removal of the fill overburden.

13.4 Data Quality Assurance and Quality Control

The data quality assurance and quality control (QA / QC) results are included in Appendix J. Based on the results of the field QA and field and laboratory QC, and evaluation against the data quality indicators (DQI) it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

14. Conclusions and Recommendations

This DSIC comprised a review of the previous desktop studies, a site walkover and intrusive soil sampling across the three proposed option areas to assess the suitability of each option area for the development of a multi-purpose school hall including toilets and a canteen.

Based on the findings presented herein, it is considered that each of the option areas are suitable or can be made suitable for the proposed hall. The results of the DSIC, and subsequent recommendations, for each option area are as follows:

Option 1

The asbestos register identifies asbestos in the buildings within the Option 1 area. PAH and TRH have been found to exceed either human health or ecological criteria in a number of the fill samples in this area. It is considered likely that these concentrations are inherent in existing asphalt and / or ash in fill soils in this area, to depths typically of around 0.5 m bgl. The remaining analyte concentrations were below the adopted SAC in all samples.

The Option 1 location can be made suitable for the proposed hall development, from a contamination perspective, subject to the following:

- The removal of identified asbestos and other hazardous materials in buildings within this area;

- Clearance of the building by a qualified occupational hygienist following the removal of hazardous materials, and then of the ground surface post demolition;
- The removal of the asphalt pavement from the area subject to construction and validation; and
- The excavation, waste classification and off-site disposal of observed asphalt and / or ash impacted soils from the area subject to construction and validation; or
- Capping of the contaminated fill with the proposed building slab, noting that this option will need to be formally notified and included in a long term environmental management plan; or
- Further site specific risk assessment of the contaminants through potentially additional sampling and testing and assessment of likely exposure scenarios (note that the outcome may still be that a form of remediation is required); and
- Preparation of a remediation action plan (RAP) to document the above options and the preferred option; and
- Validation of the remedial works implemented, confirming that the area subject to validation is suitable for the land use from a contamination perspective.

Option 2

Sampling was limited in this area due to the presence of a sports court, and given that the option is not the preferred option.

The Option 2 location can be made suitable for the proposed hall development, from a contamination perspective, subject to the following:

- Further assessment of the footprint following removal of the sports court by a suitably qualified environmental consultant. The assessment can be initially visual and then, if required, supported through appropriate additional sampling and testing of soils; and
- Preparation and implementation of an unexpected finds protocol to address any finds of potential contamination during the civil and construction works.

Option 3

Sampling was limited in this area due to the presence of a sports court that could not be drilled through, and given that the option is not the preferred option. In addition, lead was encountered in soil at one location (BH12) exceeding the health investigation level, and zinc at the same location exceeding the ecological investigation level. It is noted, however, that this location may sit outside of the actual development area, should this option be selected.

The Option 3 location can be made suitable for the proposed hall development, from a contamination perspective, subject to the following:

- Further assessment of the footprint following removal of the sports court by a suitably qualified environmental consultant. The assessment must be a combination of visual supported through appropriate additional sampling and testing of soils;
- Assessment of the visual and analytical finds against the SAC such that any remediation requirements are documented. This may require the development of a RAP;

- If the elevated lead level at BH12 is determined to be within the site, the delineation, excavation, waste classification and off-site disposal of the lead impacted soils from the area subject to construction and validation; or
- Capping of the contaminated fill with the proposed building slab, noting that this option will need to be formally notified and included in a long term environmental management plan; or
- Further site-specific risk assessment of the contaminants through potentially additional sampling and testing and assessment of likely exposure scenarios (note that the outcome may still be that a form of remediation is required); and
- Validation of the remedial works implemented, confirming that the area subject to validation is suitable for the land use from a contamination perspective.

It is noted that the PAH, TRH and lead contaminated soils are currently present beneath asphalt surfacing or appropriately 0.5 m of soil overburden. As such, the contamination is not considered to pose a risk of exposure to students at the site. However, the presence of the contamination should be documented in the school's register of hazardous materials, such that any future intrusive works in these areas appropriate consider the exposure to the contaminants.

15. References

CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene.* Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

NSW EPA. (2022). *Contaminated Sites, Sampling Design Guidelines.* NSW Environment Protection Authority.

16. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at 38-54 and 66 Eton Street, Sutherland. The work was carried out under the Short Form Work Order DDWO05264/23, signed 18 August 2023. This report is provided for the exclusive use of School Infrastructure NSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and / or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the (geotechnical / environmental / groundwater) components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Appendix A

Drawing(s)

Locality Plan

LEGEND

- Borehole Location
- School Boundary
- Proposed Development Boundary

NOTE:
1:Basemap from Metromap (Dated 27.07.2023)

0 10 20 30 40 50 60 70 80 90 100 110 120 m

1:1500 @ A3

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: School Infrastructure NSW		TITLE: **Test Location Plan**
OFFICE: Sydney	DRAWN BY: MN	**Proposed Multi-Purpose Medium Hall**
SCALE: 1:1500 @ A3	DATE: 19.10.2023	**38-54 and 66 Eton Street, Sutherland**

N

PROJECT No:	224456.01
DRAWING No:	1
REVISION:	0

Appendix B

About this Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix C

Asbestos Register Plan

NSW GOVERNMENT | Education

November 2015
Revised August 2017
Revised October 2020

ASSET MANAGEMENT DIRECTORATE

10/08/17_29121

ASBESTOS MANAGEMENT PLAN

FOR NSW GOVERNMENT SCHOOLS

DISTRIBUTED WITH: MEMORANDUM TO PRINCIPALS DN/15/00038

NSW GOVERNMENT | Education

MEMORANDUM TO PRINCIPALS

ASSET NOTICE

DN/15/00038

Department of Education: Asbestos Management Plan 2015 (AMP 2015) - Revised

The Department of Education (DoE) has completed revision of the existing Asbestos Management Plan (AMP) issued in 2007 to ensure compliance with the *Work, Health and Safety Act 2011*.

The Department has worked with an independent health hygienist, other government agencies and in consultation with WorkCover NSW, to ensure procedures for the management of asbestos are best practice for an educational environment.

The DoE Asbestos Management Plan 2015 (AMP 2015) is now available on the DoE Asset Management Intranet at:
https://detwww.det.nsw.edu.au/assetmanagement/safecomp/asbestosf.htm
and will be placed on the DoE website for community access along with current school asbestos registers. The AMP 2015 will now be printed and distributed to Principals in schools, along with each school's current asbestos register and a Site Specific Asbestos Management Plan (SSAMP) for in-grounds asbestos where applicable.

Principals are directed to Section 9, pages 69 to 94, of the AMP 2015, which detail a range of asbestos issues requiring an Emergency Response. Once the distribution of the printed AMP 2015 is completed, Asset Management will be providing Webinars to further inform Principals, and a Question and Answers (Q&A) section will be provided online.

Key to the AMP 2015 is an associated Panel Contract for the supply of hygienist services to address asbestos issues identified by maintenance and capital works contractors, Asset Management Units and schools. Use of the Panel Contract will ensure DoE school Asbestos Registers are updated regularly whenever asbestos disturbance works are undertaken on NSW Government School sites. Details of the Panel contract can be found online at:
https://detwww.det.nsw.edu.au/assetmanagement/assets/media/ASB_Brochure.pdf

To address issues raised by WorkCover NSW, Asset Management will be surveying all Principals early in Term 4, 2015 to confirm:

1. the AMP 2015 has been received by the school,
2. that the Webinar has been viewed and
3. AMP 2015 Section 9 - Emergency Response has been read and understood.

Should you require further advice, please contact Alan Smith, Manager Compliance and Safety (Ph: 9561 8956), Paras Doshi (Ph: 9561 8969) or Peter Smith (Ph: 9561 8224) Compliance and Safety Officers in Asset Management Directorate.

Michael Waterhouse
R/Deputy Secretary, Corporate Services
30 **September 2015**

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	DN/06/00362 Use of imported fill on school sites
	DN/07/00356 Safety notice No. 17 Asbestos Survey of DoE Facilities
	Safety Alert No. 32 – Procedures relating to asbestos during Construction Work (May 2011)
	DN/12/00505 Safety notice No. 36 – Sealant containing asbestos in demountable buildings
	DN/13/00168 Safety notice No. 46 – Use of imported fill containing asbestos, on school sites
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	Demountable checklist – release/transfer and installation
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Appendix G	DoE Hazardous materials (asbestos) register update
	Asbestos register – DoE update procedure
	Asbestos register review tool (ARRT) – operation manual
	Asbestos register – FMweb update procedure
Appendix H	Window asbestos mastic procedure
	Window asbestos putty procedure
Appendix I	Panel contract brochure

Appendix J	
	Notes on the asbestos survey 2008 and update of information
	How to read asbestos register
	Asbestos register – permanent facilities
	Asbestos register – demountable facilities
	Asbestos register – list of electronic files
	Asbestos register – site specific AMP (where applicable)
Appendix K	
	DoE hazardous materials (asbestos) register
	Schools to insert current asbestos registers
	Asbestos register, for AMS on the web
	Site specific AMP (where applicable) for AMS on the web

Definitions

ACD	Asbestos containing dust or debris that has settled within a workplace and is (or is assumed to be) contaminated with asbestos.
ACM	Asbestos containing material
Air monitoring	
	Air monitoring involves sampling airborne asbestos fibres to assist in assessing exposure to asbestos and the effectiveness of implemented control measures. It must be conducted in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Dust, 2nd Edition [NOHSC: 3003 (2005)]. It is a DoE requirement that air monitoring is a requirement when any form of asbestos disturbance works is undertaken.
Agent of DoE	Department of Public Works and Services (DPWS), also known as NSW Public Works (PW), a division of Department of Finance and Services or similar
FMC	Facilities Maintenance Contractor; also termed as Facilities Maintenance Contractors (FMC)
AMD	Asset Management Directorate (DoE state office)
AMP	Asbestos Management Plan for schools only
AMU	Asset Management Unit (DoE regional office)
Amosite	Brown asbestos
ARRT	Asbestos Registers Review Tool
Asbestos	Defined as the fibrous form of mineral silicates; belonging to the serpentine and amphibole groups of rock-forming minerals, including actinolite, amosite, crocidolite, chrysotile, anthophyllite, tremolite, or any mixture containing one or more of these.
Asbestos assessor	
	A person who is WorkCover NSW licensed in accordance with the regulations for air monitoring, clearance inspections or the issuing of clearance certificates for class A asbestos removal work. Note: all DoE Occupational Hygienist Panel Contractors/Consultants are Licensed Asbestos Assessors.
Bonded asbestos	
	As of Work Health and Safety Regulation 2011 the term bonded asbestos is to be no longer used. Please refer to non-friable asbestos.
Chrysotile	White asbestos. Generally, the most commonly used asbestos type.

Class A licensed asbestos removalist	
	As per Part 8.10 of the WHS Regulations, a contractor, WorkCover NSW licensed to remove all types and quantities of asbestos.
Class B licensed asbestos removalist	
	As per Part 8.10 of the WHS Regulations, a contractor, WorkCover NSW licensed to remove any amount of non-friable asbestos, or ACM and ACD associated with the removal of non-friable asbestos or ACM.
Competent person	
	For a clearance inspection under clause 473 – *A person who has acquired through training or experience, the knowledge and skills and is able to carry out a clearance inspection:*
	a. a certification in relation to the specified VET course for asbestos assessor work, or
	b. a tertiary qualification in work health and safety, occupational hygiene, science, building, construction or environmental health.
Crocidolite	Blue asbestos
DoE	Department of Education (prior to 1 July 2015, known as Department of Education and Communities (DoEC))
DFS	Department of Finances and Services
DPWS	Department of Public Works and Services, a division of Department of Finance and Services
Environmental consultant	
	Note: for the purposes of this plan, the hygienist and the environmental consultant are the same role. A qualified and/or experienced health and safety consultant engaged to provide advice on asbestos and to recommend management of asbestos containing materials.
f/mL	Fibres per millilitre of air
Fair condition	
	Showing small amounts of damage / deterioration
Facility manager	
	Person with responsibility for the DoE Facility or a suitably appointed delegate
FMC	Facilities Maintenance Contractors; also termed as Facilities Maintenance Contractors (FMC)
Fibre	A particle of asbestos with a width of less than 3 µm and length greater than 5 µm, and with a length to width ratio of greater than 3:1.
Fibrous cement	
	Cement based building material containing reinforcement of either asbestos or non-asbestos fibres. Trade names include but are not limited to Super Six, Hardiflex, Hardiplank and Villaboard.
Friable asbestos	
	Any material that contains asbestos and is in a powder form or can be crumbled, pulverised or reduced to powder by hand pressure when dry.
Good condition	
	Showing no, or very minor, signs of damage and/or deterioration of material.
HACA	Heads of Asbestos Coordination Authorities
Hazardous materials	
	Building materials that include asbestos, polychlorinated bi-phenols (PCBs), synthetic mineral fibres (SMFs) and lead based paints.
Hygienist	**Note: for the purposes of this plan,** the hygienist will also be a competent person / asbestos assessor / WorkCover accredited licensed asbestos assessor as defined by regulations and selected from DoE hygienist panel.

Hygienist panel (contract)	
	A Public Works contract that provides a panel of three contractors for the supply of occupational hygienist services to DoE for the management of assets to ensure compliance with the relevant legislation, including the NSW Work Health and Safety (WHS) Regulation 2011, particularly as this relates to asbestos. All hygienists engaged under this contract are licensed asbestos assessors.
Licensed asbestos removalist	
	Means a person conducting a business or undertaking who is WorkCover NSW licensed under the WHS Regulations to carry out class A or class B asbestos removal work.
NATA	
	National Association of Testing Authorities. NATA is a government-endorsed provider of accreditation for laboratories and similar testing facilities, including asbestos sample analysis and sampling for airborne asbestos fibres.
Non-friable asbestos	
	Means material containing asbestos that is not friable asbestos, including material containing asbestos fibres reinforced with a bonding compound.
NSW EPA	New South Wales Environment Protection Authority
NSW EP&A Act	
	New South Wales Environmental Planning and Assessment Act
NSW OEH	New South Wales Office of Environment and Heritage
Permit to work	
	A Permit to work authority will need to be issued to and signed by the contractor, acknowledging presence of asbestos containing materials in the work area/s identified in the register prior to commencing work. The contractor is to indicate the control measures to be used. Permit to work authorities will only be issued by the DoE Facility Manager (refer Appendix A).
PCBU	Person conducting a business or undertaking
Poor condition	
	Showing a large amount of damage / deterioration or that the material is unserviceable for its intended use
POEO	Protection of the Environment Operations (POEO) Act
NSW Public Works	
	Department of Public Works & Services, a division of Department of Finances and Services Division
PW	Department of Public Works & Services, a division of Department of Finances and Services Division
Risk assessment (asbestos)	
Low risk	Asbestos containing materials that pose a low health risk to personnel, employees and the general public providing they remain undisturbed. Refer to Section 3.4.
Medium risk	
	Asbestos containing materials that pose a moderate risk to people in the area – there is a medium potential for the material to release asbestos fibres if disturbed. Refer to Section 3.4.
High risk	Asbestos containing materials that pose a high health risk to personnel or the public in the area of the material – there is a high potential for the material to release asbestos fibres if disturbed, or a potential for the materials to release fibres even if undisturbed. Refer to Section 3.4.
SSAMP	Site specific Asbestos Management Plan; also known as Asbestos in Grounds Management Plan
WHS Act	*NSW Work Health and Safety Act 2011*
WHS regulation	
	NSW Work Health and Safety Regulation 2011

1. Introduction

1.1 General requirements

All schools are required to notify their local Asset Management Unit (AMU) of any works to be carried out on their site. This includes work that may disturb asbestos containing material (ACM).

Please refer to School Asset Management Guidelines at:

https://education.nsw.gov.au/asset-management/media/documents/procurements-And-contracts/assets.pdf

As policy and other asbestos related documents are subject to change, the most recent up-to-date advice may be found on the Department of Education (DoE) Asset Management Directorate (AMD) Intranet site at:

https://education.nsw.gov.au/asset-management/compliance-and-safety/asbestos-information

This information is accessible by all school staff and DoE administrative staff.

All asbestos specific related files are maintained on the AMD Asset Management System (AMS), which are accessible by state office and AMU staff with principals able to access the same files via AMS on the web. Please also refer to Section 3 of this document.

1.2 Asbestos requirements

The DoE, as a *person with management or control of a workplace*, has an obligation under Part 8.3 of the NSW Work Health and Safety Regulation 2011 under the NSW Work Health and Safety Act 2011, to assess the risk of harm to the health and safety of any person arising from asbestos hazards.

Specifically, the Regulation states in clause 422 that: *"[a] person with management or control of a workplace must ensure, so far as is reasonably practicable, that all asbestos or ACM at the workplace is identified by a competent person."*

The Regulation also states in clause 425 that:

(1) A person with management or control of a workplace must ensure that a register (an asbestos register) is prepared and kept at the workplace.

(2) The person must ensure that the asbestos register is maintained to ensure the information in the register is up to date.

(3) The asbestos register must:

(a) record any asbestos or ACM identified at the workplace under clause 422, or likely to be present at the workplace from time-to-time, including:

1. the date on which the asbestos or ACM was identified, and

2. the location, type and condition of the asbestos or ACM, or

(b) state that no asbestos or ACM is identified at the workplace if the person knows that no asbestos or ACM is identified, or is likely to be present from time-to-time, at the workplace.

(4) The person is not required to prepare an asbestos register for a workplace if a register has already been prepared for that workplace.

(5) Subject to subclause (6), this clause applies to buildings whenever constructed.

(6) This clause does not apply to a workplace if:

(a) the workplace is a building that was constructed after 31 December 2003, and

(b) no asbestos has been identified at the workplace, and

(c) no asbestos is likely to be present at the workplace from time-to-time.

This Asbestos Management Plan (AMP) for NSW DoE Facilities has been developed to address this obligation, as it specifically relates to the presence of asbestos on the site, by managing and minimising asbestos related health risks to personnel working on or visiting the site. This AMP is to be read in conjunction with any existing hazardous materials (asbestos) register for the premises.

Nothing contained within this AMP may be considered to alter or modify guidelines as set down in the SafeWork Australia code of practice titled: How to Manage and Control Asbestos in the Workplace: Code of Practice 2011, or the requirements laid down under all relevant New South Wales Legislation.

No one section or part of a section of this AMP should be taken as giving an overall idea of this AMP. Each section must be read in conjunction with the whole of this report, including its appendices and attachments.

Asbestos Incident Procedures are included in Section 9 to be used as an aid for DoE Facility staff to help determine appropriate responses to the discovery of suspected asbestos containing materials or particular incidents.

1.3 Objectives of the Asbestos Management Plan

This AMP details the approach to be taken by the DoE in managing the asbestos hazard in DoE Facilities by documenting procedures designed to minimise the risk of exposure to asbestos of all personnel on DoE Facility premises, including all DoE and Department of Public Works (PW) personnel, teaching staff, maintenance staff, students, maintenance contractors and other visitors. This AMP is to be used in conjunction with the hazardous materials (asbestos) register for the facility and/or any other records of asbestos containing materials or risk assessments or investigations undertaken for specific sites.

NSW Work Health and Safety Regulation 2011 clause 429 states: *"A person with management or control of a workplace must ensure a written asbestos management plan is prepared for the workplace if asbestos or ACM has been identified or assumed present, or is likely to be present from time-to-time at the workplace.*

The asbestos management plan must be maintained to ensure the information is up to date."

This AMP contains the following information:

- scope and limitations of the AMP
- overview of the risk assessment process
- asbestos related regulatory requirements
- organisational responsibilities
- management of in-situ asbestos containing materials
- safe working practices
- requirements for asbestos removal
- training, and
- emergency response procedures.

An example hazardous materials (asbestos) register for the facility is included in Appendix J of this document for ready reference. This register identifies the presence of asbestos within the DoE Facility, detailing the locations, risk assessment, condition and priority rating for ACMs identified in DoE Facility buildings. Details of in-ground ACMs have been included when previous asbestos containing material ground works have been undertaken.

The hazardous materials (asbestos) register will be stored on the DoE Asset Management System for access by AMU and state office staff. This is kept updated to provide a record of ACMs and remedial works carried out that may change the original entry.

1.4 Structure of the Asbestos Management Plan

1.4.1 Component parts

When following this management plan, the following sections should be considered:

- risk assessment of asbestos containing materials
- organisational responsibilities – the persons and organisations responsible for implementing this plan
- managing asbestos in DoE Facility grounds
- managing asbestos in DoE Facility buildings
- Safe work practices – using permits to work
- asbestos removal and disposal guidelines
- emergency response procedures
- principles of asbestos management – controlling asbestos hazards
- asbestos information – general information on asbestos containing materials and risks, and
- Methodology to update registers (Appendix G)
- Methodology to provide registers to persons (Appendix G)
- DoE Panel Contract (Appendix I)
- DoE Facility Hazardous Substances Register (Asbestos – Appendix K).

1.4.2 User structure

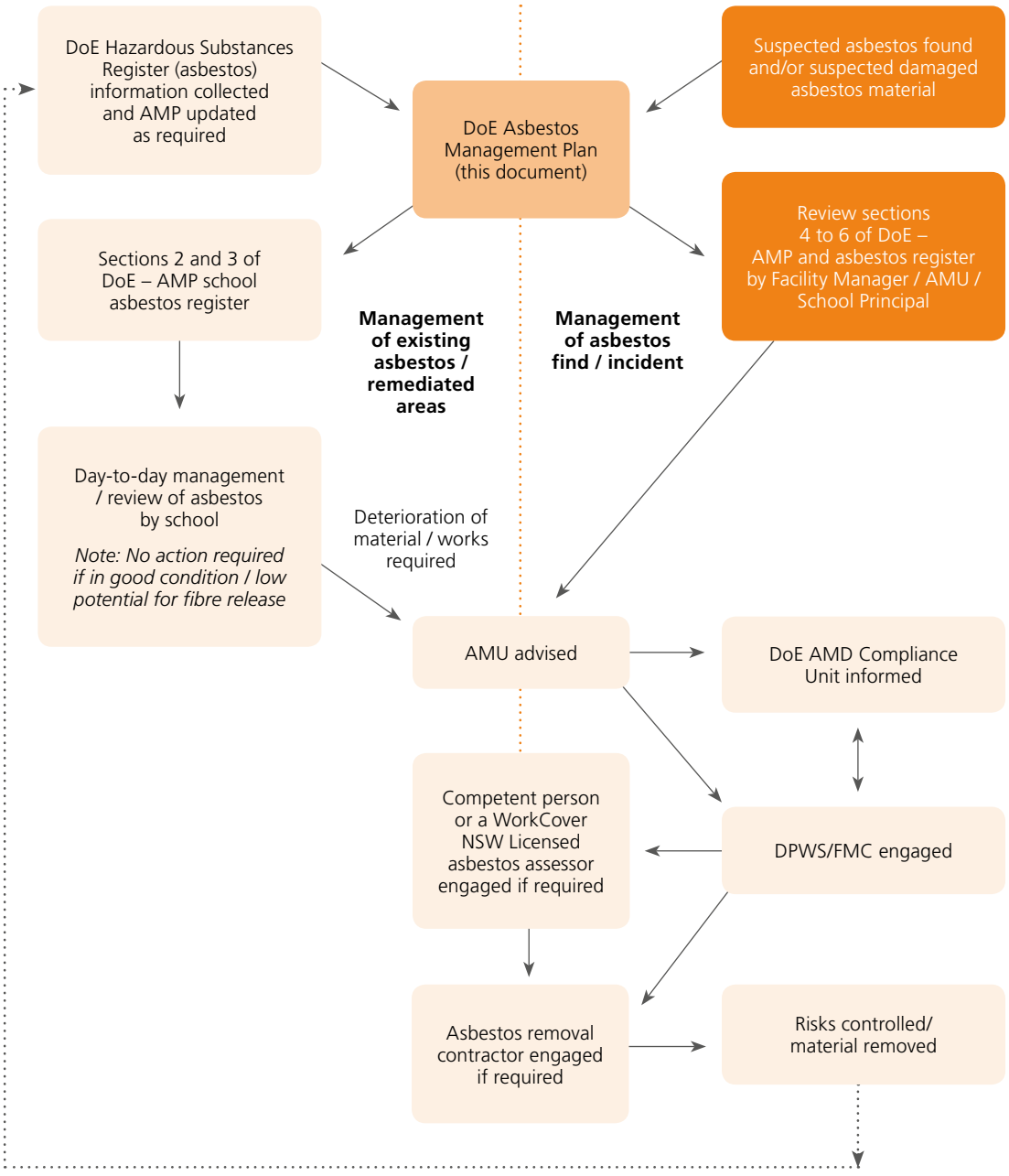


Figure 1.0 Asbestos management user structure*

*Please note: Figure 1.0 is a basic flow chart of actions which are to be implemented; it does not aim to document specific items such as communications and use of the panel contract.

1.5 Regulatory framework

All work on NSW DoE Facility buildings and grounds involving the assessment, management, removal, encapsulation, transport, disposal or otherwise potential disturbance of asbestos containing materials, shall be performed in accordance with all relevant State Acts, Regulations, Codes of Practice, Advisory Standards and industry standards, including the following as of February 2015:

- NSW Work Health and Safety Act 2011

www.legislation.nsw.gov.au/maintop/view/inforce/act+10+2011+cd+0+N

- NSW Work Health and Safety Regulation 2011

www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+674+2011+cd+0+N

- How to Manage and Control Asbestos in the Workplace: Code of Practice

www.workcover.nsw.gov.au/__data/assets/pdf_file/0015/15216/how-to-manage-control-asbestos-workplace-code-of-practice-3560.pdf

- How to Safely Remove Asbestos: Code of Practice

www.workcover.nsw.gov.au/__data/assets/pdf_file/0016/15217/how-to-safely-remove-asbestos-code-of-practice-3561.pdf

- Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC: 3003 (2005)]

www.safeworkaustralia.gov.au/AboutSafeWorkAustralia/WhatWeDo/Publications/Documents/236/GuidanceNote_

- Asbestos Blueprint: A guide to roles and responsibilities for operational staff of state and local government November 2011, as prepared by the Asbestos Co-Regulators Working Group (ACWG) for the NSW Government

www.workcover.nsw.gov.au/__data/assets/pdf_file/0005/19571/heads_asbestos_coordination_authorities_asbestos_blueprint.pdf

As information becomes available from time-to-time, changes to advice provided within this AMP or supporting documentation and/or specific investigations may be updated as required from any or above.

1.6 Users of the Asbestos Management Plan

It is the intention that the preparation and use of this AMP assists both the user and duty holder to comply with the Work Health and Safety Act 2011 (WHS Act), the How to Manage and Control Asbestos in the Workplace Code of Practice and How to Safely Remove Asbestos Code of Practice. Nothing contained within this report may be considered to alter or modify the above act or guidelines or the requirements laid down under all relevant NSW Legislation. Those responsible for the management of DoE Facilities and Contractors, are duty holders who have a duty of care. Each duty holder is required to comply with all relevant NSW Legislation.

This AMP is designed for all duty holders where asbestos and asbestos containing materials may be present. Where events or situations arise that cannot be managed under this plan by DoE Facility staff or volunteers and/or contractors, this AMP sets out the actions to be followed and the responsibilities of the NSW Department of Education who will manage all asbestos issues. Duty holders include:

- Those responsible for the management of DoE Facilities, such as:
  - school principal
  - AMU managers
  - asset management directorate

- workers[1] including voluntary staff, and
- contractors.

Please refer to Section 2.1 to 2.8 under Section 2 in this plan.

1.7 Inputs

The development of this plan has been undertaken with the following inputs and consideration:

- Consultation with NSW Department of Education, NSW Public Works (PW), WorkCover NSW and NSW Health; and is also set out in accordance of the following applicable legislation and codes of practice:
  - NSW Work Health and Safety Act 2011
  - NSW Work Health and Safety Regulation 2011
  - How to Manage and Control Asbestos in the Workplace: Code of Practice 2011
  - How to Safely Remove Asbestos: Code of Practice 2011

This AMP should be revised when any new regulations and/or codes of practice come into force.

Each duty holder, including contractors, are to familiarise themselves with the above documents before engaging in works.

1.8 Control revision and amendments

This AMP is subject to ongoing development as further consultations take place and as further relevant codes of practice and/or advice on asbestos management become available.

Each new revision of this AMP will be made available as an electronic document to all registered copy holders with an instruction that the superseded copy be destroyed. Changes to the recent revision will be highlighted. The revision number is included at the end of the document number, which is noted on each page. When amendments occur, the entire document will be made available electronically with the revision number updated accordingly.

The Project Director or Coordinator will approve amendments by initial in the Approved column below.

Minor amendments can be made to the electronic copy of this document without reissuing it. The following provides a record of amendments to this document.

Revision	Date	Description	Page	Clause	Approved

The same form will be used when updating the DoE online version of this DoE AMP. All site managers will be advised by memoranda and email when significant changes are made.

All DoE Asbestos Registers and this AMP are available to the community generally via the internet at www.dec.nsw.gov.au/about-us/supplying-to-us/asbestos-register with the most up-to-date information available internally on the DoE Asset Management System (AMS).

1 The definition of a 'worker' includes any person who carries out work for a 'person conducting a business or undertaking' (PCBU – the new term that includes employers).

2. Organisational responsibilities

It should be understood that this and similar AMP guidance documents, such as those prepared for the management of grounds, is general in nature and does not replace the need for site specific risk assessment to be undertaken by all parties involved in works prior to undertaking works on a site that might impact upon known location/s of asbestos containing materials (ACM) or uncover unexpected finds of asbestos containing materials (ACM).

This AMP is designed to be integrated into existing DoE Facility operations and maintenance programs. The following duty holders are responsible for the implementation of the control measures discussed in this document.

2.1 Department of Education

The DoE's (AMD, AMU, FMC) responsibilities include:

1. Ensuring that an asbestos register is prepared and kept at the workplace.
2. Ensuring that previous asbestos records, including clearance certificate/s, are maintained and made available to relevant persons. This may not necessarily be at the place of work, but they may be kept at a central source and provided as required.

All DoE asbestos registers and this AMP are available to the community generally via the internet at www.dec.nsw.gov.au/about-us/supplying-to-us/asbestos-register with the most up-to-date information available internally on the DoE Asset Management System (AMS).

Please refer to Appendix G and K of this AMP.

3. Ensuring that the register is reviewed, at least whenever the AMP is reviewed, and also whenever further asbestos or ACM is identified at the workplace, or asbestos is removed, altered or disturbed, sealed or enclosed at the workplace.
4. Ensuring any employee, contractor or consultant undertaking works that may result in disturbance or impact to ACM checks the on-site register for an asbestos register prior to commencing works.
5. Ensuring that all works undertaken by any employee, contractor or consultant are performed in such a way that either avoids disturbance or impact to ACM, or is performed with appropriate and effective controls in place to eliminate or minimise as far as practicable any potential for exposure of persons to asbestos.
6. Ensuring that a permit to work system is to be implemented for any works where ACM may be disturbed or impacted
7. Ensuring that the AMP is reviewed and, if necessary, revised at least once every five years or whenever the asbestos register or any associated control measures are reviewed or modified; whenever asbestos is removed or disturbed, sealed or enclosed at the workplace; if the AMP is no longer adequate for managing asbestos or ACM at the workplace; or if a health and safety representative reasonably requests a review be undertaken in accordance with the provision of the regulations.
8. Ensuring that the AMP is readily assessable to a worker who has carried out, carries out or intends to carry out work at the workplace; health and safety representatives; a PCBU who has carried out, carries out or intends to carry out work at the workplace; a PCBU who has required, requires or intends to require work to be carried out at the workplace.
9. Ensuring adequate management of systems that make certain suitable contractors and consultants are engaged to carry out asbestos related works and to ensure the necessary safety standards are being maintained for any such works.
10. Ensuring that appropriate work methods and control measures of any employee or contractor working on areas of known ACM meet the conditions and standards approved for the DoE Facility.
11. Ensuring the use of the DoE hygienist panel is mandated for all emergency and other situations of asbestos related works, including when arranging for the undertaking of inspections; sampling and risk assessment of suspected asbestos containing materials / products; determination of asbestos in soil as non-friable/friable; preparation of management documentation, air monitoring and

clearance inspections; and updating site asbestos records in the DoE asbestos register databases using the Asbestos Register Review Tool (ARRT).

12. Engaging accredited and/or licensed removal contractors when required in response to emergency situations and other situations when required (directly or indirectly through agent of DoE).

13. Ensuring that additional occurrences of asbestos containing materials are recorded in the hazardous materials (asbestos) register.

14. Ensuring that a copy of the asbestos register and AMP is transferred to successive persons whose role is to maintain management or control of each workplace.

Due to the extensive nature of DoE's Asset base and resulting responsibilities, this AMP has been prepared and is to be used in conjunction with the hazardous materials (asbestos) register for each particular facility and/or any other records of asbestos containing materials or risk assessments or investigations undertaken for specific sites.

Where individual registers and/or AMPs exist, those documents may be reviewed and revised if necessary, for example when there is a review of the asbestos register or a control measure; when asbestos is removed from or disturbed, sealed or enclosed at the workplace; when the plan is no longer adequate for managing asbestos or ACM at the workplace; or when a health and safety representative requests a review if they reasonably believe that any of the matters listed in the aforementioned points affects or may affect the health and safety of a member of their work group and the AMP was not adequately reviewed.

2.2 Use of DoE panel contract

This DoE AMP (2015) will require the panel contract to be used for all hygienist (asbestos assessor) services as to be detailed in the contract. This will allow DoE to obtain, from the panel contractors, electronic copies of all reports and testing results in a compliance file format for direct uploading onto the AMS, ie School Code_Compliance Area_Date_Type of Report (eg 1234_ASB_030113_AMP). Where there is any significant work undertaken on a DoE site, update of the asbestos register will be undertaken when a final clearance certificate is provided, using a new tablet module – the Asbestos Register Review Tool (ARRT) – that allows for more efficient updating of asbestos data.

The panel contract will provide asbestos related services to support;

2.2.1 Capital works (Major)

Capital works are works in excess of $0.5 million, including new schools, new buildings and major refurbishments. The range of services can include site inspections, Hazardous Materials Surveys, materials testing, air monitoring and clearance certificates. It would be expected that one member of the panel contract be appointed to a particular building project, to ensure consistency in reporting. For new construction, hygienist (asbestos assessor) services will be minimal, as there will be no asbestos used in construction. In works involving existing facilities, the range of services may be more extensive and would finish with updating of the existing asbestos register. Updating of the existing asbestos register will include those spaces refurbished, and spaces in the remainder of the school not previously accessed; sampling / testing of materials listed as assumed asbestos; inspection of carpeted spaces to confirm the absence of vinyl containing asbestos, and subfloor and ceiling void spaces as made accessible.

2.2.2 Minor works

These are works usually less than $1.0 million, and typically include the construction of small new facilities, refurbishment of areas within a building, provision of IT services, electrical upgrades and installation of air cooling. The demand for hygienist (asbestos assessor) services will be similar to those required for Major Works.

2.2.3 Maintenance works

Asbestos related works initiated as a result of maintenance activities are expected in most cases to be minor and are mostly less than 10m^2. If the works are more extensive, programmed maintenance works are to be undertaken by school Facilities Maintenance

Contractors (FMC). The largest of the maintenance works will be similar to a small Minor Works and the necessary hygienist (asbestos assessor) services. Minor asbestos affectations (eg a hole to be advanced through a cement sheet wall or damaged eave sheet) will require timely materials testing that will permit timely resolution.

2.2.4 School initiated works

DoE AMP (2015) will require that any school initiated / funded works use the panel contract to provide hygienist services. All hygienist (asbestos assessor) services provided to the school will have the same file naming convention as DoE, FMC or DPWS, and be reported to DoE. The inclusion of an asbestos register update as part of a final clearance certificate may not be required where a total project cost is less than $50,000.

2.2.5 Fibrous cement in grounds

Since 2003 DoE has had a separate program to address school sites that have asbestos related grounds issues, these are typically fragments of bonded AC (fibro) fragments. Services provided in response to a positive notification of fragments would be material testing, clearance certificate and a hygienist (asbestos assessor) report detailing the area of the site, pick-up report from FMC and air monitoring. A site specific AMP is created and maintained for grounds asbestos issues. For a new asbestos affected site, a site specific AMP is created and updated whenever remediation works are completed or additional incidents reported. Updating of facilities' asbestos registers are not triggered by grounds issues.

2.2.6 State office programs

State office may undertake asbestos register updates for groups of schools where there are extensive quantities of assumed asbestos or spaces in need of survey. Such groups of schools would likely be selected geographically to control travel and accommodation costs. A minimum of two panel contract members would be invited to provide a price for any such work.

2.3 Hygienist services, for asbestos, provided by the panel contract

Note that for the purposes of this plan, the hygienist will also be a Competent Person / Asbestos Assessor as defined by Regulations and selected from the DoE hygienist panel.

Advice is to be provided that is consistent with the DoE Asbestos Management Plan (2015), which is compliant with the relevant NSW legislation and national requirements. There is to be reference to advice from other jurisdictions.

Ad-hoc advice is provided where an investigation is required. The advice typically provides options for resolution of an issue and typically is finalised using a Clearance Certificate or site specific AMP.

2.3.1 Site inspections

Site inspections may be required for existing schools where a new building is planned for an unused part of the site. Practical advice from the hygienist (asbestos assessor) to facilitate the project in a cost effective way is expected.

2.3.2 Hazardous material surveys

Hazardous materials surveys are typically undertaken for existing buildings and demountables proposed for refurbishment or demolition. These surveys generally include assessment for asbestos, PCB, lead, etc, in addition to asbestos which is already covered by the asbestos register under this AMP, which cannot be undertaken in existing operating schools.

2.3.3 Clearance certificate

A clearance certificate is provided when asbestos removal or remediation is completed, and where a clearance certificate is required under the regulations. This is common in facility refurbishment works and grounds remediation works.

2.3.4 Asbestos registers update using ARRT

2.3.4.1 Building

Updating an asbestos register using ARRT is undertaken whenever asbestos or ACM is identified at the workplace, or asbestos is removed, altered or disturbed, sealed or enclosed at the workplace. Additional

information to be added to the register as a result of hygienist (asbestos assessor) activity will include areas inspected that were not previously accessible, additional samples collected, etc. It is intended that all register information is to be available via the internet. Where ceiling and underfloor samples are collected, air monitoring needs to be undertaken.

2.3.4.2 Demountables

Asbestos registers are to be updated annually, with one upgrade being made early in each school year once all demountable movements are completed to resolve accommodation needs. The bulk of this movement usually occurs in March. In general it is expected that additional demountable movements during the year occur infrequently and on a smaller scale.

Before movement of any demountable is undertaken, an asbestos checklist must be completed; this is detailed in Appendix E.

All New System (NS) Demountables were constructed asbestos free.

Old System (OS) Demountables were constructed with asbestos containing materials (ACM), with all ACM being removed during off-site refurbishment. Such Demountables are considered to be 'asbestos free', with the exception of remnant mastic material that was unable to be extracted from window frames. Any asbestos fibres in this mastic are held within the 'sticky' substrate – this part of the window frame is encapsulated in the wall.

Please refer to Appendix G for example flowcharts for updating of the register by panel contract hygienist/s.

2.3.5 Site specific AMP

A site specific AMP is produced for a DoE site with grounds asbestos (usually fibrous cement) occurrence. Where there is a reoccurrence, the site specific AMP is updated when a Clearance Certificate is produced or remediation works completed.

2.3.6 Analytical services

2.3.6.1 Materials testing

Materials testing for the full range of asbestos containing materials, which in DoE facilities is mostly non-friable asbestos cement and vinyl flooring, will be required. Friable, fibrous materials have been removed wherever found in previous programs. While there will be individual samples collected and analysed for much of the time, there will also be survey programs where bulk quantities greater than 50 will be submitted at any one time. Bulk discounts will be tendered.

DoE requires that all materials testing for asbestos be undertaken at a NATA accredited laboratory.

2.3.6.2 Air monitoring

Air monitoring will be required for all grounds pick-ups and as needed for disturbance works. Air monitoring will be required where samples are taken in underfloor and ceiling spaces.

Air monitoring should be in accordance with the National Occupational Health & Safety Commission's Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC: 3003 (2005)] and be conducted by National Association of testing Authorities (NATA) accredited personnel operating from a NATA registered laboratory.

2.3.7 Training services

2.3.7.1 Asbestos sample collection

The training of nominated personnel will be required to allow for timely sample collection and materials testing. An agreed training regime will be negotiated between all panel members. Personnel to be trained may be from DoE, DPWS, FMC or sub-contractors (to FMC).

2.3.7.2 Asbestos awareness training

It is best practice that DoE Asset Management personnel and Facilities Maintenance Contractors who are not likely to be exposed to asbestos but who work in areas where asbestos is or may be present, be provided with asbestos awareness training.

Asbestos awareness training is to be provided by a consultant selected from the DoE hygienist panel.

2.4 DoE facility manager

In addition to this AMP, the DoE facility manager is to make extensive use of documents mentioned within Appendix A, E and G of this AMP.

The files in Appendix E, regarding Engaging Contractors are available from the DoE Intranet, Work Health and Safety (WHS) Directorate / Safety Management System / Student, contractor and visitor safety.

These set out the broad responsibilities of facility managers.

The responsibilities of the DoE facility manager (eg School Principal or AMU officer) or suitably appointed delegate include:

1. Ensuring asbestos situations are safely controlled, including contractor inductions where appropriate.
2. Ensuring that employees, contractors, consultants, external users and other visitors have been suitably informed about the presence of asbestos on the site, the potential risk associated with asbestos, the precautions and management procedures to be adopted and are referred to the on-site asbestos register. The DoE facility manager is to let all users of the site know that information is also available on the internet.
3. Ensuring staff, student and visitor concerns about asbestos are dealt with in a satisfactory and timely manner, with support by the AMU as required.
4. Entering any observations of potential asbestos containing material/s directly into the Asset Management System.
5. Issuing of Permits to Work where asbestos containing materials may be disturbed or impacted upon.
6. Maintaining a register of all Permits to Work involving asbestos containing materials that have been issued and cancelled.
7. Ensuring that the use of the DoE panel contract is mandated for all asbestos disturbance/s, including those undertaken by schools under the control of the DoE facilities manager.

2.5 Agent of DoE such as Department of Public Works or similar – where engaged by DoE

The responsibilities of the agent include:

1. Ensuring that all staff of the agent who visit the site as part of undertaking works review the on-site asbestos register.
2. Management of systems to ensure suitable contractors are engaged to carry out asbestos related works and to ensure the necessary safety standards are being maintained for any such works, and that all are referred to the onsite asbestos results for further information.
3. Ensuring that appropriate work methods and control measures of any staff member or contractor working on areas of known asbestos contamination, meets all legislative requirements.
4. Maintenance of management systems to ensure suitable consultants from the DoE hygienist panel are engaged to carry out asbestos related works, and to ensure the necessary safety standards are being maintained for any such works, and that all are referred first to the onsite asbestos results for further information.
5. Arranging for assessment and sampling of suspected asbestos containing materials / products by consultants engaged from the DoE hygienist panel, if not mentioned in the register or not previously tested (ie listed as 'Assumed asbestos').
6. Ensuring asbestos situations are safely controlled, including the labelling of asbestos remaining in-situ by consultants engaged from the DoE hygienist panel, where required.
7. Engaging consultants from the DoE hygienist panel when required in response to emergency situations and other situations when required.

Use of the DoE hygienist panel is mandated for all emergency and other situations of asbestos related works, including, when arranging for the undertaking of inspections; sampling and risk assessment of suspected asbestos containing materials / products, determination of asbestos in soil as non-friable / friable; preparation of management documentation, air monitoring and clearance inspections; and updating site asbestos records in the DoE asbestos register databases using the ARRT.

8. Engaging removal contractors who are approved by DoE when required in response to emergency situations and other situations when required.

Note: Should a contractor be used on-site who is not engaged by the agent, it is a DoE requirement that the contractor meets all of the requirements as set out above.

In addition to this AMP, the agent of DoE is to make extensive use of documents mentioned within Appendix A to K of this AMP.

2.6 DoE staff and volunteers

DoE staff responsibilities include:

1. Informing the Facility Manager of the presence of any previously unknown asbestos hazard or a suspected asbestos hazard on-site. This may require reference to the on-site asbestos register.
2. Complying with the DoE Facility AMP to ensure staff or students are not at risk of exposure to airborne asbestos fibres.

2.7 Facilities Maintenance Contractors (FMC) and other contractors

A person conducting a business or undertaking has a primary duty of care to ensure workers and others are not exposed to risks to their health and safety. All duty holders are to consult, cooperate and coordinate with each other as well as consulting with workers and health and safety representatives.

All contractors (including facility maintenance contractors and staff) involved in the undertaking of works (including preparatory stages) should be reminded that this and similar AMP guidance documents, such as those prepared for the management of grounds, are general in nature, and do not replace the need for site specific risk assessment to be undertaken by all parties involved in works prior to undertaking works on a site that might impact upon known location/s of asbestos containing materials or uncover unexpected finds of asbestos containing materials.

All projects require a review of a complete asbestos survey prior to contract. If any doubt exists as to the completeness of an existing register then a contractor must discuss this concern with the DoE representative, and if required engage the services of a consultant from the DoE hygienist panel prior to the contract being determined.

As a PCBU, contractors' responsibilities include:

1. Ensuring that they and/or their contractors refer to the on-site asbestos register for information and identify any asbestos or ACM that they have management or control of. The PCBU is to note that the existing register is a non-destructive survey and is to be used as a guide only.
2. If there is uncertainty as to whether work is asbestos related work, assume asbestos is present or arrange for an analysis of a sample to be undertaken by a consultant engaged from the DoE hygienist panel to determine if asbestos or ACM is present. Analysis is to be completed by a laboratory accredited by NATA to do so.
3. The DoE is to be notified if any asbestos or ACM is identified and not included in the asbestos register for the workplace. A ready reckoner may be issued to the preferred contractor upon procurement (perhaps attached with the purchase order) explaining where the register may be obtained from. Please refer to Appendix G of this AMP.
4. If they and/or their contractors consider that the work they are about to do will disturb asbestos, they are to discuss this with the DoE representative.
5. If advice is required then the DoE representative is to consult with and/or refer details of the DoE hygienist panel members to the contractor.
6. Ensuring that work methods and procedures comply with the relevant legislation, codes of practice, Advisory Standards and industry standards, and undertake work according to the requirements nominated by DoE.
7. Employing suitably trained, skilled and competent staff on DoE Facility projects. Determine if additional training is required prior to taking on or commencing works.

8. Ensuring that their employees are inducted in safe work procedures for asbestos containing materials / products.
9. Obtaining the necessary approvals from regulatory authorities prior to starting any asbestos removal or maintenance activities (including appropriate asbestos removal licences).
10. Ensuring that all work is conducted in a safe and competent manner.
11. Ensuring that a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel carries out air monitoring of the work area if there is uncertainty as to whether the exposure standard is likely to be exceeded.
12. Ensuring FMC are disposed of in an appropriate manner at a licensed landfill facility.
13. Retaining records of materials disposed of at a licensed landfill facility (eg tipping dockets).
14. Obtaining the corresponding asset number and details and providing all documentation, including analysis reports, clearance certificates, air monitoring and disposal documentation (including tipping dockets) via a member of the DoE hygienist panel to the agent of DoE and DoE.

In addition to this AMP, the contractor is to make extensive use of documents mentioned within Appendix A to K of this AMP.

2.8 Contractors involved in construction works

Construction work includes any work on a structure involving:

- maintenance and repair
- alteration and renovation
- construction and commissioning
- conversion, refurbishment and fitting out
- Decommissioning, demolition and dismantling.

A person conducting a business or undertaking has a primary duty of care to ensure workers and others are not exposed to risks to their health and safety. All duty holders are to consult, cooperate and coordinate with each other as well as consulting with workers and health and safety representatives.

As a PCBU, contractors' responsibilities include:

1. Ensuring that they and/or their contractors refer to the on-site asbestos register for information and identify any asbestos or ACM that they have management or control of. The PCBU is to note that the existing register is a non-destructive survey and is to be used as a guide only.
2. If there is uncertainty as to whether work is asbestos related work, assume asbestos is present or arrange for an analysis of a sample to be undertaken to determine if asbestos or ACM is present. Analysis is to be completed by a laboratory accredited by NATA to do so and selected from the DoE hygienist panel.
3. The DoE is to be notified if any asbestos or ACM is identified and not included in the asbestos register for the workplace. A ready reckoner may be issued to the preferred contractor upon procurement (perhaps attached with the purchase order) explaining where the register may be obtained from. Please refer to Appendix G of this AMP.
4. If they and/or their contractors consider that the work they are about to do will disturb asbestos, they are to discuss this with the DoE representative.
5. If advice is required then the DoE representative is to consult with and/or refer details of consultant panel members from the DoE hygienist panel to the contractor.
6. Ensuring that work methods and procedures comply with the relevant legislation, codes of practice, Advisory Standards and industry standards, and undertake work according to the requirements nominated by DoE.
7. Employing suitably trained, skilled and competent staff on DoE Facility projects. Determine if additional training is required prior to taking on or commencing works.

8. Ensuring that their employees are inducted in safe work procedures for asbestos containing materials / products.
9. Obtaining the necessary approvals from regulatory authorities prior to starting any asbestos removal or maintenance activities (including appropriate asbestos removal licences).
10. Ensuring that all work is conducted in a safe and competent manner.
11. Ensuring a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel carries out air monitoring of the work area if there is uncertainty as to whether the exposure standard is likely to be exceeded.
12. Ensuring FMC are disposed of in an appropriate manner at a licensed landfill facility.
13. Retaining records of materials disposed of at a licensed landfill facility (eg tipping dockets).
14. Obtaining corresponding asset number and details and provide all documentation, including analysis reports, clearance certificates, air monitoring and disposal documentation to the agent of DoE and DoE.

In addition to this AMP, the contractor is to make extensive use of documents mentioned within Appendix A to K of this AMP.

3. Asbestos management

3.1 General

The management of in-situ asbestos is important to ensure asbestos containing materials and other non-friable asbestos products are not damaged or deteriorate to such an extent that DoE Facility staff, students, contractors or visitors are unnecessarily exposed to airborne asbestos fibres.

The requirements of the contractor site induction and permit to work system (refer Section 3.8.3) will aid in the management of in-situ asbestos containing materials.

3.2 Principles of asbestos management

3.2.1 General principles

The NSW Department of Education' principles of asbestos management have been fully adopted from general principles published by the SafeWork Australia: How to Manage and Control Asbestos in the Workplace: Code of Practice 2011. The key principles are summarised below:

1. Asbestos removal may not be immediately necessary, but must be completed before a structure, or part of a structure, is demolished.
2. Removal of asbestos should be subject to priority setting, determined by the condition and location of the asbestos as well as scheduled refurbishment works.
3. Asbestos presents a risk only when it is airborne. The risk to health increases as the number of fibres inhaled increases.
4. Wherever practicable, substitutes shall be found for asbestos products. Such substitutes shall be thoroughly evaluated before use, to ensure that they do not constitute a health hazard. Ultimately, all asbestos products should be eliminated. Note: No asbestos containing materials (ACMs) may be reinstalled or reused. Where any ACMs is disconnected, it must be replaced with non-asbestos containing product.
5. Asbestos that has been incorporated into a stable matrix can be found in many working environments. Provided the matrix remains stable and no airborne dust is produced, it presents a negligible health risk.
6. The presence of asbestos should be identified after reference to the on-site asbestos register for information. Further investigation may be warranted where disturbance works are to be undertaken.
7. No person shall be exposed to the risk of inhalation of asbestos in the course of employment without being provided with full information of the work health and safety consequences of exposure and appropriate control strategies.
8. At present it is not possible to assess whether there is a level of exposure to asbestos in humans below which an increased risk of cancer would not occur. Accordingly, exposure to asbestos should always be kept to a minimum.
9. Asbestos removalists and maintenance workers in an asbestos environment must be suitably protected.
10. The recognised occupational exposure standard for asbestos is that adopted by SafeWork Australia. The method used to measure exposure to asbestos is the Membrane Filter Method as endorsed by the National Commission; Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC: 3003(2005)]
11. Products containing asbestos in-situ shall be labelled accordingly where required.
12. The spraying of asbestos shall be prohibited. All future use of asbestos for insulation purposes shall be prohibited.

The general principles of asbestos management (and an AMP) are broadly covered by four separate phases. These are:

- the identification
- the evaluation
- the control phase
- the ongoing monitoring / re-assessment phase.

These phases are best illustrated by the following flow chart in Figure 3.1.

Procedures need to be designed and implemented to appropriately control any asbestos hazard, to ensure that personnel are not exposed to asbestos to an extent likely to cause danger to health. These procedures can be aligned to the DoE Work Health and Safety hierarchy as described below under Control of Asbestos Hazards.

3.2.2 Control of asbestos hazards

The control of asbestos hazards should utilise the most appropriate method applicable to the particular circumstances. Based upon the assessment of the condition of the asbestos, its potential to suffer damage or mechanically degrade, and the likelihood of exposing people to airborne asbestos, the following hierarchy of control strategies are relevant:

3.2.2.1 Removal

Removal and disposal of ACMs undertaken where there is an immediate or likely risk of fibre release, eg asbestos insulation.

3.2.2.2 Substitution

Replacement of ACMs with non-hazardous materials (eg replacement of asbestos cement with compressed fibre cement sheeting).

3.2.2.3 Mitigation (re: removal)

Clean-up or decontamination of areas such as surface pick-up.

3.2.2.4 Isolation

Encapsulation or sealing of in-situ ACM (eg painting exposed surfaces of asbestos cement products, sealing fill materials in the ground with a bitumen surface).

3.2.2.5 Engineering controls

It is DoE policy that these are not to be considered for DoE Facilities.

3.2.2.6 Administrative procedures

Inclusive of training, Asbestos Management Plans and Safe Work Procedures.

3.2.2.7 Personal protective equipment (PPE)

To be used by persons working on or near asbestos containing materials, eg respiratory protection. Use of specific PPE is to be in accordance with relevant guidelines and standards following appropriate risk assessment.

3.2.2.8 Atmospheric monitoring

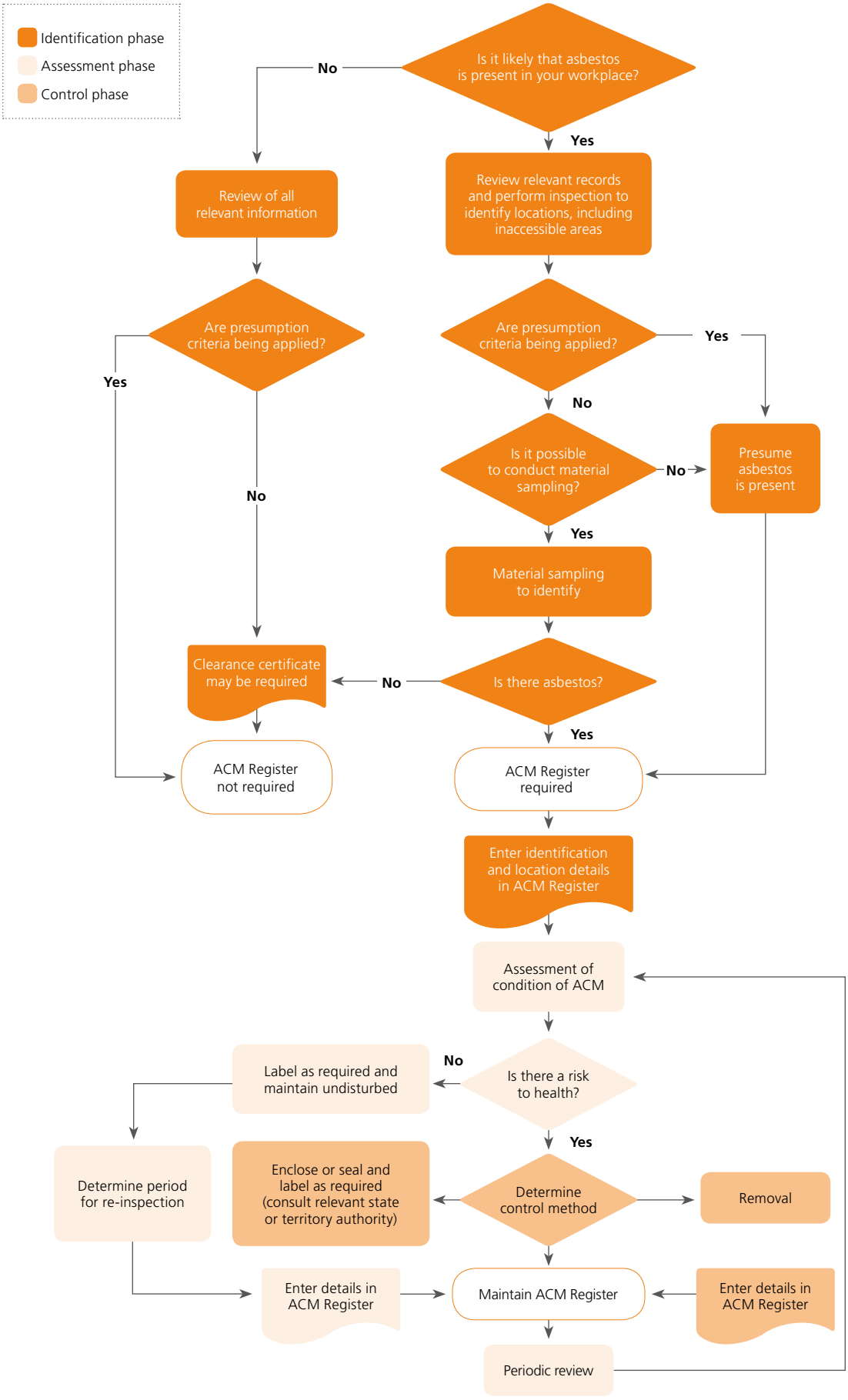
On occasions, and where required by regulations, Para-occupational airborne asbestos fibre monitoring may be required as a way of verifying the efficacy of any control measures implemented.

3.2.2.9 Health monitoring

Under the NSW Work Health and Safety Regulation 2011, health monitoring may also be required. It is not anticipated that DoE will be required to provide / undertake health surveillance of its employees in relation to asbestos, but if needed this would be in accordance with health monitoring (Clause 435).

It is DoE policy that all risks (for example hazardous substances including asbestos) should be suitably managed to ensure that health surveillance is not required for staff, visitors and contractors (eg by using an asbestos management plan). This is achieved by ensuring that works disturbing asbestos are carried out in accordance with applicable statutory requirements and relevant guidance documents. For example by using existing site specific asbestos management plans, the on-site asbestos registers and appropriate procedures of monitoring as per Clauses 435.

Figure 3.1 General principles of an Asbestos Management Plan[2]



3.3 Identifying the risk

All DoE Facilities were surveyed for FMC from October 2007 – May 2008 after which an initial asbestos register was issued to all schools.

All DoE asbestos registers and this AMP are available to the community generally via the internet at www.dec.nsw.gov.au/about-us/supplying-to-us/asbestos-register with the most up-to-date information available internally on the DoE Asset Management System (AMS).

The information in the register is a record of the location of any asbestos and is used to inform the risk assessment.

A material assessment of ACM is completed during the inspection to assess the type of Asbestos and ACM, and level of damage or deterioration.

The surveyor, selected from the DoE hygienist panel, takes into consideration the location of the ACM to formulate the risk ratings and subsequent remediation priority mentioned below.

The surveyor updates the register by way of the Asbestos Register Review Tool (ARRT).

In addition to the completion of the survey, register and risk assessment, an important component of the management of ACM is regular condition assessment.

A condition assessment may be conducted for example by a Facility Manager. The Facility Manager is to inspect for building materials that are damaged or could be easily disturbed. It should be mentioned that this is not a survey, but simply an inspection of the fabric of the building looking for damage. If damage is found, and the material is known to contain asbestos or the Facility Manager is not sure, then the Facility Manager is to contact their AMU.

3.3.1 Asbestos register

The DoE Facility Manager is responsible for ensuring that the asbestos register is available to any contractors who are planning works that may involve the disturbance of asbestos containing materials. The register must be issued prior to works being undertaken.

Please note that the existing register is a non-destructive survey and is to be used as a guide only.

If asbestos containing materials are suspected to be present and have not been previously tested and recorded in the on-site asbestos register, a hygienist (asbestos assessor) sourced from the DoE hygienist panel should be engaged to identify ACMs in the vicinity.

When demolition of buildings and/or structures is to be undertaken or when major refurbishment is to be undertaken, a supplementary asbestos audit with sampling of suspected asbestos containing materials should be carried out. This may involve destructive inspections in order to access materials. The purpose of this audit is to identify all asbestos containing materials for removal / encapsulation prior to demolition / refurbishment being carried out. The audit should also provide information on the location, extent, condition, including friablility, of asbestos containing materials. All building works involving disturbance of ACM will result in updating of the site asbestos register when a clearance certificate is issued at the completion of works.

Please refer to Section 2.3.4 above; and

Please refer to Appendix G for example flowcharts for updating of Register by panel contract hygienist/s.

Asbestos registers produced for DoE sites incorporate a risk assessment process that is embedded and well defined within the Asbestos Register Review Tool (ARRT). This is identical in function to that used for the 2007/2008 survey of facilities that established asbestos registers for DoE.

3.3.2 Risk assessment process

The asbestos risk assessment process entails identifying, evaluating, controlling and monitoring sources of asbestos within buildings or other structures.

The risk assessment also involves consultation with others. Please refer to Appendix F Communications Strategy for details of risk assessment communications.

Asbestos within a building represents a health risk to people only when the asbestos fibres are airborne and are subsequently inhaled.

2 Included as a general reference tool for explanatory purposes and taken from the Code of Practice for the Safe Removal of Asbestos [NOHSC: 2002 (1988)].

The risk to health increases as the number of fibres inhaled increases, ie the health risk is related to the dose, or level of exposure. Dose is a function of the amount, or concentration, of airborne asbestos fibres, and the duration of exposure. Asbestos containing materials that are in a stable matrix, or are effectively encapsulated or sealed, and remain in a sound condition while left undisturbed, represent a negligible asbestos related health risk.

It is necessary to differentiate between 'asbestos hazard' and 'asbestos risk'. 'Hazard' indicates potential for harm, while 'risk' refers to the probability of that harm becoming actual. For example, the presence of asbestos in a building is a hazard, but while that asbestos remains in sound condition and does not release fibres into the air, the risk is negligible. When determining the risk the following factors should be assessed: condition of the asbestos; friability of asbestos containing materials; likelihood of disturbance; exposed surface areas; proximity of air plenums and direct air stream; and environmental conditions. Figure 3.2 shows the likelihood of airborne fibres in disturbed or deteriorated asbestos containing materials.

Figure 3.2 Airborne fibre release risk scale

The inputs to the DoE risk assessment are the:

1. Material condition assessment
2. Risk status assessment

These are further defined below to ensure uniform application.

Both the above mentioned assessment inputs are given numerical values, which when added, result in the output as a:

1. Remediation Priority, which is a default calculation

The remediation priority is either agreed upon or additional standard / specific comments added, where the assessing factors have not been considered in the inputs.

Figure 3.3 is a flowchart representation of the ARRT risk assessment process.

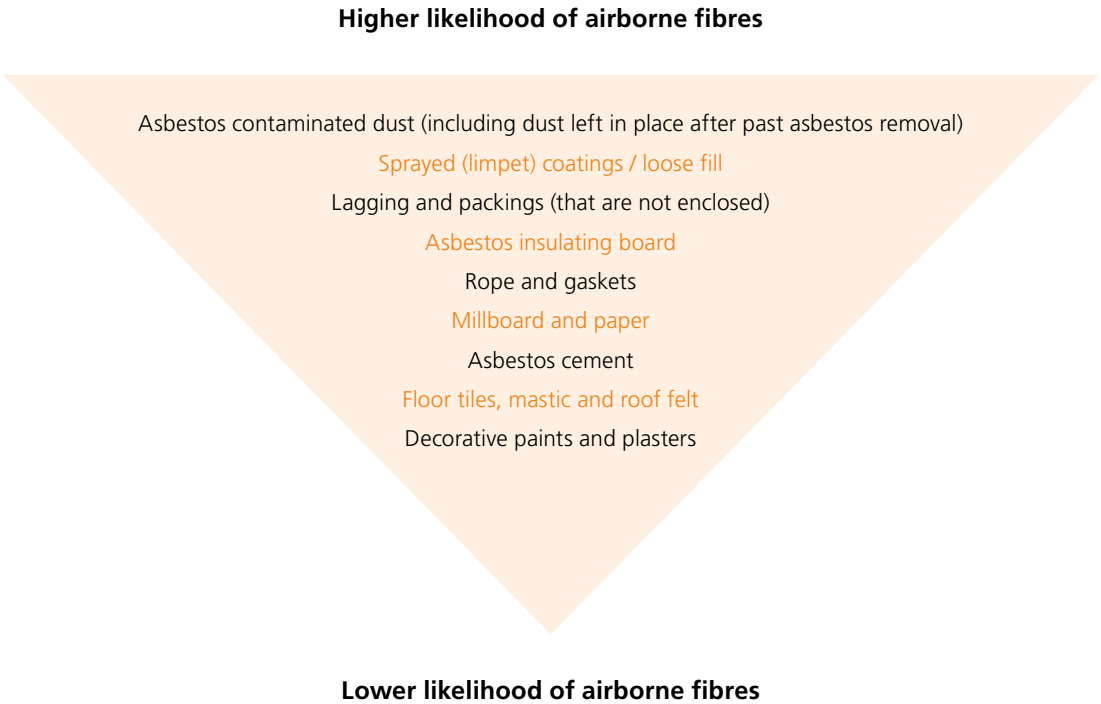


Figure 3.2 Airborne fibre release risk scale

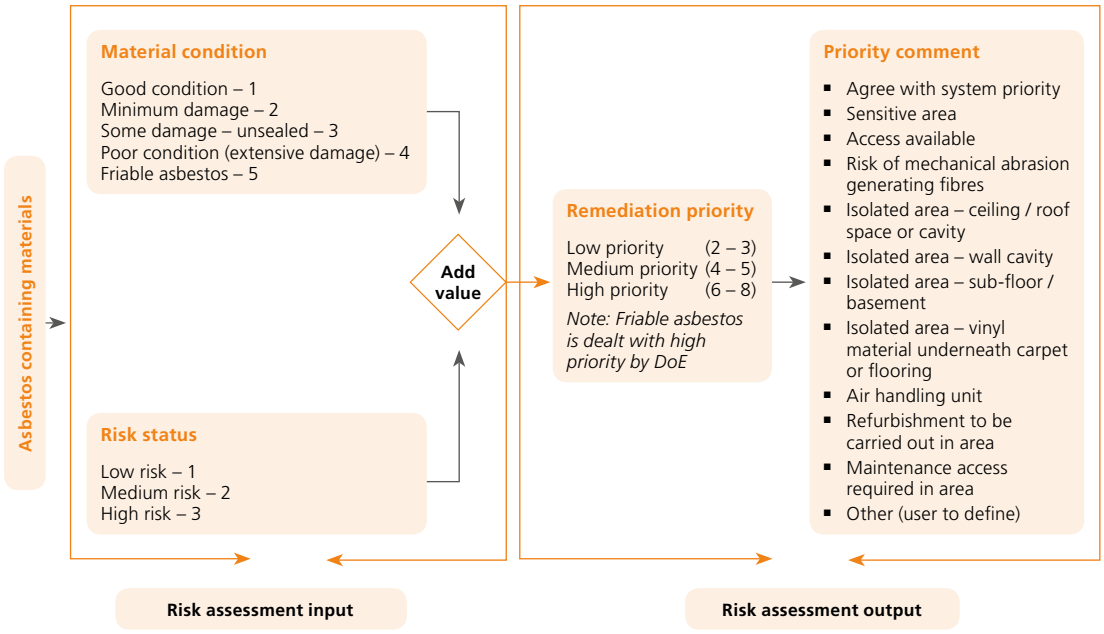


Figure 3.3 ARRT Risk assessment process

3.3.2.1 Material condition assessment

The ARRT records the material condition of identified ACM in the following format:

- **Good condition**, rating of (1), for non-friable asbestos that is sealed and has no visible damage. This primarily related to asbestos cement (AC) sheet and vinyl tiles.
- **Minimal damage**, rating of (2), for non-friable asbestos that has a very small amount of damage, eg hairline cracks.
- **Some damage / unsealed**, rating of (3), non-friable asbestos with significant breakage or several small areas where material has been damaged, revealing loose asbestos fibres. Non-friable asbestos that is unsealed.
- **Poor condition**, rating of (4), non-friable asbestos that has extensive damage. Visible asbestos debris.
- **Friable asbestos**, rating of (5), any occurrence of friable asbestos.

3.3.2.2 Risk status assessment

Asbestos identified by inspections is reported with a risk assessment in the register for each DoE Facility. Each asbestos situation is allocated either a 'High', 'Medium' or 'Low' risk rating to be delivered by a hygienist (asbestos assessor) on-site, taking in to account condition, location, surface treatment and potential friability.

The allocation of the risk rating is based on many factors, but is ultimately subjective and relies on the professional experience and competency of the assessor. DoE requires these to be well defined so there is a uniform application of criteria, and this is applied consistently across the DoE portfolio by assessors.

These risk status assessment ratings are defined as follows:

High risk, rating of (3): high potential for fibre release. **Restrict, access and remove.**

As a guide, the material conforms to one, or more, of the following:

- Friable or poorly bonded to substrate (that can readily release fibres), located in accessible areas.
- Asbestos subjected to recurrent abrasion or disturbance.
- Severely water damaged or deterioration likely.
- Friable asbestos material located in air-conditioning ducting.
- Asbestos debris and stored asbestos in reasonably accessible areas.

Medium risk, rating of (2): elevated potential for fibre release. **Enclose, encapsulate or seal, reinspect periodically.**

As a guide, the material conforms to one, or more, of the following:

- Damaged material in accessible area.
- Friable material or poorly bonded substrate, with bonding achievable using appropriate surface treatment.
- Possibility of disturbance through abrasive contact.
- Possibility of deterioration caused by weathering.

Low risk, rating of (1): low potential for fibre release. **No Remedial Action, Remove during Refurbishment or Maintenance, Reinspect Periodically.**

As a guide, the material conforms to one, or more, of the following:

- Sealed, bonded ACM.
- Firmly bonded to substrate and readily visible for inspection.
- Asbestos debris or stored material in rarely accessed areas.
- Further disturbance or damage unlikely other than during maintenance or service.
- Readily visible for further assessment.
- Stable and damage unlikely, due to isolation or location.

Should materials / products of unknown composition, or materials / products suspected of containing asbestos, be encountered on-site and are not documented in any existing asbestos survey report, including the on-site asbestos register, such as materials / products should be treated as if they were asbestos until sample analysis confirms otherwise.

In the event that additional asbestos is identified, a risk assessment shall then be conducted by a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel. For example, in the event that demolition or refurbishment works are to be carried out in areas previously not inspected for the presence of asbestos, such as inaccessible wall cavities or beneath floors, an inspection and risk assessment should be performed by a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel prior to the commencement of the planned demolition / refurbishment works.

3.3.2.3 Remediation priority

The remediation priority is the addition of Material Condition and Risk Status Assessment score as per the selection by the DoE hygienist (asbestos assessor) selected from the panel contract. The remediation priority score is automatically calculated with the following:

- **High remediation priority**, rating of (6 – 8) – ACM requires immediate removal or complete encapsulation.
- **Medium remediation priority**, rating of (4 – 5) – ACM requires immediate repair or sealing of surfaces to remediate potential for fibre release.
- **Low remediation priority**, rating of (2 – 3) – ACM may remain in-situ under the control of an asbestos management plan.

The total added score for the remediation priority will identify the urgency of asbestos material to be remediated or removed.

For example within ARRT, if the asbestos containing materials was determined to be in poor condition (rating of 4) and the risk status was high (risk status score of 3), the material would be determined to be a high remediation priority (ie a Remediation Priority score of 7 [High priority is between 6 and 8]).

Further guidance regarding the use of the ARRT can be found in Appendix G.

3.3.3 Example materials and typical ratings

The 2007/2008 survey and subsequent updates of data have typically rated and actioned the following:

Remediation priority	Typical products	Normal DoE actions
High remediation	■ AC roofing, friable ■ Pipe lagging, friable	All friable ACM products are removed immediately. Being programmed out of school hours, possibly during a school vacation. All known friable ACM removed.
Medium remediation	■ AC sheet, badly broken ■ AC sheet, multiple fragments in a space ■ Broken or loose vinyl tiles	Where badly affected – remove. Where practicable, patch / fix / seal to make serviceable and safe.
Low remediation	■ Painted AC sheet ■ Electrical distribution boards ■ Backing board, vinyl tiles	Maintain by normal processes.

Please note: All high remediation rated priority items were removed by DoE in 2008. Medium remediation items were dealt with within 12 months of the issued registers.

3.4 Record keeping

The DoE Facility Manager shall maintain detailed records of all activities and work permits relating to asbestos works that have been undertaken on the site. The records kept should include:

- DoE Facility asbestos management plan
- DoE Facility hazardous materials on-site (asbestos) register, including updates and amendments; grounds asbestos management plan (if applicable)
- inspection records
- copies of all 'permit to work' documents
- records pertaining to the informing of DoE Facility employees about the presence of asbestos on-site, and that such employees have been appropriately trained in safe work procedures and practices as required
- observations by DoE Facility Manager, entered directly into Asset Management System (AMS)
- records of any asbestos abatement works performed on-site electronically stored in FMweb
- clearance certificates indicating areas are safe to reoccupy after asbestos abatement works.

DoE will engage consultants obtained from the DoE hygienist panel when updating registers. Please refer to Section 2.3.

DoE will retain all asbestos related reports, including all asbestos fibre air monitoring results on the AMS.

Methodology, including flow chart of how to update registers and site details, are found in Appendix G.

3.5 Sampling and labelling

3.5.1 Sampling

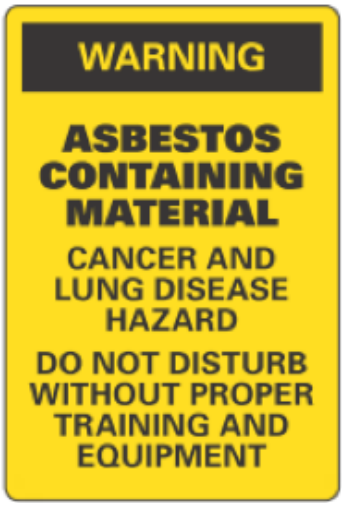
All analysis of bulk samples and all airborne fibre monitoring and analysis are to be conducted by a laboratory registered with the National Association of Testing Authorities, Australia (NATA).

Consultants and/or laboratories are to be selected from the DoE hygienist panel.

3.5.2 Labelling

Labelling may be required to clearly identify and provide warning of the presence of asbestos containing materials. Labels should comply with Australian Standards AS1319. Regardless of the labelling system chosen within the facility, all visitors who are about to undertake works on-site are to view the site specific asbestos register.

Examples of standard warning labels are shown below:



Further warning signs and labels can be found in "Appendix B" of the Code of Practice: How to Manage and Control Asbestos in the Workplace.

3.5.2.1 Non-public areas

General Management policy should include the installation of self-adhesive labels or other clear signage in prominent positions on or near asbestos containing materials located in non-public areas where maintenance personnel may operate from time-to-time. Such areas typically include plant rooms, ceiling spaces, service ducts and the like. The purpose of such labelling is to immediately bring to the attention of such personnel the presence of asbestos, to avoid the inadvertent mechanical disturbance of the material via maintenance or other works.

3.5.2.2 Public areas

In the teaching and public areas of the DoE Facility, labels are not to be installed.

It is always the intention of DoE to manage all instances of asbestos containing materials in accordance with relevant guidance materials, codes of practices and Australian Standards, and in accordance with this AMP.

Before any work is to commence on-site that may impact upon any structure or involve the disturbance of soils, the persons involved in such works are to consult the relevant building register and asbestos in grounds management plan for the site. It is the responsibility of those persons involved in the proposed project to familiarise themselves with the contents of the registers / asbestos in grounds management plan, to conduct their own risk assessment and perform works in accordance with all known relevant guidance materials, codes of practices, Australian Standards and this AMP.

All asbestos containing materials are to be determined prior to works commencing and not damaged during the works. All such materials are to be removed or managed under appropriate controlled conditions in accordance with all legislative requirements.

All teaching and support staff working on-site are to be inducted onto this AMP and details contained within the registers / asbestos in grounds management plan contained on-site. All staff are to notify the principal immediately of any occurrence of broken building materials, regardless of their perceived asbestos content.

3.6 Occupational exposure standards

It is the aim of the DoE that personal exposure to airborne levels of asbestos is kept sufficiently low to negate medical surveillance.

The exposure standard for airborne asbestos is 0.1f/ml.

DoE aims to maintain exposure of all employees, contractors and the general public to airborne levels considered to be not significantly above that of background and below the lower detection limit for the sampling / analytical method, that being 0.01f/ml.

All monitoring is to be conducted by a hygienist (asbestos assessor) from the DoE hygienist panel in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)].

It is expected that the only time a level might be obtained above 0.01f/ml is during asbestos removal works, which are to be undertaken by a licensed asbestos removal contractor outside of school hours. In such cases all works will be managed in accordance with How to Safely Remove Asbestos: Code of Practice and NSW Work Health and Safety Regulation 2011.

3.7 Safe work practices

3.7.1 General

Prior to commencing any works on any DoE Facility building, such as demolition, refurbishment or maintenance, the hazardous materials (asbestos) register on-site must be consulted to determine if any known asbestos containing materials / products are present that are at risk of being disturbed.

Please note that the existing register is a non-destructive survey and is to be used as a guide only. If there is any doubt as to the location of asbestos, then an intrusive survey or additional sample collection and analysis is to be organised via the use of the DoE hygienist panel.

If documented asbestos containing materials / products are present in the area and may be impacted upon by the proposed works, the asbestos must be removed/encapsulated under controlled conditions prior to the commencement of any building works.

Depending on the nature of the asbestos, abatement options other than removal (such as encapsulation) may be feasible.

If unknown materials / products, or undocumented materials / products suspected of containing asbestos are encountered during building works, such materials / products are to be treated as if they contain asbestos and any work that may impact on that material / product must immediately cease, pending sampling and analysis by a qualified person selected from the DoE hygienist panel. This will allow the DoE to determine what control methods are required.

3.7.2 Importation of material

Imported material such as fill is a possible source of asbestos contamination. No individual or organisation is to be permitted to dump any type of fill on a school site. Fill shall only be brought onto school sites as part of necessary works and must be accompanied by an appropriate validation certificate ensuring that the fill is suitable for use. Please refer to Appendix E for DoE Asset Management Directorate advice on the use of imported fill on school sites.

3.7.3 Permit to work

If it is determined, after consulting the hazardous materials on-site (asbestos) register, that asbestos containing materials or products are present in the vicinity of the planned works, a permit to work authority will need to be issued to, and signed by, the contractor. Permit to work authorities will only be issued by the DoE Facility Manager (refer Appendix A). All asbestos works must be undertaken by an agent of DoE, such as Department of Public Works, following approval from the directorate. All asbestos works are to be undertaken outside of school hours.

Before being issued with a permit to work, individuals will be required to read and understand this AMP as well as copies of relevant hazardous materials on-site (asbestos) registers or asbestos removal control plans or risk assessments prepared by DoE hygienist panel members and held on file on-site or obtained from DoE website/s. Individuals must be aware of their legal obligations in relation to health and safety specified in the NSW Work Health and Safety Act 2011 and the NSW Work Health and Safety Regulation 2011.

Where practicable, project personnel should be made aware of the requirements of this AMP prior to tendering to ensure they allow for such requirements when quoting.

Workers engaged in the removal of asbestos and asbestos containing materials will not be issued with a permit to work unless they are employed by a company holding a removal licence issued by WorkCover NSW appropriate for the type of asbestos containing materials concerned.

The permit to work formally places a responsibility for compliance with this AMP and the NSW Work Health and Safety Regulation 2011 on the signatories.

The permit to work is designed to ensure appropriate work practices are employed in the vicinity of asbestos containing materials / products. The permit to work will document what asbestos is to be removed, encapsulated or otherwise protected, prior to the contracted maintenance or building works proceeding. The permit to work will also indicate whether other requirements such as use of personal protective equipment (PPE), the installation of barricading and airborne fibre monitoring are necessary and may provide recommendation for further consultation, sampling or investigation by a member of the DoE hygienist panel prior to permit and contract finalisation.

When a project involves a team of more than one worker, the person in charge of the team will be issued with the permit to work. That person will be responsible to ensure their workers are aware of their responsibilities. That person will also be responsible to ensure that each worker's signature appears on the appropriate section of the permit.

When work is completed, or the permit to work expires (whichever occurs first), the permit shall be signed by the contractor and returned to the DoE Facility Manager to cancel it after ensuring that a safe situation exists. The DoE Facility Manager shall review any documentation provided by the DoE hygienist panel member, such as asbestos air monitoring and clearance inspection certificate/s, and inspect the work area to ensure that it is fit for purpose prior to returning it to normal use. The AMU can provide assistance if required.

The DoE Asset Management Directorate shall be advised immediately by any site personnel of any incidents of non-compliance with the AMP that have occurred.

The DoE Facility Manager will maintain a register of all permits to work that have been issued and cancelled.

It will be a condition of engagement of contractors who are required to work on-site that a permit to work be issued and cancelled as required.

The format of the permit to work is illustrated in Appendix A.

3.7.4 Facility site visit log

Each DoE facility is to maintain a Facility Site Visit Log. All visitors to a site who intend to undertake works are to view the asbestos register / asbestos in grounds plan (site specific Asbestos Management Plan) relevant to their proposed works on-site. A copy of the relevant section from the asbestos register / asbestos in grounds management plan is available at DoE facilities. Following a complete review of that information, the visitor is to check the box (highlighted **red** in below image) and sign the Facility Site Visit Log to confirm that they have reviewed the asbestos register and other asbestos related documents.

They are to note that the existing register is a non-destructive survey and is to be used as a guide only.

All contractors are to review details on FMweb during the planning of all works, review this AMP and make all relevant enquiries prior to finalisation of the contract.

Facility Site Visit Log

Complete one log entry for every site visit.

date: _____
time in: _____
time out: _____
hours worked: _____

For insurance work, essential urgent repairs, maintenance extra task, programmed maintenance work or demountable work, also complete a Service Report

FACILITY NAME
FACILITY NO.
LOCATION OF WORK
building no. room no.

Work done or reason for visit

Asbestos Register Checked ☐ yes ☐ no
(Required when any grounds or building fabric disturbance is undertaken)

WAS THE JOB COMPLETED?
☐ yes
☐ no If no, what further action is required?
☐ site visit
☐ other
Details

CONTRACTOR'S COMPANY NAME:
Contractor's rep./ Visitor Name: signature
DEC Facility Manger Name: signature

Type of work 1431110
☐ insurance work
☐ essential urgent repair
☐ programmed maintenance work
☐ reactive maintenance
☐ demountable work
☐ condition assessment
☐ meeting
☐ other
☐ preventive statutory maintenance
☐ maintenance extra task
☐ school initiated works

Note: The DoE Facility Manager must check that all entries are legible before signing this log. When this page is complete, send the yellow copies to your Asset Services Officer (AS0). Pink copies go to the contractor.

3.8 Contractor health and safety

Prior to undertaking any work that involves the removal, repair or disturbance of asbestos containing materials, a Safe Work Method Statement (SWMS) will be prepared that defines safe procedures to protect the health and safety of personnel. This statement should include the following measures, as a minimum:

- confirmation of their review of the relevant asbestos register, asbestos removal control plan and other relevant documentation, prior to preparation of the SWMS
- review of risks associated with their possible exposure to asbestos or asbestos containing materials (ACM)
- all workers shall wear appropriate Personal Protective Equipment (PPE) for the work undertaken. This may include protective coveralls, gloves and safety boots
- all workers shall wear appropriate Respiratory Protective Equipment (RPE) for the work undertaken
- Decontamination procedures and measures (if applicable)
- asbestos removal areas and buffer zones
- asbestos air monitoring samples (number and frequency).

In addition,

- a reference to all appropriate licences and insurances held by the contractor should be included
- a reference as an additional safety measure, that all works are to be undertaken outside school hours, should be included. Appropriate measures are to be included regarding this requirement.

The Safe Work Method Statement (SWMS) should be reviewed by the Agent of DoE that engages the contractor as per the requirements of the permit to work.

3.9 Approvals

The following environmental approvals and licences will be required for asbestos work and disposal:

- prior to work being undertaken on a site, a permit is to be obtained from DoE
- contractors who remove, repair or disturb areas of 10m^2 or more of non-friable asbestos must hold a non-friable or a friable asbestos licence issued by WorkCover NSW
- contractors who remove, repair or disturb friable asbestos material must hold a friable asbestos removal licence issued by WorkCover NSW
- WorkCover NSW must be notified at least five days prior to the commencement of work when 10m^2 or more of non-friable asbestos containing materials are removed or an amount of friable asbestos containing materials are removed
- the facility that is to receive asbestos waste material would be required to be licensed by the EPA to receive that material subject to the waste classification
- all contractors must hold insurance appropriate for the asbestos work that is to be carried out.

3.10 Awareness training

All friable asbestos removal must have a licensed asbestos assessor to undertake air monitoring and clearance inspections, and issue a clearance certificate if air monitoring levels are <0.01f/ml and visual inspection showing no visible contamination of area and it's surroundings. (Clause 473 and 474 from WHS Regulation 2011).

It is best practice that DoE Asset Management personnel and Facilities Maintenance Contractors who are not likely to be exposed to asbestos but who work in areas where asbestos is, or may be present, be provided with an asbestos awareness training. It is recommended that such training shall include the following:

- overview of asbestos related legislation (State), standards and codes of practice
- information on the presence of asbestos in the DoE Facility buildings and grounds, including the types of asbestos and typical locations where asbestos may be encountered

- information should be provided on the differences between friable and non-friable products
- information on the health risks associated with asbestos
- highlighting the need to avoid avoid disturbing in-situ asbestos containing materials /products
- procedures to be followed in the event damaged or disturbed asbestos containing materials / products are identified, or unknown materials / products or materials / products suspected of containing asbestos are encountered, including the relevant point of contact within the DoE
- information about general methods of asbestos management and removal
- information about air monitoring.

Asbestos awareness training is to be provided by a consultant selected from the DoE hygienist panel.

3.10.1 Hazardous materials

Although not covered by this management plan, the DoE has requirements for the management of hazardous materials other than asbestos. A general overview of DoE hazardous materials management is presented in Appendix E of this document.

4. Control and mitigation measures

4.1 Determination of control measures

In accordance with the SafeWork Australia *How to Manage and Control Asbestos in the Workplace: Code of Practice 2011*, the following control measures may be adopted:

Leave in-situ (defer action)

The identification of asbestos in a building does not automatically necessitate its immediate removal. Asbestos in a stable condition and not prone to mechanical damage can generally remain in-situ. The asbestos will need to be inspected on a regular basis to ensure its integrity is maintained. Asbestos situations should be labelled with an appropriate warning where required, and must be removed under controlled conditions prior to demolition or refurbishment works that may disturb the asbestos.

Encapsulation or sealing

Encapsulation refers to the coating of the outer surface of the asbestos material by the application of some form of sealant compound that usually penetrates to the substrate and hardens the material. Sealing is the process of covering the surface of the material with a protective coating impermeable to asbestos. Encapsulation or sealing helps protect the asbestos from mechanical damage, and is designed to reduce the risk of exposure by inhibiting the release of asbestos fibres into the airborne environment, and increase the length of serviceability of the product.

The use of encapsulation or sealing may be of limited application. It is not considered to be an acceptable alternative to repairing or removing severely damaged or friable asbestos containing materials.

Enclosure

Enclosure involves installing a barrier between the asbestos material and adjacent areas. This is effective in inhibiting further mechanical damage to the asbestos, and friable products such as calcium silicate pipe lagging or sprayed limpet asbestos may be targeted for enclosure where removal is not an option. The type of barrier installed may include plywood or sheet metal products, constructed as boxing around the asbestos.

Removal

Removal of asbestos must be performed under certain controlled conditions, depending on the type of asbestos product to be removed. Removal is considered preferable to the other abatement options such as enclosure or encapsulation, as it eliminates the hazard from the work place. The removal process, however, does pose an increased risk to personnel engaged in the removal, and may result in increased airborne fibre levels in adjacent occupied areas if the removal program is not strictly controlled. Asbestos removal is generally an expensive exercise, and can cause major disruptions to building occupants.

The removal of asbestos is considered appropriate when the asbestos product is deteriorated, has reached an unserviceable condition, or is at risk of being disturbed, and the other control options are not feasible. Where demolition or refurbishment works are to occur, and this work is likely to impact on asbestos containing materials, the asbestos must be removed under controlled conditions prior to the commencement of any site works.

Where the asbestos is friable and not in a stable condition, and there is a risk to health from exposure, it should be removed as soon as practicable. High risk friable is to be removed as a matter of priority.

Where removal is to occur, a hygienist (asbestos assessor) is to be selected from the DoE hygienist panel, to provide consultancy advice and monitoring prior to, during and after the removal process. An appropriately licensed and insured contractor will be engaged at all times.

Table 4.1 provides a summary of the relative advantages and disadvantages of each control method, as well as situations in which each may be considered appropriate.

Appropriate when	Not appropriate when	Advantages	Disadvantages
Defer			
■ Negligible risk of exposure. ■ Asbestos inaccessible and fully contained. ■ Asbestos stable and not liable to damage.	■ Possibility of deterioration or damage. ■ Airborne asbestos dust exceeds recommended exposure standard.	■ No initial cost. ■ Cost of removal deferred.	■ Hazard remains. ■ Need for continuing assessment. ■ Asbestos management program required.
Encapsulate or seal			
■ Removal difficult or not feasible. ■ Firm bond to substrate. ■ Damage unlikely. ■ Short life of structure. ■ Readily visible for regular assessment.	■ Asbestos deteriorating. ■ Application of sealant may cause damage to material. ■ Water damage likely. ■ Large areas of damaged asbestos.	■ Quick and economical for repairs to damaged areas. ■ May be an adequate technique to control release of asbestos dust.	■ Hazard remains. ■ Cost for large areas may be near removal cost. ■ Asbestos management system required. ■ Eventual removal may be more difficult and costly.
Enclosure			
■ Removal extremely difficult. ■ Fibres can be completely contained within enclosure. ■ Most of surface already inaccessible. ■ Disturbance to, or entry into, enclosure area not likely.	■ Enclosure itself liable to damage. ■ Water damage likely. ■ Asbestos material cannot be fully enclosed.	■ May minimise disturbance to occupants. ■ Provides an adequate method of control for some situations.	■ Hazard remains. ■ Continuing maintenance of enclosure. ■ Asbestos management program required. ■ Need to remove enclosure before eventual removal of asbestos. ■ Precautions necessary for entry into enclosure.
Removal			
■ Surface friable or asbestos poorly bonded to substrate. ■ Asbestos is severely water damaged or liable to further damage or deterioration. ■ Located in air-conditioning duct. ■ Airborne asbestos exceeds recommended exposure standard. ■ Other control techniques inappropriate.	■ Located on complex and inaccessible surfaces. ■ Removal extremely difficult and other techniques offer satisfactory alternative.	■ Hazard removed. ■ No further action required.	■ Increases immediate risk of exposure, especially to removal workers. ■ Creates major disturbance in building. ■ Often highest cost, most complex and time consuming method. ■ Removal may increase fire risk within building; substitute required. ■ Possible contamination of whole building if removal done poorly.

5. Asbestos in grounds

5.1 General

For procedures to follow when a new instance of asbestos and asbestos containing materials have been found or are suspected to be present, please follow Section 9 Asbestos Incident Procedures, which details procedures to be followed for a series of asbestos scenarios. Section 9.2 refers to incidences of site specific details of already known grounds asbestos issues that are detected in the site specific asbestos containing materials register (asbestos) in DoE Facility grounds.

SafeWork Australia How to Safely Remove Asbestos: Code of Practice states that: *Removal of asbestos from contaminated soil will require a Class A licensed asbestos removalist for any friable asbestos to be removed, or a Class B licensed asbestos removalist if more than 10 m² of non-friable asbestos is to be removed. A person who does not have a licence can remove 10 m² or less of non-friable asbestos. Where there is uncertainty as to whether the amount of non-friable asbestos is more or less than 10 m², a Class A or Class B licensed asbestos removalist should be engaged.*

Taking the above into consideration, it is DoE policy to engage a Class A licensed asbestos removalist contractor as best practice for all occurrences of asbestos contaminated soil. The contractor will be engaged by an agent of DoE from a panel approved by DoE and all engagements will be to WorkCover NSW guidelines and follow the advice of the competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel to conduct a risk assessment and determine the most appropriate control measures and remediation strategies.

As current legislation permits the removal of less than 10 m^2 of bonded (non-friable) asbestos containing material (ACMs), trained DoE staff are able to safely remove fragments of ACM. Should DoE Facility staff observe fragments of asbestos cement sheeting on DoE Facility grounds or students in possession of such material, then these materials must be collected immediately and placed into sealed plastic asbestos bags (refer to Section 7.4 for specifications of asbestos bags).

The DoE hygienist panel will provide training for DoE staff, Public Works staff, FMC, Sub-contractors (to FMC) and others as needed to ensure samples can be appropriately collected and tested to provide expeditious response to issues as they arise. Please refer to Section 2.3.7 and 3.11.

Alternatively, DoE or its agent is to proceed with the site collection of surface fragments of asbestos cement as soon as practicable by an appropriate contractor. This can often be on the same day as discovery of the material and/or its confirmation as being asbestos containing material (ACM). WorkCover NSW should be contacted on hotline number 1800 672 718 to waive the five (5) day notification period to ensure works are immediately completed.

DoE only undertakes disturbance investigations in buildings and grounds in preparation for construction projects. In these circumstances, such investigations within the building fabric and grounds should be only undertaken using the DoE hygienist panel in the absence of school students and staff. As the primary control method of ACM on DoE sites is by encapsulation (where the ACM is present as a surface layer in the building fabric or grounds) only the surface ACM is sampled, tested or remediated. The taking of soil samples for assessment of sites contaminated with fibro (asbestos cement) fragments is not required, unless disturbance works are planned. Any excavation or planned removal of soil containing ACM must be undertaken with advice provided by a member of the DoE hygienist panel.

5.2 General measures when ACM has been confirmed

Where asbestos containing materials (ACM) have been confirmed, appropriate measures should be undertaken to control the risks.

5.2.1 Surface materials

All visible surface materials should be removed as soon as possible. Asbestos containing materials (ACMs) found on the surface are likely to be in the form of fragments of asbestos cement sheeting. Should DoE Facility staff observe fragments of asbestos cement sheeting on DoE Facility grounds or students in possession of such material, then these materials must be collected immediately and placed into sealed plastic asbestos bags (refer to Section 7.4 for specifications of asbestos bags). The risk to health from handling

asbestos cement fragments is considered negligible as the asbestos fibres are bound into the cement matrix and are unlikely to release respirable fibres unless mechanically abraded.

Alternatively, an approved asbestos removal contractor should be engaged by DoE or its agent to perform the clean-up operation (this may be necessary where high-level contamination is evident) as soon as practicable and where friable asbestos removal is required.

5.2.2 ACM in fill materials

When surface asbestos containing materials have been found and fill materials have been used and are evident at the surface, appropriate measures should be undertaken to remove or encapsulate any potential asbestos containing materials, as further asbestos containing materials may possibly be contained within the fill below the surface. Soil erosion may cause these materials to reach the surface. A competent person / asbestos assessor (hygienist) should be selected from the DoE hygienist panel and engaged directly by the DoE or by an agent of DoE to assess the risks posed and to recommend appropriate management techniques to be employed.

Management techniques are required to control the risk of exposure to asbestos fibres. Depending on the situations, one or more of the following strategies may be employed:

- removal of all visible asbestos containing materials at the surface
- enclosure of area to restrict access to students and visitors
- containment of fill materials by means of applying a demarcation barrier such as geo-fabric and/or by applying a surface layer such as mulch or topsoil above contaminated soils
- re-turfing of exposed soils
- encapsulation of fill materials by means of applying a permanent covering such as concrete
- removal of asbestos contaminated soils.

Alternate strategies will be considered by DoE and/or its agent in conjunction with a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel.

5.2.3 Re-inspections

In order to monitor the effectiveness of onsite management it is essential that the treated area be regularly inspected. A visual inspection of asbestos remedial measures should be carried out to ensure that they are being maintained adequately. Reinspections will be the responsibility of the Principal or site manager. Such inspections should occur on the following occasions:

- at three[4] monthly intervals (eg a walk over of remediated areas to ensure that applications of mulch, turf, etc have been maintained)
- as part of routine building inspections
- after a period of prolonged heavy rain (eg a walkover of remediated areas to ensure that applications of mulch, turf, etc have not been disturbed by heavy rain)
- whenever damage or disturbance has been reported (eg a walkover of remediated areas to ensure that applications of mulch, turf, etc have not been disturbed by events such as vehicle trafficking).

Should areas of exposed soil or geo-fabric be identified where previous containment has occurred or where encapsulating measures appear to be damaged or are no longer effective, then these areas should be recovered immediately. Some remedial measures, such as added surface layers of mulch and topsoils, will require ongoing maintenance to ensure that a sufficient barrier layer is in place.

5.3 Actions to be taken

5.3.1 New instances of ACM

- Where new instances of asbestos containing materials are suspected of being present in DoE Facility grounds, the DoE AMU must be contacted upon discovery of suspected ACMs to determine actions to be taken.

4 Some sites, for example those with no new occurrence of asbestos in the past 5 years, are inspected at 12-monthly intervals and/or as points indicated above.

- Access to the area should be restricted to all students until it is proven that no ACMs are present or until ACMs are removed or appropriately encapsulated (asbestos containment area).
- Samples of suspected materials may be taken by a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel and submitted to a NATA accredited laboratory for analysis of asbestos fibre content.
- In the absence of analytical results, suspected materials must be assumed to be asbestos containing. Where site investigations (other than that indicated below) are undertaken only the surface level is inspected and determination of remediation requirements should be based upon the inspection and discussion with DoE.
- Please also refer to Section 9.

5.3.2 Encapsulation of soil on-site

- Where a requirement exists as a result of design factors for soil to be disturbed and/ or managed and removed for development or maintenance, a preliminary investigation is to be instigated by DoE or its agent into possible contaminants within the area of intended soil disturbance / removal, utilising existing documentation as a starting point.
- In addition to the review of available site documentation, a preliminary investigation may include a site visit, and in the case of bulk excavation works, a possible below-ground investigation and sampling to the depth required by the bulk excavation works.
- A consultant selected from the DoE hygienist panel may assist in this review of documentation, preliminary investigation and below-ground investigation.
- The above tasks should be undertaken as soon as possible, preferably before any works contract is issued and before subsurface work is commenced.
- Design / development changes may be preferable to avoid soil disturbance, and to mitigate the need for spoil management procedures, additional testing, third party review and unbudgeted waste disposal costs.
- A preferred option for consideration is encapsulation of soil on-site. To encapsulate soil contaminated with ACM in an area on-site, it is recommended to:
- Ensure that the area is isolated in the interim and any potential dust is managed
  - Ensure that a document such as a remedial action plan (RAP) and including an asbestos management plan (AMP) be prepared by a consultant selected from the DoE hygienist panel, detailing the encapsulation method (including comments on suitability for intended land-use, eg car park) and environmental management requirements during implementation (eg dust and noise management). If the selected hygienist (asbestos assessor) requires additional soil expertise, then they are to involve a suitably experienced contaminated land management consultant, preferably from within their own company and known to DoE, with experience gained from DoE sites.
  - Ensure that a permit is received from DoE to commence works.
  - The AMP will determine if the asbestos is friable / non-friable and the extent of impact (lateral and vertical) through selected sampling and analysis.
  - That document is to be submitted along with a permit application to WorkCover NSW by the selected asbestos removal contractor (as the work involves working with asbestos).
  - Notification by DoE to the EPA is to be considered depending on the level of impact.
  - DoE to verify compliance under WH&S Act and Protection of the Environment Operations (POEO) Act.
  - Notification by DoE is to be made to the respective council to allow inclusion on the site s149 certificate (under the NSW EP&A Act, 1997).
  - In addition, the area to be encapsulated is to be documented / surveyed in such a manner to accurately determine location and depth at a later date.

- Upon receipt of both above mentioned permits from DoE and WorkCover NSW, works are to commence, along with asbestos air monitoring by a hygienist (asbestos assessor) selected from the DoE hygienist panel during the encapsulation process.
- Upon completion an inspection is undertaken by the hygienist (asbestos assessor) to confirm activities as detailed within the RAP/AMP have been implemented and providing comment that the land has been remediated / encapsulated to allow for intended use, and a site-management plan is prepared to manage any future subsurface activities that may be required for the site (eg excavation of a trench to install new electricity cables or stormwater).

5.3.3 Possible disturbance or bulk excavation of large volumes of soil

- Where a requirement exists as a result of design factors for large volumes of soil to be disturbed and / or managed and removed as part of a development or maintenance, a preliminary investigation is to be instigated by DoE or its agent into possible contaminants within the area of intended soil disturbance / removal, utilising existing documentation as a starting point.
- As with any asbestos disturbance works, whenever the hygienist assesses it likely asbestos fibres will be released at quantity greater than the detection limit of air monitoring (0.01f/ml) then these works must occur in the absence of staff and students, i.e. outside of school hours, weekends and vacations.
- A preliminary investigation may also include a site visit, and potentially, in the case of bulk excavation works, a below ground investigation and sampling to the depth required by the bulk excavation works.
- A consultant selected from the DoE hygienist panel may assist in this review of documentation, preliminary investigation and below ground investigation.
- The above tasks should be undertaken as soon as possible, preferably before any works contract is issued and before subsurface works commence.
- Consideration should be given to re-design of any works to avoid soil disturbance or to incorporate encapsulation as an option (see 5.3.2 above).
- If works are to go ahead (ie the design cannot be altered and/or encapsulation is not an option) ensure that a document such as a remedial action plan (RAP), including an asbestos management plan (AMP) or asbestos removal control plan (ARCP), be prepared by a consultant selected from the DoE hygienist panel, providing recommendations for the excavation of soil or its disturbance so as to provide for environmental management requirements during implementation (eg dust and noise management). If the selected hygienist (asbestos assessor) requires additional soil expertise, then they are to involve a suitably experienced contaminated land management consultant, preferably from within their own company and known to DoE, with experience gained from DoE sites.
- Consideration is also to be given to the preparation of unexpected finds protocols prior to works commencing by a member of the DoE hygienist panel to assist the contractor undertaking bulk excavation works lessen the risk of airborne asbestos release following the completion of the planned excavation or disturbance works.
- All procedures are to be submitted to DoE and its agent prior to all works commencing.

5.3.4 Limited excavation or disturbance of soils

- Where building works requiring limited excavation or disturbance of soils (including footings) is to occur, an inspection should be undertaken prior to the commencement of works. This may include a site visit with a consultant selected from the DoE hygienist panel, review of available documentation by the selected consultant and potentially, in the case of excavation works, a below ground investigation by the selected consultant to the depth required by the excavation works.
- It may be a result that it is more prudent to alter the design of the intended works to avoid soil disturbance or to incorporate

encapsulation as an option (see 5.3.2 above) than to continue and require spoil management procedures, and additional testing and review.

- Ensure that a document such as a remedial action plan (RAP), including an asbestos management plan (AMP) or asbestos removal control plan (ARCP), be prepared by a consultant selected from the DoE hygienist panel, providing recommendations for the excavation of soil or its disturbance so as to provide for environmental management requirements during implementation (eg dust and noise management). If the selected hygienist (asbestos assessor) requires additional soil expertise, then they are to involve a suitably experienced contaminated land management consultant, preferably from within their own company and known to DoE, with experience gained from DoE sites.
- Consideration is also to be given to the preparation of unexpected finds protocols prior to works commencing by a member of the DoE hygienist panel, to assist the contractor undertaking excavation or disturbance works, following completion of the planned excavation or disturbance works.
- All procedures are to be submitted to DoE and its agent prior to all works commencing.

5.3.5 Importation of material

- No fill should be imported without being tested or certification indicating it is suitable for use on a school facility in accordance with NSW EPA waste and contaminated land guidelines. Generally it is preferable that any imported fill is virgin excavated natural materials (VENM) or excavated natural materials (ENM) as defined in the waste guidelines.
- If fill is to be imported onto a school site, the principal should contact their local Regional Asset Management Unit to obtain advice on suitable sources of supply and any documentation required. DoE Memorandum DN/06/00362 offers Asset Management Directorate advice on the use of imported fill on school sites and is included in Appendix E of this document.

6. Asbestos in buildings

6.1 General

All DoE Facilities were surveyed for FMCs from October 2007 – May 2008 after which an initial asbestos register was issued to all schools.

All DoE asbestos registers and this AMP are available to the community generally via the internet at www.dec.nsw.gov.au/about-us/supplying-to-us/asbestos-register, with the most up-to-date information available internally on the DoE Asset Management System (AMS).

The management of in-situ asbestos is important to ensure asbestos containing materials and other non-friable (formerly known as bonded) asbestos products are not damaged or allowed to deteriorate to such an extent that DoE Facility staff, students, contractors or visitors are unnecessarily exposed to airborne asbestos fibres. Asbestos that has been incorporated into a stable matrix (ie non-friable) and that remains in a good condition with no production of airborne dust presents a negligible health risk.

For procedures to follow when asbestos and asbestos containing materials have been found or are suspected to be present in buildings, please follow Section 9 Asbestos Incident Procedures, which details procedures to be followed for a series of asbestos scenarios. Section 9.3 refers to incidences of asbestos in DoE Facility buildings.

The requirements of the contractor site induction and permit to work system (refer Section 3.8.3) will aid in the management of in-situ asbestos containing materials.

No work is to commence on 'assumed' asbestos. Testing of the material is to occur and results known prior to commencing works. As per Section 9, this is to be organised by DoE and/or its agent and the use of the DoE hygienist panel.

SafeWork Australia How to Safely Remove Asbestos: Code of Practice states that: *Removal of asbestos will require a Class A licensed asbestos removalist for any friable asbestos to be removed, and a Class A or a Class B licensed asbestos removalist if more than 10 m² of non-friable asbestos is to be removed. A person who does not have a licence can remove 10 m² or less of non-friable asbestos. Where there is uncertainty as to whether the amount of non-friable asbestos is more or less than 10 m², a Class A or Class B licensed asbestos removalist should be engaged.*

Taking the above into consideration, it is DoE policy to engage the appropriate contractor for each project requiring the removal of asbestos. The contractor will be engaged by an agent of DoE from a panel approved by DoE and all engagements will be to WorkCover NSW guidelines and follow the advice of the competent person / asbestos assessor (hygienist) engaged from the DoE hygienist panel by an agent of DoE.

The competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel is to conduct a risk assessment to determine the most appropriate control measures and remediation strategies prior to the selection of the class of asbestos removal contractor and asbestos removal works getting underway.

6.2 Actions to be implemented

An up-to-date hazardous materials on-site asbestos register is maintained by the DoE Facility. When required, the DoE and/or its agent will conduct a visual inspection of all asbestos containing materials as part of the condition assessment process to record the status and condition of these materials. Changes in condition will be recorded in the on-site asbestos register, which will be made available to site managers as electronic files.

A condition assessment may be conducted, for example by a Facility Manager. The Facility Manager is to inspect for building materials that are damaged or could be easily disturbed. It should be mentioned that this is not a survey, but simply an inspection of the fabric of the building looking for damage. If damage is found, and the material is known to contain asbestos or the Facility Manager is not sure, then the Facility Manager is to contact their AMU.

Please note that the existing register is a non-destructive survey and is to be used as a guide only.

A site specific management plan will be prepared by DoE and/or its agent to identify specific actions to be taken and those responsible.

The visual inspections shall provide management recommendations for asbestos containing materials. As previously mentioned in Section 3.4, a priority rating system for control recommendations provides three ratings for managing asbestos. These are as follows:

High risk: restrict access and remove

As a guide, the material conforms to one, or more, of the following:

- Friable or poorly bonded to substrate, located in accessible areas.
- Asbestos subjected to recurrent abrasion or disturbance.
- Severely water damaged or deterioration likely.
- Friable asbestos material located in air-conditioning ducting.
- Asbestos debris and stored asbestos in reasonably accessible areas.

Medium risk: enclose, encapsulate or seal, re-inspect periodically

As a guide the material conforms to one, or more, of the following:

- Damaged material.
- In reasonably accessible area.
- Friable material or poorly bonded substrate, with bonding achievable.
- Possibility of disturbance through contact.
- Possibility of deterioration caused by weathering.

Low risk: no remedial action, remove during refurbishment or maintenance, reinspect periodically

As a guide, the material conforms to one, or more, of the following:

- Firmly bonded to substrate and readily visible for inspection.
- Asbestos debris or stored material in rarely accessed areas.
- Further disturbance or damage unlikely other than during maintenance or service.
- Readily visible for further assessment.
- Stable and damage unlikely.

6.2.1 Re-inspections

Re-inspections of ACM remaining on-site are to be conducted by a competent person / asbestos assessor (hygienist) to determine the condition of the material. Such re-inspections will comprise a visual assessment of the condition of the materials to determine whether the material remains in a satisfactory condition, or if deterioration has occurred since the previous inspection. Such re-inspections will determine if any remedial action, such as encapsulation, isolation or removal of the asbestos containing materials, is required. Re-inspections of asbestos containing materials will be performed in accordance with the SafeWork Australia: How to Manage and Control Asbestos in the Workplace: Code of Practice 2011 (however as per DoE policy re-inspections should be undertaken every 12 months where a risk assessment indicates the need for re-inspection). DoE will carry out this inspection as part of the normal annual condition assessment of the school and incorporate other details held centrally, eg demountable buildings on-site at any given time.

Normally, re-sampling of materials / products would not be required during re-inspections. If, however, previously unidentified or undocumented asbestos, or materials / products suspected of containing asbestos, are encountered during the re-inspection process, sampling and analysis may need to be performed by a hygienist (asbestos assessor) selected from the DoE hygienist panel. If so, once the results of sampling have been received by DoE, the asbestos register will be updated and re-issued by a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel. Please refer to Appendix J.

6.2.2 Damage to ACM

If accidental damage occurs to any asbestos containing material (ACM) that is likely to produce fibres during the course of day-to-day DoE Facility activities, DoE staff shall organise for all students and staff to immediately vacate the room / area. The Facility Manager shall be immediately informed, who shall contact the DoE Asset Management Unit to seek advice.

A course of remedial action will be determined, including any clean-up. The Incident Response plan should be followed in

these situations (refer Section 9). Section 9.3.4 sets out appropriate responses to the discovery of damaged asbestos containing materials.

Should asbestos containing materials become fire damaged, the DoE and/or its agent shall utilise the DoE hygienist panel and arrange for inspections by a competent person / asbestos assessor (hygienist) and subsequent removal of materials by appropriate approved asbestos removal contractors. Any fire damaged buildings must be barricaded off. Section 9.3.9 sets out appropriate responses to the event of asbestos containing materials becoming fire damaged.

Asbestos containing materials that have become fire damaged are classified as friable asbestos by WorkCover NSW, and as such will require removal by a suitably Class A licensed contractor.

Asbestos air monitoring is to be undertaken by a company selected from the DoE hygienist panel who is NATA accredited for asbestos air monitoring and is to be conducted in instances where ACMs have become damaged or where assistance is required in determining airborne exposure and risk to building occupants.

7. Asbestos removal

7.1 General

A detailed and site specific work scope and technical specification will be developed by an agent of DoE, such as DPWS, prior to the removal of ACMs from any DoE Facility buildings and grounds. The removal of ACMs shall be performed by a licensed asbestos removal contractor selected from the DoE hygienist panel (ie the appropriate licence for the removal of asbestos issued by WorkCover NSW).

Please note, any work that involves disturbing asbestos must be administered by DPWS.

SafeWork Australia How to Safely Remove Asbestos: Code of Practice states that: *Removal of asbestos will require a Class A licensed asbestos removalist for any friable asbestos to be removed, and a Class A or a Class B licensed asbestos removalist if more than 10 m² of non-friable asbestos is to be removed. A person who does not have a licence can remove 10 m² or less of non-friable asbestos. Where there is uncertainty as to whether the amount of non-friable asbestos is more or less than 10 m², a Class A or Class B licensed asbestos removalist should be engaged.*

Taking the above into consideration, it is DoE policy to engage a Class A licensed contractor as best practice for all occurrences of asbestos contaminated soil. The contractor will be engaged by an agent of DoE from a panel approved by DoE and all engagements will be according to SafeWork Australia guidelines and follow the advice of the hygienist / competent (asbestos assessor) person engaged from the DoE hygienist panel.

7.2 Asbestos in grounds general removal procedures

All work carried out that involves disturbance of ACMs (including removal) must be administered by DPWS.

All removals are to be undertaken according to:

- NSW Work Health and Safety Act 2011
- NSW Work Health and Safety Regulation 2011
- How to Manage and Control Asbestos in the Workplace: Code of Practice 2011
- How to Safely Remove Asbestos: Code of Practice 2011
- Other relevant documentation issued from time-to-time by WorkCover NSW, EPA or SafeWork Australia.
- NSW DoEC (EPA) Waste Classification Guidelines, Part 1: Waste Classification Guidelines 2009.

Follow the advice of the hygienist / competent (asbestos assessor) person engaged from the DoE hygienist panel to conduct a risk assessment and determine the most appropriate control measures and remediation strategies prior to asbestos removal works getting underway.

Several examples of common circumstances involving soil and ACM have been determined. For each of those circumstances, the following procedures should be followed:

7.2.1 Sparrow-picking of ACM fragments

- Following the determination of the area affected by fragments of ACMs by a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel and approval to commence works from DoE, a permit will be issued to DPWS to engage a friable licensed asbestos contractor.
- It is likely that fragments of ACM are in the form of asbestos cement sheeting (ACS), bituminous membrane or vinyl tile.
- The asbestos removal contractor approved by DoE is engaged to sequentially and systematically travel across each area and remove all instances of fragments of potential ACM from exposed ground surfaces.
- All works are to require asbestos air monitoring provided by a hygienist selected from the DoE hygienist panel.
- All works are to require a clearance inspection undertaken by a hygienist selected from the DoE hygienist panel following the completion of the asbestos removal works.
- All documentation, including licences, air monitoring, clearance inspections and tipping dockets, is to be provided to DoE.

- All records are to be updated. Please refer to Appendix G.

7.2.2 Encapsulation of soil containing ACM on-site

- Ensure that the area is isolated in the interim and any potential dust is managed.
- Ensure that a document such as a remedial action plan (RAP), including a site specific asbestos management plan (SSAMP) is prepared or updated by a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel, detailing the encapsulation method (including comments on suitability for intended land use, eg car park) and environmental management requirements during implementation (eg, dust and noise management). If the selected hygienist requires additional soil expertise, then they are to involve a suitably experienced contaminated land management consultant, preferably from within their own company and known to DoE, with experience gained from DoE sites.
- Ensure that a permit is received from DoE to commence works.
- The AMP will determine if the asbestos is friable / non-friable and the extent of impact (lateral and vertical) through selected sampling and analysis.
- That document is to be submitted to WorkCover NSW, along with a permit application to WorkCover NSW by the selected asbestos removal contractor.
- DoE to obtain written approval from EPA before work permit is granted by DoE.
- DoE to verify compliance under WH&S Act and POEO Act.
- Notification by DoE is to be made to the respective council to allow inclusion on the site s149 certificate (under the NSW EP&A Act, 1997).
- In addition, the area to be encapsulated is to be documented / surveyed in such a manner to accurately determine location and depth at a later date.
- Upon receipt of both above mentioned permits from DoE and WorkCover NSW, works are to commence, along with asbestos air monitoring by a hygienist selected from the DoE hygienist panel during the encapsulation process.
- Upon completion an inspection is undertaken by the hygienist consultant to confirm activities as detailed within the RAP/AMP have been implemented and providing comment that the land has been remediated / encapsulated to allow for intended use and a site management plan is prepared to manage any future subsurface activities that may be required for the site (eg excavation of a trench to install new electricity cables or stormwater).

7.2.3 Excavation of soil containing ACM from site

The preferred method is encapsulation of soils on-site (hence its repeat inclusion above), however if excavation and removal of soils from site becomes necessary, then the following is to be implemented as a general guide:

- Ensure that the area is isolated in the interim and any potential dust is managed.
- Ensure that a document such as a remedial action plan (RAP) including an asbestos removal control plan (ARCP) is prepared by a competent person / asbestos assessor (hygienist) selected from the DoE hygienist panel providing recommendations for the excavation of soil so as to provide for environmental-management requirements during implementation (eg dust and noise management). If the selected hygienist requires additional soil expertise, then they are to involve a suitably experienced contaminated land management consultant, preferably from within their own company and known to DoE, with experience gained from DoE sites.
- Ensure that a permit is received from DoE to commence works.
- The ARCP will determine if the asbestos is friable / non-friable.
- That document is to be submitted to WorkCover NSW, along with a notification to WorkCover NSW by the selected asbestos removal contractor.
- Upon receipt of both above mentioned permits from DoE and WorkCover NSW, works are to commence, along with

asbestos air monitoring by a hygienist selected from the DoE hygienist panel during the encapsulation process.

- Upon completion of soil removal (that portion contaminated with ACM), an inspection is undertaken by the hygienist consultant to confirm activities as detailed within the RAP/ARCP have been implemented and providing comment that those works have been completed in respect to asbestos contamination to a satisfactory level to allow for the next stage of works to commence. The site management plan (inclusive of a possible unexpected finds protocol) continues to be followed to manage any future occurrence of subsurface ACM that may be exposed during the excavation of soils on-site.

Following the investigation, the material should be classified in accordance with NSW EPA Waste Classification Guidelines, Part 1: Waste Classification Guidelines (2009), and taken to an approved landfill site that is licensed to receive waste relevant to its classification.

7.3 Asbestos in buildings general removal procedures

All work carried out that involves disturbance of ACMs (including removal) must be supervised by an agent of DoE, such as DPWS.

All removals are to be undertaken according to:

- NSW Work Health and Safety Act 2011
- NSW Work Health and Safety Regulation 2011
- How to Manage and Control Asbestos in the Workplace: Code of Practice 2011
- How to Safely Remove Asbestos: Code of Practice 2011
- Other relevant documentation issued from time-to-time by WorkCover NSW or SafeWork Australia

Follow the advice of the competent person / asbestos assessor (hygienist) engaged from the DoE hygienist panel to conduct a risk assessment and determine the most appropriate control measures and remediation strategies prior to the selection of the class of asbestos removal contractor and asbestos removal works getting underway.

Several examples of common circumstances involving the removal of non-friable (bonded) ACM in buildings have been determined and for the majority of instances a Class B contractor may be utilised, unless a risk assessment determines the need for a Class A removalist (except for asbestos containing vermiculite that is friable, and will always require a Class A removalist).

For each of those circumstances, the following steps or bullet-points (excluding major removal works or working at heights) should be followed.

As mentioned previously, in all instances, the above mentioned documents are to be followed and implemented.

Please note however that the following steps or bullet-points are general in nature, and are not to be considered to alter or modify guidelines as set down in the SafeWork Australia Code of Practice titled: How to Manage and Control Asbestos in the Workplace: Code of Practice 2011, or the requirements laid down under all relevant NSW Legislation.

7.3.1 Asbestos containing electrical mounting boards

- If possible the work should be done out of hours to minimise the risk of personnel coming into contact with asbestos removal works
- The work area is to be barricaded off with barrier tape and asbestos warning signs for a minimum distance of 10 metres around the work area
- Select PPE – all persons in the asbestos removal area should wear disposable coveralls and a P2 respirator as minimum protection. PPE such as gloves and safety footwear is also recommended. A risk assessment is recommended to ensure adequate PPE is provided
- Prior to commencement a qualified electrician shall isolate any electrical supply and disconnect any electrical fittings that will be affected by the works.
- Every effort shall be made to minimise the generation of dust:

  - plastic drop sheets of 200 µm thickness are to be placed in areas where the electrical mounting boards will be removed; and
  - components should not be removed where possible and disposed of as asbestos waste. Where a component is to be reused it is to be adequately Decontaminated before it is reused.
- Asbestos containing electrical mounting boards should be sealed in 200 µm plastic, or placed in approved asbestos waste bags and sealed for disposal off-site in accordance with requirements of the regulatory authority. Disposal receipts must be returned to the DoE AMU to verify correct disposal of asbestos waste
- Surfaces adjacent to the electrical mounting board removal shall be vacuumed using an approved asbestos vacuum cleaner fitted with a Class H HEPA filter as per Australian Standard AS/NZS 60335.2.69 or its equivalent
- All potentially contaminated PPE and tools should either be appropriately Decontaminated or disposed of as asbestos waste in approved asbestos waste bags.

7.3.2 Asbestos containing fire doors

  - If a risk assessment by a hygienist selected from the DoE hygienist panel determines that a licensed friable asbestos removal contractor is required, then a licensed-friable asbestos removal contractor must be engaged to complete the removal works.
  - If possible the work should be done out of hours to minimise the risk of personnel coming into contact with asbestos removal works
  - The work area is to be barricaded off with barrier tape and asbestos warning signs for a minimum distance of 10 metres around the work area
  - Select PPE – all persons in the asbestos removal area should wear disposable coveralls and a P2 respirator as minimum protection. PPE such as gloves and safety footwear is also recommended. A risk assessment is recommended to ensure adequate PPE is provided
- Every effort shall be made to minimise the generation of dust:
  - plastic drop sheets of 200 µm thickness are to be placed in areas where the asbestos fire doors will be removed
  - doors should be removed as a whole where possible and hinges removed from the door frame to avoid any possible disturbance of core material
  - any damaged areas exposing core materials should be sealed prior to removal
  - door handles and locks should not be removed where possible and disposed of as asbestos waste. Where door hardware is to be reused, cavities should be sealed and hardware adequately Decontaminated before it is reused.
- Asbestos containing fire doors should be wrapped in 200 µm plastic and sealed with duct tape. Disposal receipts must be returned to the DoE AMU to verify correct disposal of asbestos waste
- Surfaces adjacent to the fire door removal shall be vacuumed using an approved asbestos vacuum cleaner fitted with a Class H HEPA filter as per Australian Standard AS/NZS 60335.2.69 or its equivalent
- All potentially contaminated PPE and tools should either be appropriately Decontaminated or disposed of as asbestos waste in approved asbestos waste bags.

7.3.3 Asbestos containing mastic

Reference is to made to Window Asbestos Mastic Procedure – NSW Schools Demountable February 2015.

- If possible the work should be done out of hours to minimise the risk of personnel coming into contact with asbestos removal works
- The work area is to be barricaded off with barrier tape and asbestos warning signs for a minimum distance of 10 metres around the work area
- Select PPE – all persons in the asbestos removal area should wear disposable coveralls and a P2 respirator as minimum

protection. PPE such as gloves and safety footwear is also recommended. A risk assessment is recommended to ensure adequate PPE is provided;

- If mastic is found to be present on the glass pane, the glass is to be placed within 200 µm thick polythene bags and sealed for disposal as asbestos waste.

If the glass is found to be free of mastic or if the mastic can be removed cleanly then the glass pane can be disposed of or recycled as normal.

- An airless spray should be used to wet the asbestos mastic with a mix of water and wetting agent such as detergent, prior to attempting its removal.
- The remaining mastic within the frame is to be scraped out with the use of hand tools such as scrapers, screwdrivers or chisels.

Note: No power tools are to be used during any mastic removal.

- Mastic is to be removed as far as reasonably practicable. It is understood that corrugations are present within the aluminium frame, which may prevent the removal of all of the mastic. It is expected that residual mastic will remain within the frame; however every effort should be made to remove as much mastic as reasonably practicable prior to the installation of the new window pane. A note to this effect should be placed on the certificate of works as detailed within Appendix A of the above procedure.
- The frame and tools are to be cleaned with wet rags. If the rags are unable to remove the residual mastic a solvent may be utilised.
- The mastic removed along with rags and any debris and dust are to be placed within 200 µm thick polythene bags for disposal as asbestos waste.
- Any debris or dust generated during the removal process must be removed via wet wiping, and drop sheets are to be rolled onto themselves and placed within the 200 µm thick polythene bags for disposal as asbestos waste.
- Following the installation of the new glass pane the edges of the window frame are to be sealed with non-asbestos mastic to ensure the remaining asbestos mastic is enclosed and cannot be accessed during normal activity in the area.
- At the conclusion of all works the area is to be Decontaminated of all dust and debris with the use of wet wipes to ensure the area is clean and free of dust prior to allowing students and staff to return.

7.3.4 Asbestos cement pipe

- If possible the work should be done out of hours to minimise the risk of personnel coming into contact with asbestos removal works
- The work area is to be barricaded off with barrier tape and asbestos warning signs for a minimum distance of 10 metres around the work area
- Select PPE – all persons in the asbestos removal area should wear disposable coveralls and a P2 respirator as minimum protection. PPE such as gloves and safety footwear is also recommended. A risk assessment is recommended to ensure adequate PPE is provided
- Adequate WorkCover NSW approved working platforms, scaffolds, etc should be arranged for any work at height
- Every effort shall be made to minimise the generation of dust:
  - plastic drop sheets of 200 µm thickness are to be placed below the areas from which the asbestos sheeting is to be removed
  - where applicable, seal off the area from other areas. This includes isolating such items as air inlets, exhaust flues and sealing openings with 200 µm thick plastic.
- Asbestos cement pipes should be sprayed with an encapsulated or wetted prior to removal. High pressure water jets shall not be used
- The asbestos cement pipe should be removed in sections by breaking the collars with hand tools. Where this is not practical and the pipe requires cutting then this shall be done by hand tools

- Power tools should not be used, with the exception of removing fasteners
- Asbestos cement pipe sections should be removed with minimum breakage and should be lowered to the ground or floor and not dropped
- Asbestos cement pipe and/or debris shall be placed in approved asbestos waste bags, or a plastic lined industrial waste bin, and sealed for disposal off-site in accordance with requirements of the regulatory authority. Disposal receipts must be returned to the DoE AMU to verify correct disposal of asbestos waste
- Surfaces behind and adjacent to the asbestos cement pipe removed shall be vacuumed using an approved asbestos vacuum cleaner fitted with a Class H HEPA filter as per Australian Standard AS/NZS 60335.2.69 or its equivalent, and asbestos cement residues removed from screws, nail heads and adjacent surfaces, etc
- Damaged edges of asbestos cement pipes shall be sealed with an approved encapsulating paint
- All contaminated PPE and tools should either be appropriately Decontaminated or disposed of as asbestos waste in the manner described above.

7.3.5 Asbestos containing putty

Reference is to be made to Window Asbestos Putty Procedure – NSW School Buildings February 2015.

- If possible the work should be done out of hours to minimise the risk of personnel coming into contact with asbestos removal works
- The work area is to be barricaded off with barrier tape and asbestos warning signs for a minimum distance of 10 metres around the work area
- Select PPE – all persons in the asbestos removal area should wear disposable coveralls and a P2 respirator as minimum protection. PPE such as gloves and safety footwear is also recommended. A risk assessment is recommended to ensure adequate PPE is provided
- If putty is found to be present on the glass pane, the glass is to be placed within 200 µm thick polythene bags and sealed for disposal as asbestos waste. If the glass is found to be free of putty or if the putty can be removed cleanly then the glass pane can be disposed of or recycled as normal
- An airless spray should be used to wet the asbestos putty with a mix of water and wetting agent, such as detergent, prior to attempting its removal
- The remaining putty within the frame is to be scraped out with the use of hand tools such as scrapers, screwdrivers or chisels.

Note: No power tools are to be used during any putty removal.

- Putty is to be removed as far as reasonably practicable. It is understood that corrugations may be present on the frame, which may prevent the removal of all of the putty. It is expected that residual putty will remain within the frame; however every effort should be made to remove as much putty as reasonably practicable prior to the installation of the new window pane. A note to this effect should be placed on the certificate of works detailed within Appendix A of the above procedure
- The frame and tools are to be cleaned with wet rags. If the rags are unable to remove the residual putty a solvent may be utilised
- The putty removed along with rags and any debris and dust are to be placed within 200 µm thick polythene bags for disposal as asbestos waste
- Any debris or dust generated during the removal process must be removed via wet wiping and drop sheets are to be rolled onto themselves and placed within the 200 µm thick polythene bags for disposal as asbestos waste
- Following the installation of the new glass pane the edges of the window frame are to be sealed with non-asbestos putty to ensure the remaining asbestos putty is enclosed and cannot be accessed during normal activity in the area
- At the conclusion of all works the area is to be Decontaminated of all dust and debris with the use of wet wipes to ensure the area is clean and free of dust prior to allowing students and staff to return.

7.3.6 Asbestos cement sheeting

- If possible the work should be done out of hours to minimise the risk of personnel coming into contact with asbestos removal works
- The work area is to be barricaded off with barrier tape and asbestos warning signs for a minimum distance of 10 metres around the work area
- Select PPE – all persons in the asbestos cement removal area should wear disposable coveralls and a P2 respirator as minimum protection. PPE such as gloves and safety footwear is also recommended. A risk assessment is recommended to ensure adequate PPE is provided
- Prior to commencement a qualified electrician shall isolate any electrical supply and disconnect any electrical fittings that will be affected by the works
- Adequate compliant working platforms, scaffolds, etc should be arranged for any work at height
- Every effort shall be made to minimise the generation of dust:
  - plastic drop sheets of 200 µm thickness are to be placed below the areas from which the asbestos sheeting is to be removed
  - where applicable, seal off the area from other areas. This includes isolating such items as air inlets, exhaust flues and sealing openings with 200 µm thick plastic.
- Asbestos cement sheets should be sprayed or wetted prior to removal of screw or nails. High pressure water jets shall not be used
- Power tools should not be used, with the exception of removing fasteners
- Asbestos cement sheets should be removed with minimum breakage and should be lowered to the ground or floor and not dropped
- Asbestos cement sheet and/or debris shall be placed in approved asbestos waste bags, or a plastic lined industrial waste bin, and sealed for disposal off-site in accordance with requirements of the regulatory authority. Disposal receipts must be returned to the DoE AMU to verify correct disposal of asbestos waste
- Surfaces behind and adjacent to the asbestos cement sheet removed shall be vacuumed using an approved asbestos vacuum cleaner fitted with a Class H HEPA filter as per Australian Standard AS/NZS 60335.2.69 or its equivalent, and asbestos cement residues removed from screws, nail heads and adjacent surfaces, etc
- Damaged edges of asbestos cement sheeting shall be sealed with an approved encapsulating paint
- All contaminated PPE and tools should either be appropriately Decontaminated or disposed of as asbestos waste in the manner described above.

7.3.7 Asbestos containing sprayed vermiculite ceiling coating

- If work is to be carried out in an affected room that will disturb or potentially disturb the vermiculite material, the contractor, maintenance person, DoE Facility Manager, agent of DoE, Facilities Maintenance Contractor or other authorised person must engage a specialist asbestos removal contractor who holds a friable asbestos licence to undertake the work
- The licensed contractor or other competent person should prepare an Asbestos removal Control Plan (ARCP) and Safe Work method statement (SWMS) detailing procedures in accordance with above mentioned documentation. Each document is to be followed in such a manner that ensures personnel working in the affected room and any other person within the school will not be exposed to asbestos fibres. The work area must be completely enclosed and work must be undertaken out of school hours
- Work in progress asbestos air monitoring is to be carried out by a hygienist (asbestos assessor) during any work that disturbs or potentially will disturb the vermiculite material
- On completion of the asbestos work and following an inspection and subsequent certification by a hygienist licensed

(asbestos assessor) of the cleanliness of the work area and the enclosure, all surfaces must be sealed with PVA, applied by means of airless spray equipment. Prior to commencing clearance asbestos monitoring, the hygienist shall inspect all internal surfaces within the asbestos removal area to verify adequate coverage of the PVA (where accessible). PVA adhesive should be mixed with a water based paint or other appropriate colour to ensure that the PVA application is visible where applied

- Clearance asbestos air monitoring is to be carried out after a successful clearance inspection and application of PVA. Results of clearance air monitoring must be comparable to background levels and must be obtained before the area can be released for re-occupation
- All asbestos management measures originally installed must be re-instated at the completion of work and prior to the removal of the work area enclosure, unless all vermiculite material has been removed
- Air monitoring should be in accordance with the WorkCover NSW How to Safely Remove Asbestos: Code of Practice 2011, NSW Work Health and Safety Regulation 2011, National Occupational Health & Safety Commission's Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC:3003 (2005)] and be conducted by an asbestos assessor from the DoE hygienist panel

7.3.8 Asbestos vinyl tiles

- If a risk assessment by a hygienist selected from the DoE hygienist panel determines that a friable licensed asbestos removal contractor is required or if friable backing material is found to be present, then a friable licensed asbestos removal contractor must be engaged to complete the removal works
- If possible the work should be done out of hours to minimise the risk of personnel coming into contact with asbestos removal works
- The work area is to be barricaded off with barrier tape and asbestos warning signs for a minimum distance of 10 metres around the work area
- Select PPE – all persons in the asbestos removal area should wear disposable coveralls and a P2 respirator as minimum protection. PPE such as gloves and safety footwear is also recommended. A risk assessment is recommended to ensure adequate PPE is provided
- Any form of removal such as scraping, chipping or the use of a wide bladed tool may be used although every effort shall be made to minimise the generation of dust
- Where a heat source is used to soften adhesive beneath the vinyl tile, such equipment should not be used to burn the tile due to possible toxic substance release and the fire hazard
- Asbestos containing vinyl tiles and/or debris shall be place in approved asbestos waste bags or on plastic lined industrial waste bin, and sealed for disposal off-site in accordance with requirements of the regulatory authority. Disposal receipts must be returned to the DoE AMU to verify correct disposal of asbestos wastet
- All floor and adjacent surfaces shall be vacuumed after removal using an approved asbestos vacuum cleaner fitted with a Class H HEPA filter as per Australian Standard AS/NZS 60335.2.69 or its equivalent
- Wet wiping of adjacent surfaces is also recommended
- All potentially contaminated PPE and tools should either be appropriately Decontaminated or disposed of as asbestos waste in approved asbestos waste bags.

7.4 Asbestos waste management

7.4.1 ACM – general

Normally, disposal of ACMs / products will be the responsibility of the contractor engaged to perform any asbestos abatement works. The disposal of any asbestos containing materials / products off site will be in accordance with the applicable SafeWork Australia Code of Practice, local authority and legislative requirements.

- Asbestos waste such as pipe lagging, limpet or fragments of asbestos cement sheeting shall be double bagged prior to its removal from site, using 200 µm thick polyethylene bags. Asbestos waste shall be bagged once at the workface and a second time away from the workface but prior to leaving the removal area enclosure. It is recommended that a maximum bag size of 1200 millimetres (length) x 900 millimetres (width) be used. Bags should be filled to no more than 50% capacity, and contents should be wet before sealing. Consistent with good manual handling practice, bags should not exceed 16 kilograms in weight.

As such:

- All ACMs removed or ACM must be either wrapped and sealed within 200 µm thick polythene or placed within a 200 µm polythene bag which is no longer than 1200 mm and no wider than 900mm wide
- Bags containing waste are to be sealed with duct tape via the goose neck method and placed and sealed within another 200 µm polythene bag for transport to an appropriate waste disposal facility licensed to accept asbestos waste
- Alternatively, other approved containers may be used. In the case of non-friable materials such as large sheets of asbestos cement, such materials can be placed into a plastic lined industrial waste bin or like container
- Polythene sheeting parcels are to be wrapped additionally within 200 µm thick polythene sheeting for transport to an appropriate waste disposal facility licensed to accept asbestos waste.

Each bag or container shall be labelled on its outermost surface, with the following warning statement:

Caution – asbestos waste
Avoid creating dust
Serious inhalation health hazard

Transport and final disposal of asbestos waste material shall be carried out in a manner that will prevent the liberation of asbestos dust to the atmosphere. All asbestos waste material shall be buried at an approved landfill site and in a manner approved by the local and state authorities. The DoE, prior to payment of invoices, must receive copies of waste disposal receipts, as provided by the approved landfills.

7.4.2 Soil contaminated with ACM

A waste classification investigation is required to be undertaken on all soil determined as being for off-site disposal, including asbestos impacted fill.

The investigation involves the collection of soil samples for the purpose of determining the waste classification of the fill material prior to its removal and disposal. The samples may need to be analysed for other compounds, such as hydrocarbons, metals and pesticides, depending on the site history.

Following the investigation, the material should be classified in accordance with NSW DoE Waste Classification Guidelines, Part 1: Waste Classification Guidelines (2009), and taken to an approved landfill site that is licensed to receive waste relevant to its classification.

7.5 Project supervision

Prior to the removal of any asbestos, a competent person / asbestos assessor (hygienist) obtained from the DoE hygienist panel, with experience in asbestos abatement works, shall be engaged by DoE or its agent to work independently of the DoE-approved asbestos removal contractor to provide asbestos air monitoring and clearance inspection services. Depending on the nature of the work, a competent person / asbestos assessor (hygienist) from the DoE hygienist panel may also be engaged to oversee the removal of asbestos products, staying on-site for the majority of the duration of asbestos-removal works and providing an on-site field laboratory to facilitate a fast turn-around of asbestos air monitoring results to DoE or its agent. The competent person / asbestos assessor (hygienist) will work with the contractor and DoE or its agent and will be responsible for ensuring the asbestos removal contractor achieves a satisfactory level of workmanship, and complies fully with statutory requirements and the requirements of the technical specification.

Commensurate with the above requirements, the specific duties of the supervising occupational hygienist may include:

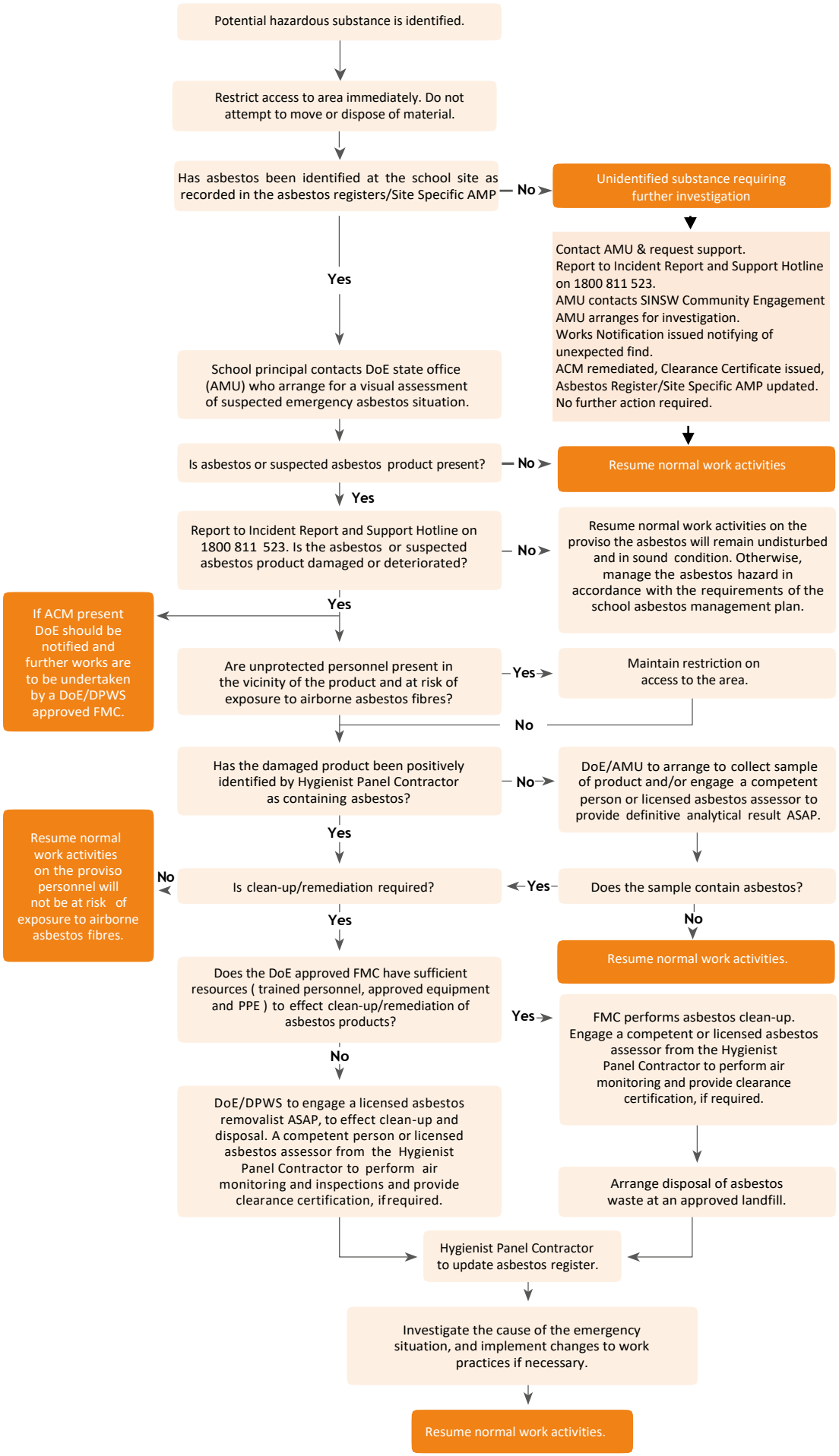
- Inspection of the integrity of the containment prior to commencement of asbestos removal works
- Inspection of the asbestos removalist's equipment, including Decontamination and negative air units, water filtration systems, vacuum equipment, personal protective equipment (PPE) etc
- Assessment of the asbestos removalist's work methods, use and maintenance of PPE, and Decontamination procedures
- Clearance visual inspection of the work area after the removal of asbestos to ensure the asbestos has been removed to a satisfactory standard
- Asbestos air monitoring in accordance with the SafeWork Australia Membrane Filter Method, during asbestos removal works and as clearance air monitoring after the removal of asbestos, but before dismantling of the containment.

8. Incident response and emergencies

An emergency situation is most likely to entail a scenario where asbestos containing materials (ACMs) / products present on-site have been inadvertently disturbed through actions of DoE Facility staff, pupils, maintenance personnel, contractors, out-of-hours vandalism and criminal entry, visitors, or damage due to severe weather conditions (eg hail damage to external asbestos products), or become exposed in DoE Facility grounds through surface erosion or illegal dumping of waste. Where such events have occurred, the DoE's School Security Unit on 1300 880 021 and DoE Asset Management Unit on 132 779 should be notified immediately.

Emergency Response Procedures shall be initiated and implemented in accordance with the flow chart diagram in Figure 8.1. A range of scenarios and appropriate responses are presented in Section 9 Asbestos Incident Procedures and should be followed when suspected ACMs have been found or when an emergency incident has occurred.

Figure 8.1: Emergency response flow chart



9. Asbestos incident procedures

9.1 Introduction

This asbestos incident procedures section aims to set out the steps to be taken for asbestos management when suspected ACMs have been found in DoE Facility grounds and buildings / facilities. While every effort has been made to include all relevant content, each page is to be used as a guide only, and is to be read in conjunction with the remainder of this AMP and relevant applicable guidance and standards.

A number of scenarios have been included based on real situations and strategies. These scenarios are situations that may potentially arise when suspected ACMs are found (and that have not been previously identified in the on-site hazardous materials register (asbestos). The management procedures described are based on the general management set out in Section 2.

When asbestos has been identified / suspected the on-site hazardous materials (asbestos) register should be immediately updated to include such materials. Where asbestos has been removed or remediated, the on-site hazardous materials (asbestos) register should be updated accordingly.

All DoE asbestos registers and this AMP are available to the community generally via the internet at www.dec.nsw.gov.au/about-us/supplying-to-us/asbestos-register, with the most up-to-date information available internally on the DoE Asset Management System (AMS).

Where asbestos management as set out in this plan requires the labelling of in-situ asbestos that can be safely managed in the DoE Facility or disposal of waste ACMs, please refer to Section 3.6.2 Labelling and Section 7.4, Asbestos Waste Management.

9.1.1 ACM in DoE Facility grounds

Illegal dumping of suspected asbestos waste

Due to the high costs associated with the disposal of asbestos waste, on rare occasions this waste is illegally dumped. Dumped ACM can be mixed with general builders' waste, which may include rubble and spoil. It is not unknown for individuals and companies to dispose of building waste, including asbestos waste, on DoE Facility grounds. This section sets out the procedures to follow in response to a dumping incident.

Single source at surface

When ACM, such as fibrous cement sheeting or other material types, have been found at the surface of DoE Facility grounds over a small area, this is usually due to demolition of a structure containing asbestos such as a building or fence where waste asbestos has been left at the surface or buried instead of being properly disposed of. This section sets out the procedures to follow in response to the finding of such materials.

Extensive surface contamination

ACM, typically as fibrous cement sheeting, has been found over a wide area of DoE Facility grounds. This can be as a result of imported waste materials used for landscaping or from demolition of domestic dwellings previously found on the site, with fibrous cement fragments becoming exposed over time due to surface erosion and soil dynamics, or due to demolition of structures containing ACM (as above). This section describes management of extensive surface contamination.

Fill materials

Fill material has been widely used in DoE Facilities, typically for landscaping / levelling purposes. Fill may also be present in building footprints. Fill generally comprises builders' rubble, typically bricks, although older fill often contains waste fibrous cement materials in addition to other building materials. Fill may also be generated on-site to build up depressions or level grounds. This section describes procedures to follow where fill materials have been found within DoE Facility grounds.

Fill material is not to be imported onto any DoE Facility unless appropriately certified.

In-ground asbestos cement pipes

It is possible that asbestos cement drainage pipes may be present in-situ within the ground at DoE Facilities. While such materials remain buried and in operation, they represent a low risk. Redundant piping may also be present, which represents a low risk if still buried or intact.

9.1.2 Facilities and buildings

Sub-floor of buildings

DoE Facility buildings that have cavities below (typically demountable or older style buildings)

present storage opportunities for waste or spare materials. This can include asbestos building materials, such as Super Six roofing or fibrous cement sheeting. Fibrous cement packing may also be present between piers and the building. Fill materials or demolition waste containing fragments of fibrous cement materials may also be present below demountable buildings and as such require action to remove materials / remediate the area. This section describes management of ACMs that may be found below buildings.

Ceiling or roof space within buildings

DoE Facility buildings that have ceiling or roof space (typically older style buildings) present storage opportunities for waste or spare materials. This can include asbestos building materials, such as Super Six roofing, fibrous cement sheeting or roofing tiles. Fibrous cement packing may also be present between framework and the building. This section describes management of ACMs that may be found within these spaces within buildings.

Appliances and furniture

A number of electrical / heating appliances and furniture have been installed at DoE Facilities that are likely to contain ACMs. These include but are not limited to 'Thermacon' heaters, air-conditioning units and hot metal workbenches. While such appliances and fixtures remain operational in good condition, the risks are controlled; however they should be properly maintained. This section describes day-to-day management of these appliances and fixtures.

Building materials – no damage

Asbestos containing materials are a common building product within structures. Providing that these materials are in a good condition and are not disturbed, they present a negligible risk of exposure and a low health risk. This section describes management of in-situ ACMs that do not require immediate attention.

Building materials – damaged

Damage occurring to ACMs in buildings may cause an increase in the risk of asbestos fibre release. Materials becoming degraded over time may also cause an increase in the risk of asbestos fibre release. Minor surface scratches may not require emergency response actions, rather a repair to the surface coating, although more extensive damage will usually require emergency responses such as restricting access and material removal. This section describes management of in-situ ACMs that may require immediate attention.

Non-friable ACMs to be disturbed by works

There may be occasions where essential maintenance or minor refurbishment work is required where ACMs are present and where work carried out will involve disturbance to these materials. This section describes steps to be taken where work may disturb ACMs or where full removal may be required.

Friable asbestos building materials

A small proportion of facilities may contain friable asbestos insulation materials such as pipe lagging and fire rated spray coatings to metal supports such as roof girders. Friable asbestos typically represents the highest risk to health, although pipe insulation will usually be sealed with a calico type wrap. Where friable asbestos is exposed or loose sprayed, immediate measures are required in order to control the risk. This section describes management of in-situ friable ACMs.

Please note that friable asbestos may only be removed by contractors licensed by WorkCover NSW to remove friable asbestos. Contractors will also be required to apply to WorkCover NSW prior to friable asbestos removal for a work site specific work permit. Please also note that DoE requires that all asbestos works undertaken on DoE Facilities be supervised by an agent of DoE such as DPWS. On some projects on-site supervision and provision of on-site laboratory (asbestos air monitoring services) may be required to be provided by a member of the DoE hygienist panel.

Fire damaged buildings

Where DoE Facility buildings become damaged or destroyed by fire, it is possible that ACMs may also have become damaged. Once ACMs become damaged by fire, there is a significantly elevated potential for fibre release. As such, it is important in all circumstances to restrict access well away from fire damaged buildings in case ACMs are present and have become damaged. This section describes the management of fire damaged buildings with respect to asbestos.

Fire damaged asbestos will also likely to be classified as friable, and as such will require removal by a licensed friable asbestos removal contractor.

Air handling units

A small number of DoE Facilities may operate Air handling units containing asbestos cement sheet internal duct lining and/or asbestos millboard within heater banks. Where asbestos cement sheeting is damaged or is likely to become disturbed, units must be sealed off and all ACMs removed. Where asbestos cement sheeting is undamaged, appropriate measures should be undertaken to ensure all surfaces are completely sealed. Where asbestos cement sheet materials are to remain, a risk assessment involving air monitoring must be carried out under full operating conditions to determine whether or not fibres are being released. If asbestos millboard products have been identified or are suspected, these should be removed immediately.

Removal of asbestos from within air handling units will require removal by a Class A licensed friable asbestos removal contractor.

Asbestos containing mastic

Asbestos containing mastic can be found in old style demountables with DPWS Suite 2 aluminium framed windows in the following locations:

- Within the window frame where the glass pane is fixed to the external aluminium frame
- On the window frame where the window is fixed to the demountable steel frame (not consistent)
- On the frame of the plywood and aluminium wall panels where the panel is fixed to the demountable steel frame (not consistent).

It is anticipated that repair works will only be undertaken to the glass pane of the demountable. It is also understood that the asbestos mastic in its current form is enclosed and is deemed to be stable. This section describes management of in-situ asbestos containing mastic.

In addition a Window Asbestos Mastic Procedure has been prepared to provide a procedure for the safe removal of small sections of asbestos putty while repairing a window. Please refer to Appendix H.

Asbestos containing putty

Windows within school buildings may contain asbestos containing putty.

Typically this putty can be identified at the following locations:

- Within the window frame where the glass pane is fixed to the external window frame
- On the window frame where the window is fixed to the building brick or timber work.

It is anticipated that repair works will only be undertaken to the glass pane of the window. This section describes management of in-situ asbestos containing putty.

In addition a Window Asbestos Putty Procedure has been prepared to provide a procedure for the safe removal of small sections of asbestos putty while repairing a window. Please refer to Appendix H.

Accidental disturbance by maintenance / contractor / capital works

Damage occurring to ACMs in buildings may cause an increase in the risk of asbestos fibre release. Minor surface scratches may not require emergency response actions, rather a repair to the surface coating, although more extensive damage will usually require emergency responses such as restricting access and material removal. This section describes management of in-situ ACMs that may require immediate attention.

It is essential that site managers have site asbestos registers checked before undertaking any disturbance within facilities.

In the event that a maintenance contractor were to disturb asbestos after checking the asbestos register and undertaking all necessary precaution, the site manager would be required to:

- Isolate the area
- Not attempt to move / dispose of material
- Immediately advise the Asset Management Unit on 132 779, who will arrange support to the school from the school facilities maintenance contractor or a hygienist from the panel contract.

Accidental disturbance by school based person or GA

Damage occurring to ACMs in buildings may cause an increase in the risk of asbestos fibre release. Minor surface scratches may not require emergency response actions, rather a repair to the surface coating, although more extensive damage will usually require emergency responses such as restricting access and material removal. This section describes management of in-situ ACMs that may require immediate attention.

DoE does not require or support any staff, students or visitors to its sites to undertake any asbestos works. It is essential that site managers have site asbestos registers checked before undertaking any disturbance within facilities. DoE has an existing requirement (Safety Alert No 32) that requires DPWS to deliver or participate in the oversight of any remediation works. It should be noted that DPWS is involved in all DoE capital works, school maintenance works and the panel contract for hygienist services. Site managers are not permitted to undertake asbestos works, including licensed asbestos contractors, without the participation of DPWS.

In the event that a school based person were to disturb asbestos after checking the asbestos register and undertaking all necessary precaution, the site manager would be required to:

- Isolate the area
- Not attempt to move / dispose of material
- Immediately advise the Asset Management Unit on 132 779, who will arrange support to the school from the school facilities maintenance contractor or a hygienist from the panel contract.

9.2 Procedures for ACM in DoE Facility grounds

The following procedures are set out as a guide to follow where suspected ACMs have been found at the surface of DoE Facility grounds.

The following key describes the colour coding of the flow arrows in each procedure:

Flow arrow	Description
	Suspected or identified ACM
	Non ACM
	Area cleared of ACM
	ACMs suspected or identified by periodic re-inspections

It should be noted that WorkCover NSW How to Safely Remove Asbestos: Code of Practice states that:

Removal of asbestos from contaminated soil will require a Class A licensed asbestos removalist for any friable asbestos to be removed, and a Class A or a Class B licensed asbestos removalist if more than 10 m² of non-friable asbestos is to be removed. A person who does not have a licence can remove 10 m² or less of non-friable asbestos as long as the person is trained (Clause 445). Where there is uncertainty as to whether the amount of non-friable asbestos is more or less than 10 m², a Class A or Class B licensed asbestos removalist should be engaged.

Taking the above into consideration it is a DoE policy to engage a friable licensed asbestos removal contractor (Class A) as best practice for all occurrences of asbestos contaminated soil. The contractor will be engaged from a panel approved by DoE and all engagements will be to WorkCover NSW guidelines and following the advice of a WorkCover NSW licensed asbestos assessor who is also a hygienist engaged from the DoE hygienist panel.

9.2.1 Dumping of suspected asbestos waste

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Waste materials discovered dumped on school grounds.

Example

Pile of builders' rubble, spoil, vegetation and asbestos cement 'Super Six' roofing sheets found dumped on the grounds of a school.

Asbestos materials

Waste found to contain suspected ACMs.

1. Immediately restrict access to vicinity of dumped waste. Do not attempt to dispose of / move waste.
2. Contact DoE AMU on 132 779 as soon as possible, DoE School Security Unit on 1300 880 021 and Incident Report and Support Hotline on 1800 811 523.
3. Contact local police station to investigate source of dumping.
4. DoE and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.
5. DoE and DPWS to arrange removal of waste out of school hours.

Return area to normal use.

Non-asbestos materials

Waste found not to contain suspected ACMs.

Contact local police station and DoE School Security Unit on 1300 880 021 to report the dumping.

Contact FMC to arrange appropriate disposal if required.

Return area to normal use.

9.2.2 Single source ACM at surface

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Suspected single fragment or small number of suspected ACMs observed at a single location.

Example

Fibrous cement sheet debris remaining from builders' waste of recently demolished building / structure.

1. Restrict access to area immediately.
2. Do not attempt to dispose of / move material.

Non-asbestos materials

Return area to normal use.
No further action required.

3. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
4. DoE and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.
5. DoE and DPWS to arrange removal of ACMs.

Return area to normal use

Specific maintenance required for the affected area may include additional watering; ensuring that excessive wear / erosion does not occur; and undertaking top-dressing / turfing.

Visual inspections of area to be carried out at three-monthly intervals, after a period of prolonged heavy rain, whenever damage or disturbance to remedial measures has been reported and whenever a suspected asbestos material has been found.

If no suspected asbestos materials are found, continue with normal use. If suspected asbestos materials are found, contact DoE AMU on 132 779 and return to point 1.

9.2.3 Extensive surface contamination

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Numerous fragments of suspected asbestos materials observed over a wide area.

Example

Fibrous cement sheet fragments observed at surface of playing field / school grounds.

1. Restrict access to area immediately.
2. Do not attempt to dispose of / move material.
3. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
4. DoE and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.
5. DoE and DPWS to arrange removal of ACMs / remediation of site.

Non-asbestos materials

Return area to normal use.
No further action required.

Return area to normal use

Area to be entered into hazardous materials (asbestos) register.

Visual inspections of area remediated to be carried out at three-monthly intervals, after a period of prolonged heavy rain, whenever damage or disturbance to remedial measures has been reported and whenever a suspected asbestos material has been found.

If no suspected asbestos materials are found, continue with normal use. If suspected asbestos materials are found, contact DoE AMU on 132 779 and return to point 1.

9.2.4 Evidence of suspected ACMs within fill materials

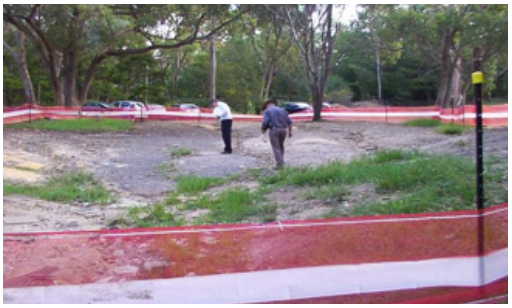
The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Fill materials revealed, containing possible ACMs.

Example

Erosion of a school field has revealed evidence of fill materials used for landscaping purposes. Fill typically has been found to consist of building rubble, including fibrous cement sheet materials as well as sand, soil and gravel.



1. Restrict access to area immediately.
2. Do not attempt to dispose of / move material.
3. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
4. DoE and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.
5. DoE and DPWS to arrange removal of ACMs / remediation of site.

Non-asbestos materials

Return area to normal use.

There remains the possibility that ACMs may be buried further down within the fill. Inspections should be carried out once per year to visually check for further fragments.

If suspected ACMs are found, contact DoE AMU on 132 779 and return to point 1.

Asbestos removed / area remediated

Return area to use. Area to be entered into hazardous materials (asbestos) register.

Visual inspections of area remediated to be carried out at three-monthly intervals, after a period of prolonged heavy rain, whenever damage or disturbance to remedial measures has been reported and whenever a suspected asbestos material has been found.

If no suspected asbestos materials are found, continue with normal use. If suspected asbestos materials are found, contact DoE AMU on 132 779 and return to point 1.

Specific maintenance will be related to the extent and nature of the remediation undertaken. Where surface materials have been applied (eg turf, topsoil, mulch) these must be maintained as per the original application.

9.2.5 In-ground asbestos cement pipes

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Asbestos cement piping is found or suspected to be present within the ground.

Example

Excavation activities have uncovered buried redundant or in-use asbestos cement piping.

Maintenance is carried out on piping that is suspected to contain asbestos.

1. Restrict access to area immediately.
2. Do not attempt to move / work on piping.
3. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
4. DoE and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.

Is piping damaged / deteriorated or requires replacing?

Yes →

Piping to be removed

DoE/DPWS is to engage a consultant from the DoE hygienist panel and a licensed asbestos removal contractor to remove all damaged and/or redundant piping. It is DoE policy to engage a friable licensed asbestos removal contractor as best practice for all occurrences of asbestos in soil.

Return area to normal use.

No ↓

Piping to remain in-situ

1. Ensure that all piping is not damaged and no debris is present. Any damaged piping and debris must be removed.
2. Piping must be adequately buried and have a surface layer of grass / vegetation or a sealing layer such as concrete, ensuring that the soil does not become eroded and leave any sections of the pipe exposed.
3. Enter pipe into hazardous materials (asbestos) register.
4. Return area to normal use.
5. Inspect surface level periodically to ensure that damage has not occurred. If damage has occurred, contact DoE AMU on 132 779 for advice and return to point 5.

9.3 Procedures for ACMs in buildings

The following procedures are set out as a guide to follow where suspected ACMs have been found within or around DoE Facility buildings and facilities.

It should be noted that WorkCover NSW define asbestos that has been subjected to hail damage where abrasion has occurred and asbestos that has been demolished without proper removal as friable asbestos. Removal of such materials should be carried out by contractors licensed by WorkCover NSW to remove friable asbestos. Contractors will also be required to apply to WorkCover prior to friable removal for a site specific work permit.

Flow arrow	Description
	Suspected or identified ACMs
	Non-asbestos material or area cleared of ACMs
	ACMs suspected or identified by periodic re-inspections. ACMs found to have deteriorated after periodic re-inspections.

9.3.1 ACMs accessible below buildings

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Suspected ACMs observed below a building / facility.

Example

Maintenance work below a demountable classroom has revealed a stack of stored fibrous cement roofing sheeting. Overland flow channelled below a demountable has eroded the surface and revealed fibrous cement materials at the surface.

Asbestos cement packing is suspected within the demountable piers.

1. Restrict access to area immediately.
2. Do not attempt to dispose of / move material.
3. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
4. AMU and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.
5. AMU and DPWS to arrange removal of waste material.

1. Restrict access to area immediately.
2. Do not attempt to dispose of / move material.
3. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
4. AMU and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.
5. AMU and DPWS to arrange removal of ACMs. Materials not removed to be entered into hazardous materials (asbestos) register.

Non-asbestos materials

Return area to normal use. No further action required.

Return area to use

Visual inspections of area remediated to be carried out at three-monthly intervals, after a period of prolonged heavy rain, whenever damage or disturbance to remedial measures has been reported and whenever a suspected asbestos material has been found.

If no suspected asbestos materials are found, continue with normal use. If suspected asbestos materials are found, contact DoE AMU on 132 779 and return to point 1.

9.3.2 ACM accessible within ceiling or roof space of buildings

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

ACMs is found or suspected to be present within ceiling / roof cavities.

Example

Maintenance activities have uncovered old asbestos cement sheets. Dust is found to contain asbestos fibres.

Building rubble, including fibrous cement sheet materials as well as sand, soil and gravel.

1. Restrict access and stop work in area immediately.
2. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
3. AMU and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.

Does ceiling space contain asbestos containing materials and/or contaminated dust?

Yes →

ACMs to be removed

AMU and DPWS are to engage a consultant from the DoE hygienist panel and a licensed asbestos removal contractor to remove all damaged and/or redundant ACM. It is DoE's policy to engage a friable licensed asbestos removal contractor as best practice.

Return area to normal use.

No

Area cleared

Return area to normal use.

9.3.3 Appliances and furniture containing ACM

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Thermacon Heating unit present within school (these units may contain flexible woven asbestos sheeting within the unit). Note: loose insulation materials found near the top of the unit are likely to be non-asbestos.

Hot metal workbench present within school (such benches may have an asbestos cement work surface).

Ovens present within school (on rare occasions, asbestos materials may be within the oven).

Unit damaged / broken

1. Restrict access to area as soon as possible.
2. Is damage to exterior panels only?

Broken panels

1. Contact GA / AMU to repair / replace panels as soon as possible.
2. Can panels be repaired / replaced?

Unit damaged / broken / cannot be repaired

1. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
2. AMU to arrange inspection and removal, appropriate disposal and replacement of unit if found to contain asbestos.

Unit repaired

Return area to normal use. Return unit to operational status.

Ensure that covering panels are maintained.

Enter unit into hazardous materials (asbestos) register.

Unit removed

Return area to normal use.

No further action required.

9.3.4 Non-friable ACM in buildings – no damage

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

ACMs identified or suspected within a building or facility.

Example

Building inspection has identified an ACMs within a school building.

Maintenance work has identified a suspected asbestos material.

A. Is the asbestos material within an air duct?

Yes →

Asbestos within air ducts

Contact DoE AMU on 132779 to arrange immediate assessment and to engage consultant from DoE hygienist panel and contact Incident Report and Support Hotline on 1800 811 523.

No ↓

B. Is the asbestos material vinyl sheeting / floor tiles?

Yes →

Vinyl sheeting and floor tiles

Enter material into hazardous materials (asbestos) register. Re-inspect by AMU to assess condition. If condition found to have deteriorated, follow procedure 9.3.5.

No ↓

C. Does the asbestos material have any unsealed exposed (eg unpainted) surfaces?

Yes →

Unsealed asbestos materials
Occasionally found within sheds, garages, etc

1. Ensure all exposed surfaces are appropriately sealed (eg with paint) or encapsulated (eg with boxing) for all materials except asbestos roof materials – these should not be sealed. Enter material into hazardous materials (asbestos) register.
2. Re-inspect by AMU (typically every 12 months).
3. If condition found to have deteriorated, follow procedure 9.3.5.
4. If material is likely to be disturbed (eg by school occupants), re-inspect at least every six months. Consider full removal of asbestos material if disturbance may damage surfaces.

No →

Sealed / encapsulated non-friable asbestos materials
Commonly found as ceiling and wall panels and eave linings.

1. Re-inspect by AMU to assess condition. Enter material into hazardous materials (asbestos) register.
2. If condition found to have deteriorated, follow procedure 9.3.5.
3. If material is likely to be disturbed (eg by school occupants), re-inspect at least every six months by school. Consider full removal of asbestos material if disturbance may damage surfaces.

9.3.5 Non-friable ACM in buildings – damaged

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Damaged ACMs identified or suspected within a building or facility.

Example

Building inspection has identified a damaged ACMs within a school building.

An incident has resulted in the damage of a known or suspected ACMs.

Asbestos debris found within roof space due to contractors not disposing of waste roof materials.

Is the damage a surface scratch?

Minor surface damage

Engage GA or AMU to seal surface scratch with appropriate substance such as paint. Enter material into hazardous materials (asbestos) register.

Return area to normal use and re-inspect to assess condition. Follow procedure 9.3.4.

If structural damage has occurred, start at point 1.

Structural damage

1. Restrict access to area immediately.
2. Do not attempt to move / dispose of material.
3. Contact DoE AMU on 132 779 and Incident Report and Support Hotline on 1800 811 523.
4. AMU and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.
5. AMU and DPWS to arrange removal or repair as deemed necessary.
6. AMU and DPWS to arrange clearances if necessary.

Non-asbestos material

Return area to normal use.

No further action required.

Asbestos removed

Return area to normal use.

Asbestos repaired

Return area to normal use and re-inspect. If condition is found to have deteriorated, contact DoE AMU on 132 779 and return to point 1.

9.3.6 Non-friable ACM to be disturbed by works

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Work is required that will disturb an ACMs.

Example

Installation of new equipment requires drilling into an ACMs.

An asbestos workbench requires repair.

Refurbishment requires asbestos walls to be replaced.

Check hazardous materials (asbestos) register prior to works being undertaken. Does the work involve disturbing / working on or near an ACMs?

No → Work may be undertaken. If any doubt as to the nature of the material, contact DoE AMU on 132 779 to arrange inspection.

Yes

Contact DoE AMU on 132 779 for advice and Incident Report and Support Hotline on 1800 811 523.

All works to be supervised by DPWS or AMU as directed by DoE. Do not undertake works without supervision, no matter how small the project is.

DoE will instruct on method of work or whether ACM should be removed prior to work commencing.

9.3.7 Asbestos containing sprayed vermiculite ceiling coating

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Work is required that will disturb a vermiculite ceiling coating.

Building inspection has identified impact damage of vermiculite ceiling coating.

Example

Installation of new equipment requires drilling into a vermiculite ceiling coating.

Check hazardous materials (asbestos) register prior to works being undertaken. Does the work involve disturbing / working on or near an ACM?

WARNING
Vermiculite material is not homogenous. A sample obtained from one location may not be representative of the material as a whole. As such, a sample which returns a result of No Asbestos Detected (NAD), should not be relied upon as being indicative of all vermiculite within a building. For this reason, prior to any works which may disturb vermiculite, additional sampling is required within the area of disturbance as needed by the DoE Hygienist Panel Contractor.

No →

Minor surface damage, resulting in debris

1. No work to be undertaken until further testing is undertaken by the DoE Hygienist Panel Contractor, who will define the scope of works.
2. Do not move or dispose of debris.
3. Contacty DoE AMU ion 132 779 and Incident Report and Support Hotline 1800 811 523.
4. AMU and DPWS will arrange for hygienst to inspect and identify as asbestos or non-asbestos.
5. If non-asbestos, normal cleanup.
6. If asbestos, AMU and DPWS to arrange for cleanup, necessary repairs.
7. AMU and DPWS to arrange clearances if necessary.

Yes

Contact DoE AMU on 132 779 for advice and Incident Report and Support Hotline on 1800 811 523.

All works to be supervised by DPWS or AMU as directed by DoE. Do not undertake works without supervision, no matter how small the project is.

DoE will instruct on method of work or whether ACMs should be removed prior to work commencing.

Note: All DoE Asbestos Registers, where Vermiculite testing is NAD, has a precautionary statement. Limited Samples Taken - Vermiculite Ceilings may contain asbestos. Asbestos testing MUST be conducted prior to any disturbance works.

9.3.8 Friable ACM within buildings

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Friable ACMs found within school building.

Example

Maintenance work has encountered friable asbestos insulation to girders in roof.

Damage has occurred to pipes revealing friable asbestos lagging.

1. Immediately restrict access to area.
2. Do not attempt to move or dispose of material.
3. Contact DoE AMU on 132 779 immediately and Incident Report and Support Hotline 1800 811 523.
4. AMU and DPWS to arrange inspections and testing if necessary by consultant from DoE hygienist panel.
5. AMU and DPWS to arrange appropriate removal or management of ACMs.

Non-asbestos material

Return area to normal use.

Asbestos adequately encapsulated

1. Label material as potentially containing asbestos. Enter material into hazardous materials (asbestos) register.
2. Ensure material is not disturbed.
3. Arrange for AMU to re-inspect at least every year to assess condition. If condition found to have deteriorated, follow from point 1.

Asbestos to be removed

Friable asbestos removed by a WorkCover NSW licensed contractor.

Consultant from DoE hygienist panel clears area to be returned to use.

Asbestos removed and area cleared

Return area to normal use.

9.3.9 Fire damaged buildings containing ACM

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Fire has damaged confirmed or suspected ACMs.

Example

Arsonists have set fire to a demountable school building. The building is known to contain asbestos cement eave linings panels.

Fire has gutted part of a school building. The nature of materials present is unknown.

Emergency services response

Building released by emergency services (fire brigade / police).

1. Access to area restricted by DPWS / AMU. Commonly isolation fence installed.
2. Do not attempt to access the area under any circumstances.
3. Contact DoE AMU on 132 779 immediately if not previously advised and Incident Report and Support Hotline 1800 811 523.

4. AMU and DPWS to arrange inspections and testing as required for hazardous substances by consultant from DoE hygienist panel.

No ACMs found

DPWS to arrange for demolition or repair of building.

ACM found or suspected

5. DPWS to arrange for asbestos removal. This may require structural improvements to allow safe access to damaged structures. Air monitoring to be carried out by a consultant from DoE hygienist panel.
6. Consultant from DoE panel to provide clearance certificates to DoE upon successful completion of asbestos removal works.
7. DPWS to arrange for demolition or repair of building.

9.3.10 Air handling units containing ACM

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Asbestos cement materials used in air-handling units.

Example

Asbestos cement sheet panels lining internal ducting of air-conditioning system.

Asbestos cement sheet panels lining internal ducting of air-movement system.

Asbestos millboard suspected within heater banks of Air handling system.

Are asbestos millboard materials present?

Yes → **Millboard products identified**

Unknown

1. Contact DoE AMU on 132 779 immediately and Incident Report and Support Hotline on 1800 811 523.
2. AMU and DPWS to arrange inspections and testing if necessary by consultant from DoE hygienist panel.
3. AMU and DPWS to provide appropriate management of ACMs. This may involve removal or leaving materials in-situ with monitoring.

Asbestos removed and system cleared

Air handling system may be returned to use.

Asbestos retained

Air handling system may be returned to use providing that ongoing monitoring is carried out as recommended by competent person or asbestos assessor clears area to be returned to use.

1. Do not operate air-handling system.
2. Contact DoE AMU on 132 779 immediately.
3. AMU and DPWS to arrange inspections and testing by consultant from DoE hygienist panel. AMU and DPWS to arrange appropriate removal or management of ACMs.

Asbestos to be removed

Friable asbestos removed by licensed contractor.

Consultant from DoE hygienist panel clears area to be returned to use.

Clearance Certificates to be provided to DoE.

Asbestos removed and system cleared

Air handling system may be returned to use.

9.3.11 Asbestos containing chalk boards

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Asbestos containing chalk board in operation within teaching room.

Such chalk boards comprise asbestos cement sheeting with a paint coating forming the writing surface.

Board damaged or paint surface deteriorating

Do not use chalk board.

Chalk board in good condition

Board is intact with no visible damage and painted surface in good condition. (ie. no peeling or flaking).

Board damaged

1. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
2. AMU to arrange inspection and removal, appropriate disposal and replacement of board if found to contain asbestos.

Paint surface deteriorating

Recoat as soon as possible.

Return board to use.

Leave and maintain

Enter material into hazardous materials (asbestos) register.

If condition found to have deteriorated, follow damaged procedures.

If material is likely to be disturbed (eg by school occupants), re-inspect at least every six months by school. Consider full removal of asbestos material if disturbance may damage surfaces.

Asbestos detected

Yes → **Board can be repaired**

Yes

Asbestos board removed

Return area to normal use.

No further action required.

9.3.12 Asbestos containing mastic

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

The mastic is found within the window frame where the glass pane is fixed to the external aluminium frame, in an old style demountable.

The mastic is found on the window frame or on the frame of the plywood and aluminium wall panels where the panel is fixed to the demountable steel frame (not consistent).

Mastic deteriorating / damaged

Restrict access to area as soon as possible.

Mastic damaged

1. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
2. AMU to arrange inspection and removal, appropriate disposal and replacement of board if found to contain asbestos.

Asbestos detected

Yes

Asbestos mastic removed

Return area to normal use.

No further action required.

Mastic in good condition

Putty is intact with no visible damage and painted surface (if it exists) in good condition. (ie no peeling or flaking).

Leave and maintain

Enter material into hazardous materials (asbestos) register.

If condition found to have deteriorated, follow procedures as per window asbestos mastic procedure, Appendix H.

If material is likely to be disturbed (eg due to works on glass panes or window frames), re-inspect at least every six months by school. Consider full removal of asbestos material if disturbance may damage surfaces.

No →

Mastic can be repaired / sealed

9.3.13 Asbestos containing putty

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Window frame to where glass is fixed to the external window frame contains putty.

Putty is present on the window frame where the window is fixed to the building brick or timber work.

Putty deteriorating / damaged

Restrict access to area as soon as possible.

Putty damaged

1. Contact DoE AMU on 132 779 as soon as practicable and Incident Report and Support Hotline on 1800 811 523.
2. AMU to arrange inspection and removal, appropriate disposal and replacement of board if found to contain asbestos.

Asbestos detected

Yes

Asbestos putty removed

Return area to normal use.

No further action required.

Putty in good condition

Putty is intact with no visible damage and painted surface (if it exists) in good condition (ie no peeling or flaking).

Leave and maintain

Enter material into hazardous materials (asbestos) register.

If condition found to have deteriorated, follow procedures as per window asbestos mastic procedure, Appendix H.

If material is likely to be disturbed (eg due to works on glass panes or window frames), re-inspect at least every six months by school. Consider full removal of asbestos material if disturbance may damage surfaces.

No →

Putty can be repaired / sealed

9.3.14 Accidental disturbance of ACM by maintenance / contractor / capital works

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

Asbestos or suspected ACMs is damaged by contractor or other non-school based person due to maintenance works or general housekeeping.

Example

Work is undertaken before the register is checked and without sampling, resulting in damage to what is later identified to be asbestos containing vinyl wall lining.

Structural damage

1. Restrict access to area immediately.
2. Do not attempt to move / dispose of material.
3. Inform relevant school personnel.
4. Contact DoE AMU on 132 779 and Incident Report and Support Hotline on 1800 811 523.
5. AMU and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.
6. AMU and DPWS to arrange removal or repair as deemed necessary.
7. AMU and DPWS to arrange clearances if necessary.

Non-asbestos material

Return area to normal use / next stage of works.

No further action required.

Asbestos removed

Return area to normal use.

Asbestos repaired

Return area to normal use and re-inspect. If condition is found to have deteriorated, contact DoE AMU on 132 779 and return to point 1.

9.3.15 Accidental disturbance of ACM by school based personnel

The processes listed below are a summary of the Emergency response flow chart, Figure 8.1, page 82 that would be applied to this asbestos scenario. Refer to 8.1 for more information.

Event

ACMs or suspected ACMs is disturbed by school based personnel due to maintenance works or general housekeeping.

Example

Work is undertaken around ceiling cavity without prior checking of asbestos register, resulting in disturbance to fibrous cement sheeting.

Structural damage

1. Restrict access to area immediately.
2. Do not attempt to paint / move / dispose of material.
3. Contact DoE AMU on 132 779 and Incident Report and Support Hotline on 1800 811 523.
4. AMU and DPWS will arrange inspections and testing if necessary by consultant from DoE hygienist panel.
5. AMU and DPWS to arrange removal or repair as deemed necessary.
6. AMU and DPWS to arrange clearances if necessary.

Non-asbestos material

Return area to normal use / next stage of works.

No further action required.

Minor surface damage

Engage GA or AMU to seal surface scratch with appropriate substance such as paint. Enter material into hazardous materials (asbestos) register.

Return area to normal use and re-inspect to assess condition. Follow procedure 9.3.4.

If structural damage has occurred, start at point 1.

Asbestos repaired

Return area to normal use and re-inspect. If condition is found to have deteriorated, contact DoE AMU on 132 779 and return to point 1.

Asbestos removed

Return area to normal use.

10. Frequently asked questions (FAQs)

(These frequently asked questions and answers have been prepared in terms of queries of the school principals. All scenarios in the questions are purely examples.)

A school's general assistant, while undertaking a small material task, has accidentally disturbed what appears to be fibro. What should be done?

Follow the steps mentioned below:

- Stop working immediately and isolate the immediate area. Check to see if the material is identified in the school's asbestos register.
- Contact the Asset Management Unit (AMU) on 132 779 to seek advice.

For more information, check the DoE's Asset Management Plan Appendix 'F' – Communications Strategy regarding the brochure 'What You Need to Know About Asbestos containing Materials.'

A member of teaching staff requested students to remove loose vinyl tiles in the foyer area of the school as part of an activity. The tiles were subsequently found in the asbestos register to be positive for asbestos. What should be done?

- Stop working immediately and isolate the immediate area.
- Make sure all those involved in the removal of the tiles have undertaken basic personal Decontamination.
- Contact AMU on 132 779 to seek advice.

Along with above steps, check the DoE's Asset Management Plan Appendix 'F' – Communications Strategy regarding the brochure 'What You Need to Know About Asbestos Containing Materials'.

A member of the school staff may have been exposed to asbestos, and has made a complaint about skin and eye irritation. What should be done?

Irritation of eyes and skin is not caused by exposure to asbestos. However, if there is a concern regarding respiratory damage, the teacher should contact their own doctor and the AMU on 132 779. In addition, Work Health and Safety Directorate may be contacted for advice.

How will a school know if buildings contain asbestos?

Please check the asbestos register of the school for identified asbestos containing materials. If a register does not exist, contact the AMU on 132 779 and they will contact a panel contractor to conduct sample tests or asbestos surveys, depending on what's required.

If ever in doubt about whether or not an asset is positive for asbestos, assume asbestos is present and take the necessary precautions by following the steps above and contacting the AMU to seek advice.

Someone has dumped materials that could potentially contain asbestos by the school's footpath. What should be done?

Areas outside school property are a council issue. Contact the local council and inform them of the incident.

Also contact the AMU on 132 779 and inform them of the incident so they can follow up with the council regarding the matter.

For more information, check the DoE's Asset Management Plan Appendix 'F' – Communications Strategy regarding the brochure 'What You Need to Know About Asbestos containing Materials'.

Where can I get a guide to asbestos removal?

Please check the DoE's Asset Management Plan Appendix 'F' – Communications Strategy regarding 'What You Need to Know About Asbestos Containing Materials.' The last section is about where you can get more information.

How does a school find a WorkCover NSW licensed contractor?

Schools do not need to conduct any asbestos works themselves. Consequently, schools do not need to search for any WorkCover NSW licensed contractor themselves.

It is essential that site managers have site asbestos registers checked before undertaking any work that could potentially disturb ACMs within the school's facilities.

In the case of any asbestos related work, the school must contact the AMU on 132 779.

It should be noted that DPWS is involved in all DoE capital works, school maintenance works and the panel contract for hygienist (asbestos assessor) services.

For more information, please read DoE's Asbestos Management Plan.

How can I be sure, as a principal, that the removal of asbestos on a school site has been conducted in a safe manner?

Ensure that the following steps have been taken by a WorkCover NSW licensed contractor while removing fibro sheeting:

- They have received a permit (refer to Appendix A) to commence works from DoE
- They have received a permit from WorkCover NSW relevant to the type of asbestos works to be carried out.

In general, the contractor is to:

- Not use power tools. Asbestos fibres can be released if power tools are used for anything other than the removal of screws.
- Wear an Australian Standards Protection Level 2 (P2) minimum half face disposable mask and disposable coveralls. These are generally available from hardware suppliers. Non-Australian Standards certified masks should not be used where asbestos is present.
- Wet down fibro sheets to reduce dust generation and movement.
- Take the fibro sheets off whole (again, not using power tools as this may create dust).
- Seal fibro sheets in construction grade plastic (this should be 200 microns thick) and dispose of as asbestos waste.

Should the asbestos be in powder form or if it can be crumbled, pulverised or reduced to powder by hand pressure when dry, then an asbestos removal contractor with an AS1 Licence is required for its removal.

Contact the AMU on 132 779 and seek further advice on appropriate removal of asbestos on school sites.

For more information, check the DoE's Asset Management Plan Appendix 'F' – Communications Strategy regarding the brochure 'What You Need to Know About Asbestos Containing Materials'.

As a principal, I have concerns about the neighbours (or a contractor working for them) taking down a shed and demolishing a house and generating dust. Are they doing it safely?

Your neighbour, or their contractor, should be:

- Wearing personal protective equipment (PPE)
- Taking the sheets off whole and not using power tools to minimise dust
- Not working on windy days
- Wetting down the sheets
- Putting them in a plastic lined skip.

If you are worried that they are not doing things safely, contact the AMU on 132 779 immediately.

How do schools know if a neighbour's fibro shed or other building has asbestos in it?

First of all, schools need to identify whether the property is adjoining or not to the school property. If the property is adjoined, then contact the local council and also inform the AMU on 132 779 to seek advice. The AMU will arrange for a sample test by a consultant from the DoE's hygienist panel.

For further information, check the DoE's Asset Management Plan Appendix 'F' – Communications Strategy regarding the brochure 'What You Need to Know About Asbestos Containing Materials'.

Appendix A

Permit to work for works affecting or involving asbestos containing materials

(Section 3.7.3)

To be completed by the Facility Manager.

School principals will require the support of the AMU to complete this documentation for school initiated works.

Part A: Planned work details

School to complete:

Work permit number: AMF1 _____ Date of issue _____

DoE facility name _____

DPWS contact _____ Phone _____

Emergency contact _____ Phone _____

Contractor to complete:

Permit Issued to _____ Valid up to _____

Contractor's company name _____

Address _____

Phone _____ Asbestos license no. _____

Location of works _____

Duration of works _____

Location and description of asbestos containing materials _____

_____

_____

Before approval is granted to proceed with work, confirm the following: (school to complete)

1. Has the existing hazardous materials on-site (asbestos) register been examined jointly with the DoE facility manager? Yes ☐ No ◯
2. Has the area where the intended works are to be performed been examined jointly with the DoE facility manager? Yes ☐ No ◯
3. Are asbestos containing materials / products present in the work area? Yes ☐ No ◯
4. Will the works impact on or disturb the asbestos containing materials / products? Yes ☐ No ◯
5. If YES to question 4 above, are the appropriate asbestos work procedures as outlined in the DoE Facility Asbestos Management Plan documented and understood? Yes ☐ No ◯
6. Are DoE Facility users at risk of exposure to airborne asbestos? Yes ☐ No ◯
7. Is it necessary to evacuate DoE Facility staff and students prior to work commencing? Yes ☐ No ◯
8. Has a copy of the on-site hazardous materials (asbestos) register for the work area concerned been issued to the contractor? Yes ☐ No ◯
9. Has a copy of a Safe Work Method Statement been supplied and reviewed? (refer to AMU for advice) Yes ☐ No ◯

Mark as required
Contractor to complete:

WorkCover NSW Asbestos removal Licence required	Yes ☐ No ◯
Health and Safety Plan to meet WorkCover NSW Requirements to be prepared and approved prior to works commencing	Yes ☐ No ◯
Asbestos Supervisor to be present whilst work is being carried out	Yes ☐ No ◯
Personal protection equipment to be worn	Yes ☐ No ◯
No air-conditioning to be running on affected building / floor *('Asbestos No Entry' signs to be placed at each end of affected floor and in the lift lobbies)*	Yes ☐ No ◯
No power tools allowed to work on asbestos material without suitable controls *(Procedures documented in asbestos removal technical specifications / procedures for this work to be adhered to)*	Yes ☐ No ◯
Air monitoring required	Yes ☐ No ◯
Clearance visual inspection by independent party required	Yes ☐ No ◯

Comments / Other requirements:

Part B: Acceptance of Work Permit

I/We (The Contractor) have read and understood the requirements of the permit and will undertake work in accordance with the Work Health and Safety Regulation 2011

Contractor's Name _____ Signature _____

DoE Facility Manager Name _____ Signature _____

Part C: Completion of work (If Applicable)

I (The Hygienist (Asbestos Assessor) /Supervisor) have inspected the area where work has been carried out and am satisfied that the works have been carried out in accordance with the work permit and that all asbestos risks are satisfactorily controlled

Hygienists (Asbestos Assessor) and/or Supervisor's Signature _____

Once signed above no further works can be undertaken on this permit. If work has changed the status of asbestos containing materials, the hazardous materials (asbestos) register must be updated.

Completed permit to be retained by DoE Facility

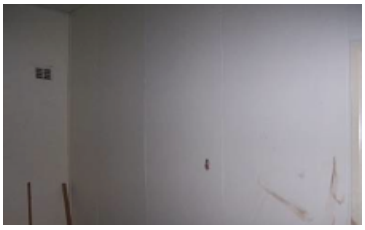
Appendix B

Identifying asbestos containing materials

Possible situations of asbestos containing materials in DoE facilities

Fibrous cement corrugated roof sheeting panels are very commonly found as roofing on older buildings and occasionally as wall sheeting. Also known as Super Six, these materials typically contain 10-15 per cent asbestos, most commonly chrysotile, although amosite and/or crocidolite have frequently been used. The manufacture of asbestos cement ceased in the late 1980s. A whole of government program removed asbestos cement roofing during the 1980s and early 1990s, however some may remain that was previously unidentified.

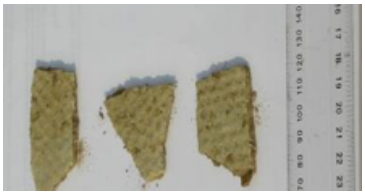
Fibrous cement ceiling panels were commonly present in older buildings, as the ceiling between classrooms and the roof space. Usually manufactured in 1-metre wide sheets, with nail or fixing points usually recognisable at 1-metre intervals. Also known as Hardifex, Hardiplank and Villaboard, these materials typically contain 10-15% asbestos, most commonly chrysotile, with amosite and crocidolite occasionally used.



Fibrous cement wall sheeting is occasionally used in older buildings cladding existing walls or used to form partition walls. Usually manufactured in 1-metre wide sheets, with nail or fixing points usually recognisable at 1-metre intervals. Also known as Hardifex, Hardiplank and Villaboard, these materials typically contain 10-15% asbestos, most commonly chrysotile, with amosite and crocidolite occasionally used.

Vinyl floor finishes are very commonly used throughout DoE Facility buildings, usually as small tiles. Sometimes known as Corlon. Generally chrysotile was used as a reinforcing agent between 3-7% for both the vinyl and the reinforced backing of linoleum. Not all vinyl floor tiles contain asbestos and sometimes quantities of asbestos can be too low to detect.

Electrical insulation board is very commonly found on older electrical meter panels or switch/fuse boards. Sometimes labelled as Zelemite, Lebah or Ausbestos and mostly black in colour. These boards are commonly found as a mounting for electrical meters or as a hinged panel mounting for fuses and switchgear. Typically, chrysotile is bonded into the matrix of the material.



Fibrous cement debris. Imported fill materials used in DoE Facility grounds, such as for landscaping or for gravel tracks, have been found to contain fibrous cement board fragments. Occasionally, previous structures with fibrous cement materials that have existed on DoE Facility grounds may have debris buried in the ground after demolition.

Appendix C

Asbestos information sheets

Common types of asbestos containing materials

Asbestos cement

The most commonly used asbestos material. Common types include corrugated roof sheeting, flat panel sheeting used for walls and ceilings, as well as flue pipes and insulation boards. Flat fibre cement sheeting has been used extensively in eaves lining, ceilings, and internal and external wall linings. These materials typically contain chrysotile asbestos, although amosite and crocidolite may have been used, particularly in older materials. The asbestos fibres are held in a cement bound matrix, and therefore have a low potential to be released unless abraded or damaged.

Resinous asbestos insulation board

Typically, these are found as panels behind and/or in front of electric meters and circuits. Chrysotile is the most common asbestos fibre used in these products. The fibres are held in a bonded matrix, and therefore have a low potential to be released unless the material is abraded or damaged.

Vinyl floor tiles

Vinyl materials often can have very small quantities of asbestos fibre (typically less than 7%), and are usually of the chrysotile type. Asbestos contained in the vinyl body of the tile or sheet is held in a stable matrix. The very low rate of wear does not normally give rise to the fibre release that is to pose a significant health risk. Asbestos may be found in the vinyl body of the tile or sheet, as a fibrous backing under the tile or sheet and/or as a fibrous adhesive used to fix the tile.

Sprayed asbestos insulation

Sometimes referred to as 'limpet.' Sprayed asbestos was applied as a thermal and anti-condensation insulation material on the underside of roofs as well as a fire protection material on steel and concrete reinforced beams and columns, and on the underside of floors. Over-spray of target areas is common. Spray coatings usually contain 55-85% asbestos with one or a combination of chrysotile, amosite and crocidolite. Generally not applied after the 1970s. Sprays have a high potential for fibre release if unsealed.

Common types of asbestos containing materials (continued)

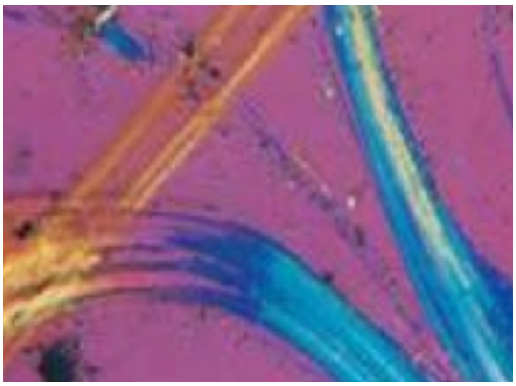
Thermal insulation

Used to insulate pipes, boilers, pressure vessels, calorifiers, etc, and containing between 6 and 85% asbestos content of all types. Often asbestos insulation will be encapsulated with calico and painted, although this type may be easily damaged. Once damage has occurred, the risk of fibre release is high.

Paper / card and textiles

Paper and card products typically contain chrysotile-type asbestos and can be used for electrical / heat insulation of electrical equipment, wiring and plant as well as a lining for other products. These materials, if not encapsulated or bonded, can easily become damaged and release fibres. Asbestos ropes were often used as heat resistant lagging and seals and electrical flash guards in fuses, typically containing chrysotile and/or crocidolite. Cutting of ropes may increase risk of fibre release, along with degradation over time.

Asbestos fibres



Chrysotile: White asbestos fibre. Generally the most commonly used asbestos type. Lowest risk asbestos fibre.

Amosite: Brown asbestos fibre. Frequently used asbestos fibre. Slightly increased health risk than chrysotile.

Crocidolite: Blue asbestos fibre. Not as commonly used. Highest health risks associated with this fibre.

Fibre release

For asbestos containing products to pose a health risk, airborne fibres must be generated either through degradation or high energy mechanical action. The degree of asbestos fibre release, and hence inhalation exposure, is in part dependent upon the matrix material binding the asbestos and its general condition.

Health risks associated with asbestos

The inhalation of airborne asbestos fibres is associated with the development of respiratory diseases. Asbestos related diseases typically do not become apparent until between 20 and 40 years after first exposure.

Asbestosis: Scarring of lung tissue resulting from prolonged inhalation of asbestos fibres. This can result in breathlessness, which may lead to disability and in some cases death.

Lung cancer: Prolonged inhalation of asbestos fibres may increase the risk of developing lung cancer.

Mesothelioma: A cancer of the lining of the chest cavity (pleura) or the lining of the abdominal cavity (peritoneum). Typically only occurs from inhalation of amosite and crocidolite fibres.

Development of asbestos related diseases typically is dependant on a high dose of asbestos inhalation (a function of the extent of fibre and exposure and the period of exposure).

Appendix D

Ground remedial measures and maintenance

DoE facility grounds remedial measures and maintenance techniques

Remedial measure / treatment	Appropriate when:	Maintenance requirements
Grass seeding and/or turfing.	Topsoil has become exposed in an area where asbestos containing materials may be present below clean soil / clean fill. Low traffic areas.	Visual checks to ensure grass cover is adequate at three-monthly intervals. Periodic resting of area may be required.
Topsoil and turfing.	Fill material has become exposed / surface eroded where asbestos containing materials may be present. Low to medium traffic areas.	Visual checks to ensure grass cover is adequate at three-monthly intervals. Periodic resting of area may be required otherwise turf will require re-laying if the surface becomes eroded. Adequate watering during drought periods (this option may not be suitable during periods of extended drought when reservoir levels drop below 40%).
Mulching (may be in conjunction with topsoiling). Locally indigenous plant species can be planted in addition to create a thicker surface layer and to discourage trafficking across the area.	Fill material has become exposed / surface eroded where asbestos containing materials may be present. Low traffic areas.	Visual checks to ensure mulch cover is adequate at three-monthly intervals. Materials should be re-applied if original application becomes displaced or lessens.
Application of geo-fabric and clean fill. Must be used in conjunction with topsoil and turf / seeding or mulching.	Fill materials (containing asbestos) are exposed and high concentrations are expected. Low to medium traffic areas.	As per maintenance requirements for topsoil / turf and mulch. If geo-fabric becomes exposed, clean fill and surface materials must be re-applied. If geo-fabric becomes damaged, consider replacement.
Terracing. Must be used in conjunction with topsoil and turf / seeding or mulching.	Embankments comprising fill materials become eroded, exposing fill and asbestos containing materials.	As per maintenance requirements for topsoil / turf and mulch.
Restricting access using physical barriers, such as fencing, walls, etc. Must be used in conjunction with topsoil and turf / seeding or mulching.	High traffic areas where asbestos containing materials have become exposed (this measure diverts traffic away from the area).	As per maintenance requirements for topsoil / turf and mulch. Ensure that physical barrier integrity is maintained.
Concrete / bitumen encapsulation.	High traffic areas, high risk of exposure to asbestos containing materials in the ground.	Visually inspect periodically to ensure surface is as original application.
Removal of asbestos contaminated fill / soil.	Major works are required in areas that require significant excavations.	N/a – asbestos removed.

Note: Where asbestos remedial measures have been carried out with the exception of removal, excavation works carried out subsequently must be under the authority of a work permit and appropriate PPE and RPE must be worn. Dust suppression must be carried out to avoid potential release of fibres.

Appendix E

Ground remedial measures and maintenance

Safety notices, key points for engaging contractors, local workplace procedure for contractors and demountable checklists

- DN/05/00321 Safety notice no. 10 – mandatory survey portable plug-in kilns may contain asbestos
- DN/06/00362 Use of imported fill on school sites
- DN/07/00356 Safety notice no. 17 – asbestos survey of Department of Education facilities
- Safety alert no. 32 – procedures relating to asbestos during construction work (May 2011)
- DN/12/00505 Safety notice no. 36 – sealant containing asbestos in demountable buildings
- DN/13/00168 Safety notice no. 46 – use of imported fill containing asbestos, on school sites
- Engaging contractors – key points
- Demountable checklists – release / transfer and installation

Memorandum to all principals

Safety Notice No 10 – Mandatory Survey: Portable Plug-in Electric Kilns May Contain Asbestos

Reference: **DN/05/00321**

Date: **9 September 2005**

A small portable plug-in electric kiln used in a secondary school industrial arts area has been found to contain fibrous asbestos lagging. Kilns of this type may have application in secondary school industrial arts, creative arts and possibly science areas and may be present in some primary schools.

The Department of Education and Training requires the identification of all portable electric kilns used in schools to determine the range of models and age of this equipment to facilitate any necessary remedial actions.

This issue does not include any of the larger pottery kilns (70, 140 or 280 litre) which are maintained under the School Building Services and Equipment Maintenance Contract.

Principals are required, as a matter of urgency to:

- Identify whether portable plug-in electric kilns are present in the school (sample photographs are attached). Kilns which are obviously not small portable electric kilns should not be reported.
- Advise no later than Thursday 22nd September 2005 the regional WHS Liaison Manager by Fax or email, using the attached form, detailing the type of kilns in the school. A NIL RETURN is required if no portable kiln is present in the school.

As soon as the collated advice is available, additional information will be provided to schools regarding a state wide remediation action.

Should you wish to discuss this matter further please contact your regional WHS Liaison Manager, or Alan Smith, Manager Compliance and Energy, Asset Management on ph: 9561 8956.

Mike Cush
General Manager, Asset Management

Portable electric kilns

Photograph 01: Kiln with exposed lagging

Photograph 02: SMF lagged kiln

Photograph 03: Two versions of kiln from same manufacturer

Asset Management Directorate

MEMORANDUM TO
ALL PRINCIPALS

DN/06/00362

USE OF IMPORTED FILL ON SCHOOL SITES

I am aware of a number of cases where building contractors, neighbouring property owners or members of the school community have approached the school principal to obtain permission to dump excavation soil on a school site. This could be presented to the school as an inexpensive way to enhance school facilities.

Excavated soil being provided to schools in this way could contain fibro fragments or other contaminants. The removal of such materials after distribution across a school site is extremely difficult and can only be achieved at a high cost. Visual inspection is not sufficient to identify all contaminants.

School principals must not permit any individual or organisation to dump fill of any type on a school site. Should there be a need to obtain soil or fill materials, the principal should contact their local Regional Asset Management Unit (AMU) for advice regarding suitable sources of supply and any documentation required. The AMU will document the approved arrangements on the school file. If you are purchasing fill, a reputable supplier will provide certification that the fill is clean on request. Alternatively, a report from a qualified Occupational Hygienist should be obtained prior to acceptance of fill from donors.

Should illegally dumped material be identified on a school site, the principal should immediately restrict access to the dumped waste and must not attempt to remove the material. The principal must contact officers in their Regional AMU which will arrange inspections and any necessary testing in conjunction with the Department of Commerce (Commerce). The AMU and Commerce will then arrange for the safe removal of waste materials out of school hours.

Should you require any further advice regarding this matter please contact Alan Smith, Manager, Compliance & Energy on telephone 02 9561 8956 or John Deeble, Senior Advisor, Asset Services on telephone 02 9561 8084.

Beryl Jamieson
GENERAL MANAGER, ASSET MANAGEMENT

MEMORANDUM TO PRINCIPALS,

REGIONAL DIRECTORS and

INSTITUTE DIRECTORS

SAFETY NOTICE No.17

DN/07/00356

Asbestos Survey of Department of Education and Training Facilities.

The Department, under State Procurement Contract 0602390, has recently engaged Noel Arnold and Associates to undertake an asbestos survey of schools and TAFE colleges, to commence during Term 4, 2007.

The Department anticipates that surveys will be completed during May 2008 with the asbestos registers provided to schools and colleges during July 2008.The results of this survey will be used to establish an asbestos register for each school and TAFE college.

All schools and colleges can expect to be surveyed unless, they have previously been surveyed with an asbestos register established or all facilities on site have been constructed after 1989.

Principals and College Directors are requested to:

- Respond promptly to enquires from Noel Arnold and Associates when programming the survey of their school/college;
- Facilitate access to sensitive spaces (e.g. student toilet/change facilities) and access to normally locked spaces (e.g. store rooms) to undertake the survey;
- Ensure all school/college staff are aware that contractors from Noel Arnold and Associates are afforded a brief inspection all occupied spaces including those which may be in use for teaching learning purposes; and
- Accommodate variations to the notification periods during the early stages of the survey, i.e. 2 weeks initial notification and 48 hours confirmation will normally apply.

Your support in facilitating this survey is greatly appreciated and feedback to your regional Asset Management Unit, via maintenance review meetings will also be beneficial.

The Department has developed a brochure with information on the contract, the responsibilities of contractors, schools and colleges, and a Site Inspection and Test Report.

The brochure and all other information relating to this contract, is available on the Department's Intranet at: https://detwww.det.nsw.edu.au/assetmanagement/safecomp/asbefibr/ The Department will also post future updates on the survey here.

If you have any questions regarding the survey please contact Alan Smith, Manager Compliance and Energy, on telephone number 9561 8956 or fax 9561 8438.

Beryl Jamieson
General Manager, Asset Management
16 November 2007

MEMORANDUM TO:

ASSET MANAGEMENT UNITS
REGIONAL DIRECTORS
INSTITUTE DIRECTORS
SCHOOL EDUCATION DIRECTORS
REGIONAL HR MANAGERS
REGIONAL ASSET MANAGEMENT UNIT MANAGERS
OHS LIAISON MANAGERS
PRINCIPALS
TAFE COLLEGE AND CAMPUS MANAGERS
BER COORDINATORS

SAFETY ALERT No 32

PROCEDURES RELATING TO ASBESTOS DURING CONSTRUCTION WORK

The Department's *Asbestos Management Plan* sets out the requirements for managing asbestos related issues in construction work.

In accordance with the *Asbestos Management Plan*, all NSW government schools and TAFE colleges and campuses are required to notify their local Asset Management Unit (AMU) of any works to be carried out on their site. This includes work that may disturb asbestos materials.

In accordance with the Department's procedures set out in the *Asbestos Management Plan*, it is essential that the appropriate action is taken to check for the presence of asbestos in buildings or grounds before construction work begins on Departmental premises.

There are a range of steps that must take place before construction work commences:

- The contractor is inducted onto the site and given a copy of the school's asbestos register and *Asbestos Management Plan*. With respect to the induction of contractors, there are important processes for safety induction in place. Refer to the site Engaging contractors on the Department's OHS website.
- The contractor understands the procedure in place for reporting unexpected finds of asbestos (refer to Section 5 of the *Asbestos Management Plan*, *Incident Response and Emergencies*)

- The contractor has consulted the asbestos register to determine whether there are any asbestos containing materials in the vicinity of the work
- A permit to work is issued to the contractor and the contractor has the appropriate licences and approvals
- The work area is effectively barricaded and/or isolated
- Ensure appropriate work methods and control measures of any staff member or contractor working on areas of known asbestos contamination, meets all legislative requirements
- Engaging removal contractors when required in response to emergency situations

For further information, please refer to the *Asbestos Management Plan*.

Asbestos registers have recently been updated to reflect changes that have occurred in recent capital works and any advice regarding the removal and identification of asbestos material that has arisen from maintenance and other activities.

Asset Management Directorate requires that all asbestos related disturbance works involve Public Works to either deliver the works or participate in oversight of any remediation works. This is to ensure all legislative requirements are met and for the necessary documentation to be collected to enable ready update of Asbestos Registers.

The Asset Management website provides further information concerning management of asbestos:

https://detwww.det.nsw.edu.au/assetmanagement/safecomp/asbestosf.htm

Please contact your regional Asset Management Unit on telephone **132 779** if you require support and advice when addressing asbestos issues.

Yours sincerely

Peter Riordan
Deputy Director-General
Workforce Management and Systems Improvement
May 2011

MEMORANDUM TO PRINCIPALS

SAFETY NOTICE No.36

DN/12/00150

Sealant containing asbestos in Demountable buildings.

The Department of Education and Communities has confirmed that an asbestos containing mastic like sealant has been used in demountable buildings to weather seal glazing, aluminum window frames and wall panels.

An independent health hygienist has inspected the sealant product and has found it to be non-friable and assessed the risk associated with this material as low as it would be quite difficult to liberate asbestos due to the sticky nature of the sealant.

Principals are requested to ensure any contractors working on demountable buildings are made aware of this asbestos affectation. This will ensure contractors implement appropriate Workcover approved procedures when works may disturb this product.

The Department is revising all school asbestos registers to include this product as an asbestos affectation, these will be available to Principals via *AMS on the Web* and the DEC Internet site at:

https://www.det.nsw.edu.au/about-us/supplying-to-us/asbestos-register/

Specific advice regarding the product will the added to the Department's Asbestos Management Plan, which is under review with Workcover pending release for implementation for 2013.

Related information, Safety Notice No. 32, Construction Work and Asbestos, was issued in 2011 and can be found at:
https://detwww.det.nsw.edu.au/adminandmanage/ohands/safety_alert/index.htm

Should you require further advice please contact Alan Smith, Manager Compliance and Environment (Ph: 9561 8956) or Amelia Tsang, Compliance and Safety Officer (Ph: 9561 8969) in Asset Management Directorate.

Peter Johnson
R/Deputy Director-General, Corporate Services
10 **August 2012**

MEMORANDUM TO PRINCIPALS

SAFETY NOTICE No.46

DN/13/00168

Use of imported fill containing asbestos, on school sites

There have been a number of instances in recent years where building contractors, neighbouring property owners or members of the school community have approached a school principal to obtain permission to dump excavated soil or fill on a school site. This is often presented to the school as an inexpensive way to enhance school facilities.

Excavated soil or fill provided to schools in this way may contain fibro (asbestos) fragments, building rubble (glass or ceramic tiles) or other contaminants. The removal of such soil after distribution across the school site is extremely difficult and can only be achieved at a high cost. Visual inspection is usually not sufficient to identify all contaminants.

Recently there have been a number of instances where a school has accepted contaminated soil/fill. In one recent incident, the inspection and clean-up costs of one truckload of 'donated' fill containing fibro fragments was $15,000. Had this fill been distributed across a wide area the remediation costs could have been many times greater.

Principals must not permit any individual or organisation to dump soil or fill of any type on a school site. Should there be a need to obtain soil or fill material, the principal should contact their local Asset Management Unit (AMU) on 132 779 for advice on a suitable source of supply and the necessary documentation to ensure that it is clean. The AMU will document this on the school file. If you are purchasing fill, a reputable supplier will provide certification that the fill is clean, on request. This certification must be retained by the school.

If a Principal accepts soil or fill from a donor, the Principal must ensure that a material testing report from a qualified Occupational Hygienist is obtained certifying the soil or fill as clean, prior to the soil or fill being accepted. This certification must be provided to the AMU for attachment to the school file, prior to the soil or fill being placed on the school site.

Should any material be dumped on a school site without the authorisation of the Principal, the Principal must follow the Department's Asbestos Management Plan (Section 6.2.1). This requires Principals to restrict access to the dumped waste immediately and not attempt to remove the material. The incident must be reported to the AMU, after which Public Works will arrange for removal of the material out of school hours.

All future contaminated fill delivered to a school site may be reported to the Environment Protection Authority as an illegal activity under the *Environmental Planning and Assessment Act 1979*. In addition, the school will be required to contribute to clean-up/remediation costs.

Should you wish to discuss this matter further please contact: Paras Doshi, Compliance and Safety Officer on Ph: 9561 8969 or Alan Smith, Manager Environment and Compliance, on Ph: 9561 8956.

Anthony Perrrau
General Manager, Asset Management Directorate
25 October 2013

Engaging contractors

Under WHS legislation, the obligation to ensure health and safety extends not only to staff and students, but to all workplace visitors, including contractors.

Providing a Work Health and Safety (WHS) induction for all new employees and others undertaking work is a legislative requirement for all departmental workplaces. For detailed information, please check WHS Directorate's Induction link on intranet:

https://education.nsw.gov.au/inside-the-department/health-and-safety/training-and-induction

Contractors are often used to carry out maintenance and repair work on Departmental premises. The risk associated with such activities can be high, so particular attention must be paid to health and safety.

To assist Departmental workplace managers, the Department of Public Works and Services (DPWS) addresses WHS requirements in the specifications for all major and minor capital works, as well as maintenance contracts. This includes the:

- Facilities Management Manual
- For Schools:
  - Quick reference guide to school maintenance and cleaning contracts (PDF 422.88 KB)
  - Principals' A-Z guide to school maintenance and cleaning 2011-2016 (PDF 441.34 KB)
  - Participant's guide for school principals: new maintenance and cleaning contracts (PDF 1980.81 KB)

The detailed information on Facilities Management contract is available at:

education.nsw.gov.au/asset-management/procurements-and-contracts/facilities-management-contracts/contractors-information

Using independent (non-Department of Public Works approved) contractors places the responsibility for overall safety, supervision and ensuring legislative and Departmental requirements are met, on the workplace manager.

Key points for engaging contractors:

Workplace managers should:

- Wherever possible, use government contractors who comply with legislative and Departmental requirements eg maintenance and cleaning contractors.
- Follow Departmental procedures for engaging contractors. See WHS Induction.
- Rigorously check independent contractors to ensure safety obligations are met. Contractors must be suitably licensed and trained to undertake the work required and be able to provide relevant safety and insurance documentation prior to work commencing.
- Ensure that all contractors report to the workplace manager or their delegate on arrival.
- Provide contractors with a site specific induction. Include information on local conditions which may impact on safety, as per the above safety procedures.
- Inform staff, students and visitors of safety procedures while work is in progress.
- Provide opportunities for ongoing consultation and review of safety matters with contractors.
- Monitor contractor performance and raise any safety concerns with the contractor, and where relevant, with the Department of Public Works (DPWS) supervisor.

Further information:

- Asset Management Directorate – Asbestos Fibro Link on DoE Intranet
- Work Health and Safety Directorate – Induction

Reference: **Work Health and Safety Directorate & Asset Management Directorate Intranet.**

Date: **1st February 2015**

DET Demountable release / transfer checklist

Demountable serial number:
Current Location: **Check carried out by:**
Date:

AMS: Asbestos Present? Yes ☐ No ☐ If No, no further action is necessary (information is held by DET AMU)

Release – Please check each item below and tick box as applicable.
Mark any defects on a plan/drawing of the unit and attach to this checklist.

Element	Condition	Action
1. Ceiling Sheet (containing asbestos)	☐ Good condition	☐ No action required
	☐ Small cracks (corners)	☐ Stabilise crack and repair on installation, refer to Demountable Remediation Guidance 01
	☐ Large cracks & loose sheets, holes effecting stability	☐ Remove sheet, reinstate on installation, refer to Demountable Remediation Guidance 02
2. Wall Sheeting (containing asbestos)	☐ Good condition	☐ No action required
	☐ Small cracks	☐ Stabilise crack and repair on installation, refer to Demountable Remediation Guidance 04
	☐ Large cracks & loose sheets, holes, effecting stability	☐ Remove sheet, reinstate at installation, refer to Demountable Remediation Guidance 03
3. Entry steps and landing (containing asbestos)	☐ Good condition	☐ No action required
	☐ Small amounts of wear/ small cracks	☐ Stabilise damage panel and repair on installation, refer to Demountable Remediation Guidance 05
	☐ Large amounts of wear/ large cracks effecting stability	☐ Remove sheet, reinstate at installation, refer to Demountable Remediation Guidance 05
4. External eaves (containing asbestos)	☐ Good condition	☐ No action required
	☐ Small cracks	☐ Stabilise crack and repair on installation, refer to Demountable Remediation Guidance 06
	☐ Large cracks & loose sheets, holes, effecting stability	☐ Remove sheet, reinstate at installation, refer to Demountable Remediation Guidance 06

Installation (if not proceeding to storage on off-site maintenance)

New location: **Check carried out by:**
Date:

Installation – Please check each item below and tick box as applicable. Refer to plan/drawing of the unit (see above) attached to this checklist.

Element	Condition	Action
1. Ceiling Sheet (containing asbestos)	☐ Good condition	☐ No action required
	☐ Small cracks (corners)	☐ Stabilise crack and repair on installation, refer to Demountable Remediation Guidance 01
	☐ Large cracks & loose sheets, holes effecting stability	☐ Remove sheet, reinstate on installation, refer to Demountable Remediation Guidance 02
2. Wall Sheeting (containing asbestos)	☐ Good condition	☐ No action required
	☐ Small cracks	☐ Stabilise crack and repair on installation, refer to Demountable Remediation Guidance 04
	☐ Large cracks & loose sheets, holes, effecting stability	☐ Remove sheet, reinstate at installation, refer to Demountable Remediation Guidance 03
3. Entry steps and landing (containing asbestos)	☐ Good condition	☐ No action required
	☐ Small amounts of wear/ small cracks	☐ Stabilise damage panel and repair on installation, refer to Demountable Remediation Guidance 05
	☐ Large amounts of wear/ large cracks effecting stability	☐ Remove sheet, reinstate at installation, refer to Demountable Remediation Guidance 05
4. External eaves (containing asbestos)	☐ Good condition	☐ No action required
	☐ Small cracks	☐ Stabilise crack and repair on installation, refer to Demountable Remediation Guidance 06
	☐ Large cracks & loose sheets, holes, effecting stability	☐ Remove sheet, reinstate at installation, refer to Demountable Remediation Guidance 06

Appendix F

Communication strategy – brochure
'What you need to know about asbestos containing materials'

NSW GOVERNMENT | Education

July 2015

WHAT YOU NEED TO KNOW ABOUT ASBESTOS CONTAINING MATERIALS IN NSW GOVERNMENT SCHOOLS

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Introduction

The health, safety and well-being of students and staff is the highest priority of the NSW Department of Education (DoE). This commitment includes ensuring that any asbestos containing materials found in NSW Government schools and other facilities is managed in such a way as to minimise the risk to students, staff, contractors, parents and other visitors to the site.

Asbestos can be found throughout our society. Thousands of Australian businesses, homes and public buildings such as hospitals and schools were built using asbestos containing materials in the roof, floors and walls or have asbestos in insulation and ceilings.

The fact that asbestos fibres can cause asbestos related diseases such as lung cancer and mesothelioma often causes anxiety if people suspect that their home, school or office has asbestos containing materials. However, studies have shown that these products, if in sound condition and left undisturbed, do not pose a significant health risk.

Health problems usually occur when people are unaware of the hazards of working with asbestos containing materials. DoE has therefore implemented processes to ensure that all potential asbestos hazards are appropriately controlled and that asbestos containing materials that have deteriorated and therefore represents a health hazard are immediately removed from NSW Government schools.

This document is designed to help students, staff, parents and the community answer questions and learn the facts about asbestos in NSW Government schools. An awareness and understanding of these issues is essential to ensure that potential asbestos risks are quickly reported and managed, and that students, staff and visitors to the site are protected from possible exposure to asbestos.

Dr Michele Bruniges
Director-General of Education

The asbestos issue

What is asbestos and where is it found?

Asbestos is a mineral found in certain types of rock formations. When mined and processed, it takes the form of very small fibres which are usually invisible to the naked eye.

Asbestos became a popular commercial product because it is strong, won't burn, resists corrosion, and insulates well. It was used in around 3,000 products manufactured worldwide, most commonly in the construction, car manufacturing and textile industries.

Between the 1940s until the late 1980s asbestos was widely used in domestic, commercial and government buildings in Australia as 'fibro' wall and ceiling sheeting, 'super six' roofing sheeting, floor and ceiling tiles, as an insulator around pipes or sprayed in buildings, and as a fire retardant. Asbestos is sometimes found in unauthorised material such as fill on school sites.

Bonded (non-friable) and Friable Asbestos

Bonded (non-friable) asbestos containing materials are those where the asbestos fibres are bonded into the matrix eg fibro and which cannot be crushed by hand when dry. Most of the asbestos found in NSW schools, colleges and homes is bonded. Organisations like NSW Health advise that these materials, if left undisturbed and in a reasonable condition, are not a significant health risk.

Friable Asbestos is asbestos fibres or material that contains asbestos and can be pulverized under hand pressure. Friable (loosely bound) asbestos is more hazardous than bonded (non-friable) asbestos, as the fibres can more easily become airborne, presenting a greater risk of them being inhaled. Millboard, pipe and boiler lagging are examples of friable asbestos. Asbestos cement product which has been damaged so that it can be crushed by hand is also considered as friable asbestos.

When is asbestos a problem?

The presence of asbestos containing material at a school does not automatically mean that health is at risk. The potential risk is dependent upon how the asbestos containing material is managed and whether it is bonded (non-friable) or friable.

Asbestos becomes a health risk when a large amount of asbestos fibres are released into the air and inhaled. Health problems usually occur when people are unaware of the hazards of working with asbestos containing materials. It is therefore important that any work undertaken with materials containing asbestos is done in a manner that ensures minimal release of dust or small particles.

If safety guidelines are followed, asbestos containing materials should not be a problem.

I think I have found some asbestos – what happens next?

If you identify a possible asbestos hazard at your school:

- Do not panic – asbestos that is properly managed represents a very low health risk. Immediately advise the School Principal; and
- Comply with all asbestos management requirements at the site.

The school principal will:

- See if the material has already been identified in the asbestos register;
- Isolate the immediate area where the material has not previously been identified or where the condition of the material has deteriorated;

- Not attempt to dispose of or remove any material; and
- Contact the DoE Regional Asset Management Unit on 132 779 as soon as possible.

The regional asset management unit will:

- Arrange inspections and testing if necessary;
- Arrange treatment or removal of material if required; and
- Advise when the area can be returned to normal use.

Management of asbestos containing materials

How does DoE manage asbestos containing materials?

DoE ensures that asbestos containing materials are managed in a way that provides the maximum safety to students, staff and visitors to the site. The process followed by DoE includes:

- Making School Principals aware of the requirements for managing asbestos;
- Assessing facilities to ascertain the presence or absence of asbestos;
- Developing and maintaining a register containing the location or suspected location of asbestos at each site;
- Assessing the potential health risks of asbestos containing materials;
- Removing or controlling asbestos containing materials that pose an immediate health risk;
- Ensuring asbestos removalists and maintenance workers are suitably qualified and protected;
- Regularly reviewing and monitoring identified areas to ensure they are in good condition and do not pose an immediate health risk;
- Schools are required to obtain the approval of the Regional Asset Management Unit before undertaking any building work on the site; and
- Within funding constraints, continually working towards asbestos free facilities.

What has DoE done so far?

- DoE has an asbestos management plan which details how it manages asbestos in its facilities and documents the procedures which are followed to minimise the risk of exposure to asbestos of all students, staff and other visitors to the site;
- Visual inspections and testing are undertaken immediately where possible asbestos hazards are identified at a school;
- Inspections of all DoE facilities been completed. A register of areas containing asbestos has been provided to each facility;
- Where there is a risk to health from exposure DoE takes action to encapsulate, enclose or remove the asbestos containing material (see page 7);
- All known hazardous, friable asbestos containing materials have already been removed from schools in previous programs; and
- Schools are provided with advice on how to maintain gardens, grounds and other facilities which have been treated for asbestos containing materials.

What are the methods of controlling asbestos hazards?

DoE has a number of options to control asbestos hazards. It is important to understand that the immediate removal of asbestos containing materials may not be necessary or even the most appropriate action. In some instances the removal process may prove more hazardous than other options as it may increase the risk of fibres being released into the air.

Depending on the particular circumstances and condition of the asbestos containing material DoE will utilise one of the following four options:

Remove

DoE will remove any unstable asbestos containing materials under controlled conditions to ensure the health and safety of all persons at the site.

Leave and monitor

DoE will firstly look to leave and monitor stable asbestos containing materials that are not prone to damage.

Encapsulate or seal

The second option is to encapsulate or seal (ie. paint or coat) stable asbestos containing material that may be prone to damage and therefore need to be protected.

Enclose

DoE may enclose stable asbestos containing material that may be prone to damage but where encapsulating or sealing does not provide sufficient protection or may disturb asbestos fibres.

What are the schools responsibilities?

The main responsibility of the school is to ensure the health and safety of its students, staff and visitors to the site including parents, tradespeople and contractors.

To achieve this, the school principal must:

- Read and comply with all instructions and information provided on asbestos issues
- Provide information to students, staff and parents on the management and control of asbestos in NSW Government schools
- Ensure that contractors appointed by the school to work on or near asbestos containing materials are working in a safe manner (see Page 9)
- Stop any work on or near asbestos containing materials where unsafe practices appear to be happening
- Contact the Regional Asset Management Unit on 132-779 if they have any concerns or require assistance in the management of asbestos, and
- Maintain gardens, grounds and other facilities that have been treated for asbestos or left in-situ in the manner advised by the Asset Management Unit or Contractor.

Staff also have responsibilities including:

- Informing the School Principal if they identify any potential asbestos containing material
- Taking reasonable care to ensure the health and safety of themselves and others under their supervision, and
- Complying with all asbestos management requirements at the site.

How do I know if work on or near asbestos containing materials is being done safely?

Building work done on or near asbestos containing materials will be closely supervised by the Facilities Maintenance Contractor, the Department of Public Works and Services or the Regional Asset Management Unit.

If the work is being undertaken in a safe manner:

- The Contractor will have been inducted onto the site and been given a copy of the Asbestos Register and Asbestos Management Plan
- The Contractor will have consulted the Asbestos Register to determine if there are any asbestos containing materials in the vicinity of the work

- A Permit to Work will have been issued to the Contractor
- The Contractor will have the appropriate licences and approvals (see Page 10)
- The Contractor will have prepared Safe Work method statements
- The work area will be effectively barricaded and / or isolated
- Warning signs will be erected
- Air-conditioning units in adjacent areas will be switched off and vents sealed
- Dust generated from the work will be contained within the immediate area
- Breathing protection devices, disposable coveralls and other necessary personal protective equipment will be worn
- Drop sheets will be used to gather work generated asbestos waste
- Asbestos material which is to be removed will be placed in heavy duty stiff plastic bags, and
- Asbestos disposal bins will be lined with plastic.

What licences and approvals should the contractor completing the works have?

The following environmental approvals and licenses are required for asbestos work and disposal:

- Contractors who remove, repair or disturb areas of 10m^2 or more of bonded (non-friable) asbestos must hold a bonded (non-friable) or a friable asbestos licence or a demolition licence issued by WorkCover NSW
- Contractors who remove, repair or disturb friable asbestos material must hold a friable asbestos removal licence issued by WorkCover NSW
- Friable asbestos work must have a permit issued by WorkCover NSW specific for the project undertaken
- WorkCover NSW must be notified at least five days prior to the commencement of work when 10m^2 or more of bonded (non-friable) asbestos containing materials are removed
- The facility that is to receive asbestos waste material must be licensed by the EPA to receive that material, and
- Contractors must hold insurance appropriate for the asbestos work that is to be carried out.

What do I do if it appears unsafe practices are occurring?

If you see any practices that appear to be unsafe you should advise the School Principal who will contact the Regional Asset Management Unit if required.

The School Principal has the right to stop the work, pending advice from the Asset Management Unit, where they have serious concerns about health and safety.

Work should also be stopped and the Regional Asset Management Unit contacted in all instances where a Contractor finds or suspects the presence of asbestos containing materials when undertaking building or maintenance work at the site.

Where can I get more information?

If you have any further queries you should contact the School Principal. This person will know the most about the asbestos situation at the school and should be able to answer most of your questions relating to the management and control of asbestos at the site. The Principal can seek further advice and support at any time from the Regional Asset Management Unit.

In addition, general information is available on a number of government websites. This information is useful not only for the management of asbestos in schools but also for the many homes and offices which contain asbestos throughout NSW and Australia.

Department of Education Intranet

Asbestos Management Plan

https://education.nsw.gov.au/asset-management/compliance-and-safety/asbestos-information

Work, Health and Safety (WHS)

https://education.nsw.gov.au/inside-the-department/health-and-safety/training-and-induction

Control and Management of Asbestos in the workplace

https://education.nsw.gov.au/inside-the-department/health-and-safety/training-and-induction/e-safety-support

Other government websites

NSW Government, *Fibro and Asbestos – A Renovator and Homeowner's Guide*

www.balranald.nsw.gov.au/wp-content/uploads/2014/04/asbestos-fibro-renovator-and-homeowners-guide.pdf

NSW Government, Fibro and Asbestos – *First Steps Checklist*

www.cbcinspections.com.au/Files/ASBESTOS.pdf

NSW Environment Protection Authority (EPA), *Asbestos Waste Monitoring*

http://www.epa.nsw.gov.au/wasteregulation/asbestos-monitor.htm

WorkCover Authority of NSW, *Asbestos*

www.workcover.nsw.gov.au/newlegislation2012/health-and-safety-topics/asbestos/Pages/default.aspx

WorkCover Authority of NSW, Heads of Asbestos Coordination Authorities (HACA)

www.workcover.nsw.gov.au/health-and-safety/safety-topics-a-z/asbestos/heads-of-asbestos-coordination-authoritis-haca

NSW Health, *Asbestos and Health Risks*

www.health.nsw.gov.au/environment/factsheets/Pages/asbestos-and-health-risks.aspx

NSW Health, *DIY Safe*

www.health.nsw.gov.au/environment/diy/Pages/default.aspx

NSW Health, DIY Safe *Dust and Fume Hazard*

www.health.nsw.gov.au/environment/diy/Documents/diysafely.pdf

Department of Health, enHealth Document, Asbestos – A Guide for Householders and the General Public

www.health.gov.au/internet/publications/publishing.nsf/Content/CA2578620005D57ACA2579FB0008A15F/$File/asbestos-feb13.pdf

Department of Health, enHealth Document, Management of asbestos in the non-occupational environment

www.health.gov.au/internet/main/publishing.nsf/Content/ohp-enhealth-asbestos-cnt.htm

Asbestos related laws and codes of practice in NSW

Legislation

Work Health and Safety Regulation 2011

www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+674+2011+cd+0+N

Protection of the Environment Operations (Waste) Regulation 2005

www.legislation.nsw.gov.au/inforcepdf/2005-497.pdf?id=15937bef-eef8-c8ed-d2c1-dd4c148cc79c

WorkCover authority of NSW codes of practice / SafeWork Australia resources

How to Safely Remove Asbestos

www.workcover.nsw.gov.au/__data/assets/pdf_file/0016/15217/how-to-safely-remove-asbestos-code-of-practice-3561.pdf

How to Manage and Control Asbestos in the Workplace

www.workcover.nsw.gov.au/__data/assets/pdf_file/0015/15216/how-to-manage-control-asbestos-workplace-code-of-practice-3560.pdf

Guide to Working with Asbestos

www.workcover.nsw.gov.au/health-and-safety/safety-topics-a-z/asbestos/asbestos-training

Heads of Asbestos Coordination Authorities (HACA) – Asbestos Resources

www.workcover.nsw.gov.au/health-and-safety/safety-topics-a-z/asbestos/heads-of-asbestos-coordination-authorities-haca

Appendix G

DoE hazardous materials (asbestos) register update

- Asbestos register
  - Example flow chart/s for updating register
  - Asbestos register review tool (ARRT) – operation manual
- Asbestos register – FMweb update procedure

Example flowcharts for updating of register

This section of AMP illustrates the involvement of the hygienist (asbestos assessor) and the updating of the asbestos records in the Asset Management System (AMS).

The following flowchart is provided as an example and explains maintenance of an asbestos register via a panel hygienist and their subsequent use of the Asbestos Register Review Tool (ARRT) prior to a project commencing. It does not aim to show all stakeholders and steps.

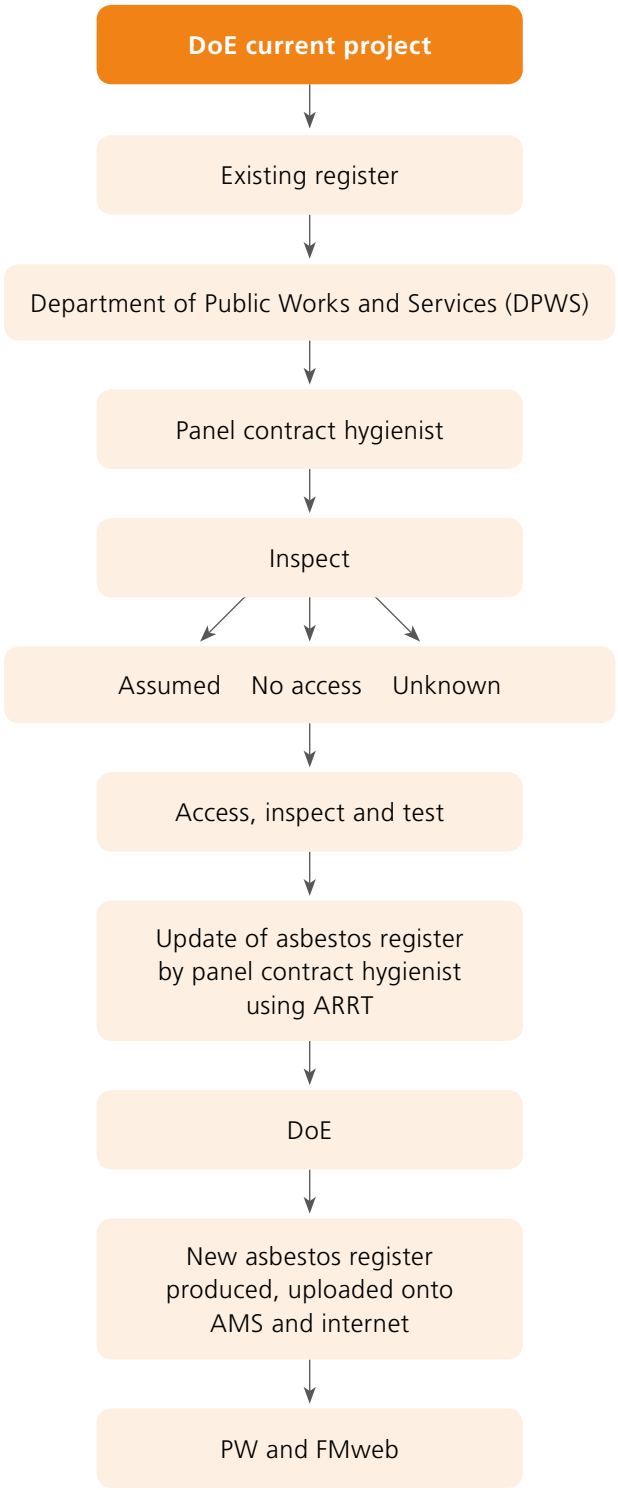


Figure G.1: Example flow chart – updating of register by panel contract hygienist

The following flowchart is provided as an example and explains maintenance of an asbestos register via a panel hygienist, their involvement in asbestos management during a project and their subsequent use of the Asbestos Register Review Tool (ARRT). It does not aim to show all stakeholders and steps.

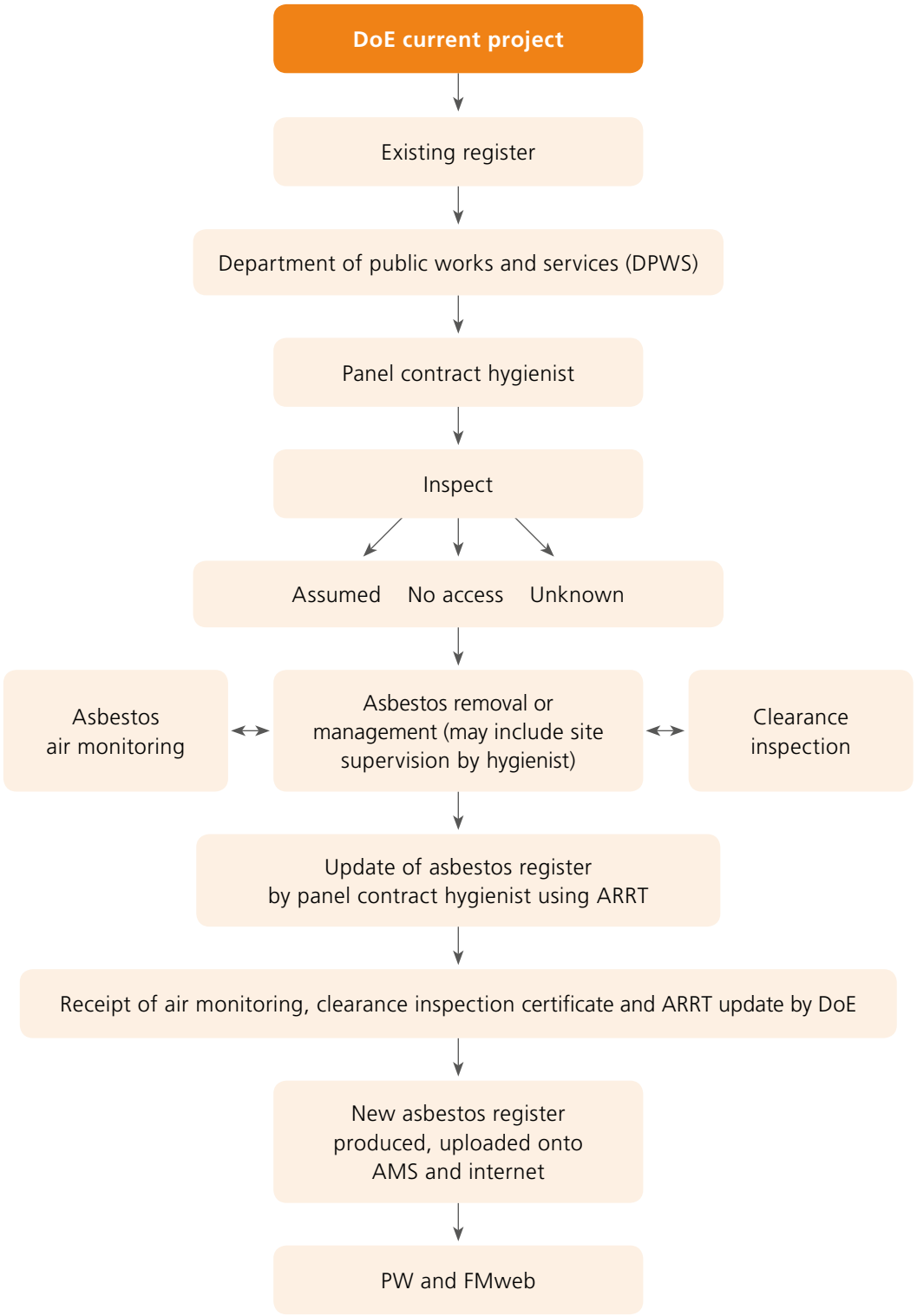
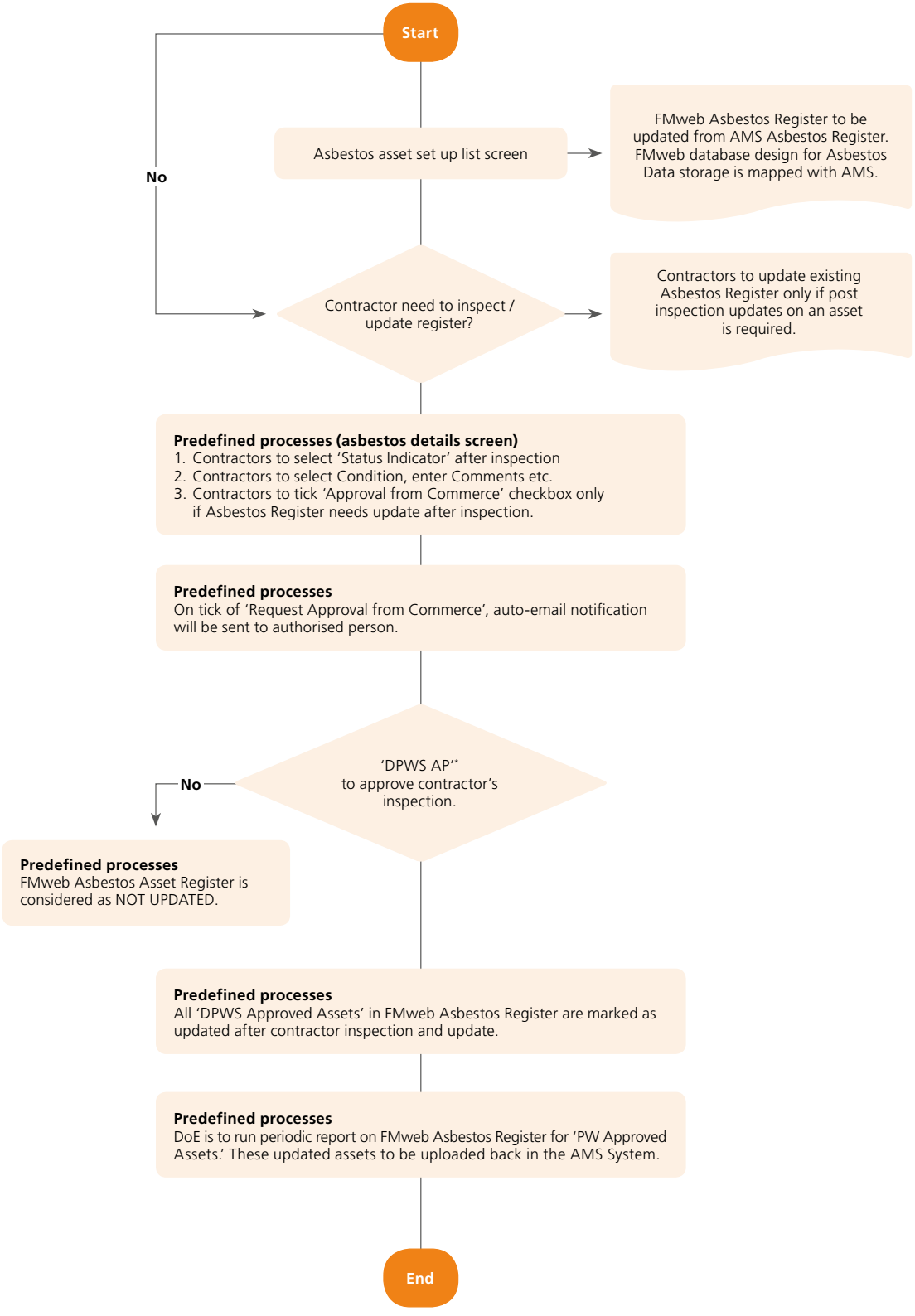


Figure G.2: Example flow chart – updating of register by panel contract hygienist (with project involvement)

Asbestos register – update procedure for FMweb

This section of AMP illustrates the procedure of updating the asbestos records in the FMweb program. The following flowchart explains maintenance of asbestos asset registers in FMweb.

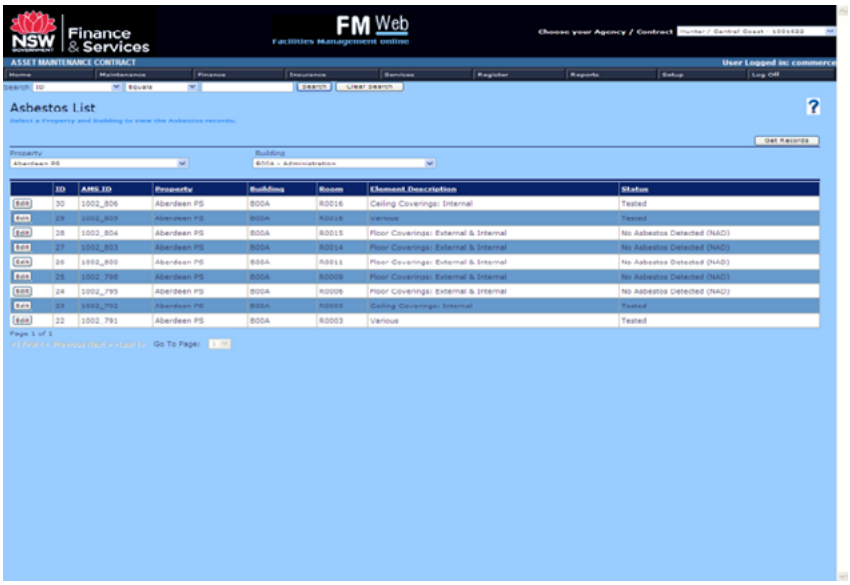
Maintenance of asbestos asset register in FMweb



*DPWS AP – Department of Public Works and Services Authorised Person

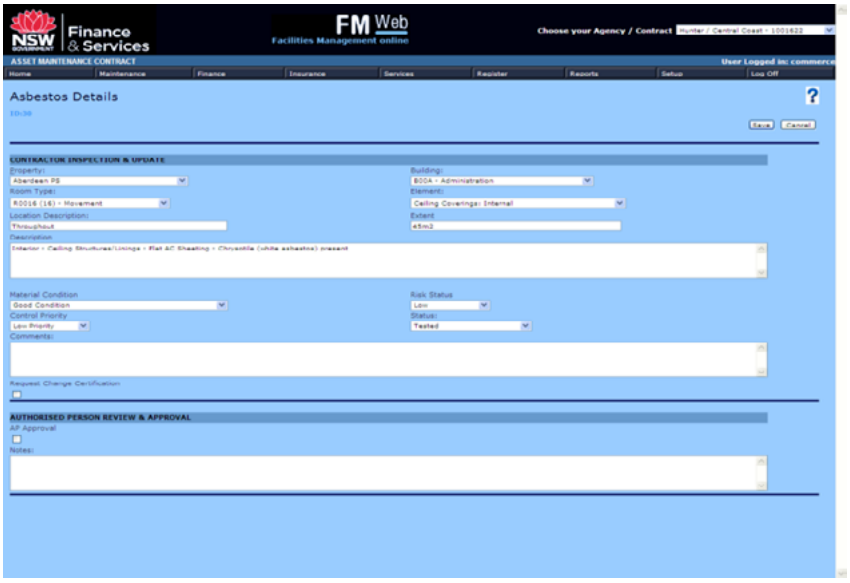
Asbestos list screen in FMweb:

- Log in using user name and password in FMweb.
- Click on ‘Register’ >> ‘Asbestos list’ from FMweb main menu to go to the asbestos list screen.
- Asbestos asset list screen shows important fields like asbestos asset ID, AMS ID, property name, building, room, element and status details for the selected property and building.
- To get the asbestos asset list, user must select property and building.



- Edit’ button on the ‘asbestos list’ screen open up the ‘asbestos details’ screen. Users can modify the details of recorded asbestos asset on this page.

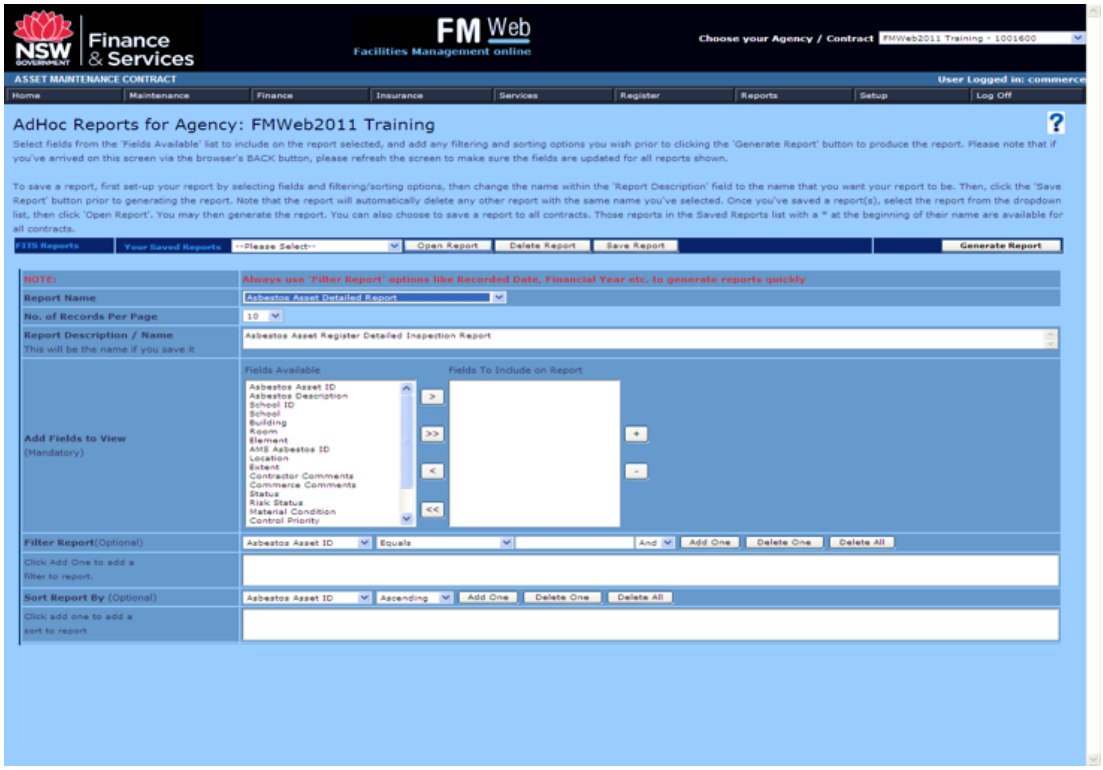
Asbestos details screen:



- Asbestos asset can only be recorded at the element level. Elements drop down list shows all the valid elements for selection.
- 'Location' is a free text box where multiple locations can be entered for a single asbestos asset recorded against element.
- 'Extent' is a free text where users can enter measurements of the assessed asbestos.
- 'Description' is a 500 character long free text where user can enter asbestos description and other details.
- 'Material condition' is a drop down box with the condition options.
- 'Risk status' is drop down box to mark the asbestos condition risk as high, medium or low.
- 'Control priority' is drop down to select priority ranking as high, medium or low.
- 'Status' drop down box allows users to select appropriate status based on the survey result. Contractors should update Asbestos asset status periodically. The status indicator have below 3 options:
  - a. Assumed asbestos
  - b. Tested
  - c. No asbestos detected (NAD)
- 'Comments' is a 500 character free text box where user can enter notes with respect to the periodic assessment of asbestos asset.
- Asbestos details screen is updated to provide an option for contractor to send an approval request to public works authorised person (AP), once inspection is carried out at the site.
- Once contractor tick 'request change certification' checkbox and save the record, auto-email notification will be sent to Public Works AP to inspect and action this item in FMweb.
- New 'authorised person review and approval' panel is added on asbestos details screen in FMweb where PW AP can tick on 'AP approval' check box and add comments in 'notes' text box.

FMweb reports:

- FMweb has reporting facility to generate ad-hoc reports on Asbestos Asset Register maintenance.



Appendix H

Window asbestos mastic and putty procedure

- Window asbestos mastic procedure
- Window asbestos putty procedure

NSW GOVERNMENT | Education

WINDOW ASBESTOS MASTIC PROCEDURE

NSW GOVERNMENT SCHOOLS DEMOUNTABLE

Revision	Details	Date	Amended by
00	Original	22 August 2012	
A	Amended with comments provided by the Asset Management Directorate	24 October 2012	
B	Insertion of photos to appendix B	17 November 2012	
C	Date amended	22 November 2013	
D	Date amended	15 April 2014	
E	Date amended	3 June 2014	
F	Date amended	1 February 2015	

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Reviewer: Jason North

Signed:

Approved by: Jason North

Signed:

Date: See above

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Please note that when viewed electronically this document may contain pages that have been intentionally left blank. These blank pages may occur because in consideration of the environment and for your convenience, this document has been set up so that it can be printed correctly in double-sided format.

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Appendix A Certificate of works

Appendix B Photographs

Glossary

Acronym	Definition
A	Amosite Asbestos (brown asbestos)
ACM	Asbestos containing Material
AS 1216	Standards Association of Australia, Classification and Class Labels for Dangerous Goods
AS 1319	Standards Association of Australia, Rules for the Design and Use of Safety Signs for the Occupational Environment
AS 1715	Standards Association of Australia, Selection, Use and Maintenance of Respiratory Protective Devices
AS 1716	Standards Association of Australia, Respiratory Protective Devices
C	Crocidolite Asbestos (blue asbestos)
CH	Chrysotile Asbestos (white asbestos)
Competent person	Contractor that has undertaken asbestos awareness training, has appropriate experience and has been inducted to this WAMP
EPA	Environment Protection Authority
Fibres/mL	Countable Fibre per Millilitre of Air Sampled
L/min	Litres per Minute of Air
Minor Works	Removal of non-friable asbestos putty to an extent of less than <10m2 or approximately 3-4 windows
NAD	No Asbestos Detected
NATA	National Association of Testing Authorities, Australia
NOHSC	National Occupational Health and Safety Commission
PPE	Personal Protective Equipment
RPE	Respiratory Protective Equipment
WAMP	Window Asbestos Mastic Procedure (this document)

1. Introduction

This window asbestos mastic procedure (WAMP) has been developed to assist with the management of asbestos mastic associated with aluminium framed windows installed in some old system demountables located throughout NSW Government Schools.

This WAMP has been developed for the use of Department of Education (DoE), NSW Public Works and school contractors that have been engaged to repair a window following the identification of damage such as a broken window.

Any repairs to windows fitted with asbestos mastic must be undertaken by a competent person; that is, a contractor that has undergone at minimum an asbestos awareness training course, can demonstrate relevant experience and has been inducted into the use of this WAMP.

This WAMP only allows for the competent person to undertake remediation works that do not exceed $10m^2$ of mastic asbestos containing material. In respect of this value of $10m^2$, a comparative linear amount is difficult to determine.

It is considered appropriate that this might not be typically greater than 3-4 windows. Please note that it is not expected that the amount of asbestos containing mastic included within the removal of 3-4 windows is to exceed an amount of $10m^2$, however it is considered that a project of such size requires the involvement and guidance of a contractor working alongside a glazier.

If additional windows need to be repaired/ replaced or if the demountable is to undergo any refurbishment works, works to the windows or other asbestos containing materials must be undertaken by a contractor holding as a minimum a non-friable asbestos removal licence (ASB).

Please refer to Work Health and Safety Act and Regulations 2011 (NSW), WorkCover NSW How to Manage and Control Asbestos in the Workplace Code of Practice 2011, WorkCover NSW How to Safely Remove Asbestos Code of Practice 2011 and the DoE asbestos management plan (AMP), in particular Sections 7 and 9.

1.1 Background

An investigation was undertaken of a typical old style demountable with Public Works Suite 2 aluminium framed windows and asbestos containing mastic was identified in the following locations of the demountable:

a) Within the window frame where the glass pane is fixed to the external aluminium frame

b) On the window frame where the window is fixed to the demountable steel frame (not consistent)

c) On the frame of the plywood and aluminium wall panels where the panel is fixed to the demountable steel frame (not consistent)

As it is anticipated that repair works will only be undertaken to the glass pane of the demountable and as the asbestos mastic in its current form is enclosed and deemed to be stable and safe this WAMP shall only provide a procedure for the safe removal of small sections of asbestos mastic while repairing a window.

2. Window Asbestos Mastic Procedure (WAMP)

2.1 Determination if window is fitted with asbestos mastic

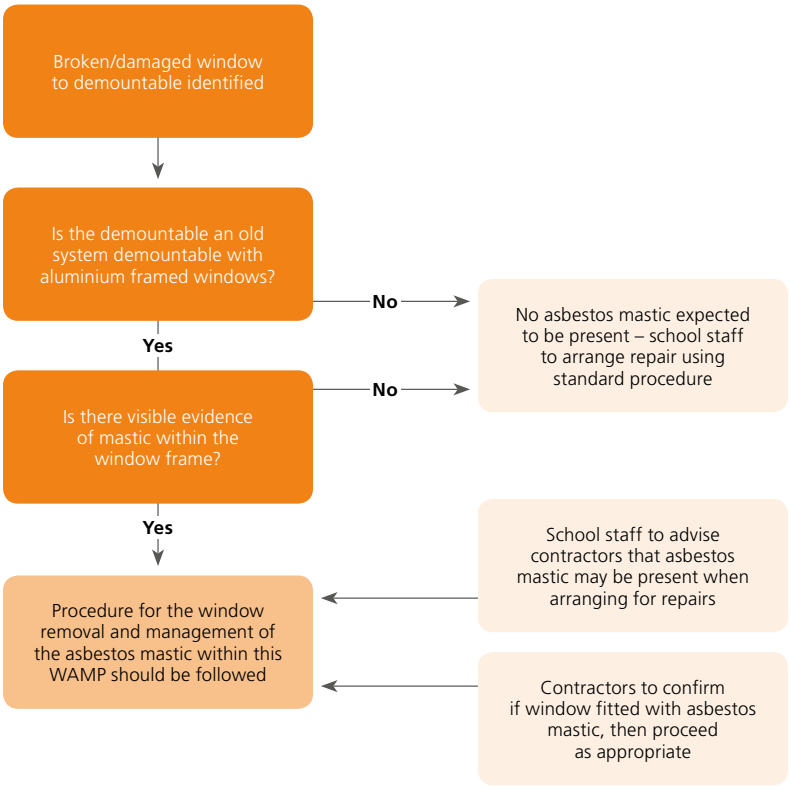


Figure 2.1 Demountable broken window

2.2 Asbestos removal control plan – minor works

The following plan has been developed as a guide to assist with the safe removal of asbestos mastic associated with the aluminium window frames of the old system demountable buildings located at NSW Government Schools.

Each contractor is to assess the works to be done prior to commencement, noting that all asbestos removal works must be undertaken in accordance with the requirements of Work Health and Safety Act and Regulations 2011 (NSW), WorkCover NSW How to Safely Remove Asbestos Code of Practice 2011 and the DoE asbestos management plan (AMP).

Asbestos removal works are only to be undertaken outside of school hours as detailed within the DoE AMP.

All asbestos removal/remediation works must be documented and a certificate of works (see Appendix A) completed and provided to the Asset Management Unit (AMU) representative. The school asbestos register is to be updated with the applicable information.

2.2.1 PPE requirements

All persons engaged in the asbestos removal and window replacement works should wear appropriate PPE including:

- Particulate respirator in accordance with AS 1715 and 1716; as a minimum it is recommended contractors are to be fitted with P2 disposable respirators
- Disposable coveralls that provide particle-tight protection (Type 5) and limited splash-tight protection (Type 6)
- Safe eye protections such as safety glasses, goggles or face shields
- Cut and slip resistant hand protection
- Ankle high, steel capped safety boots, and
- Hard hats.

Please regularly refer to relevant Australian Standard (AS) for further details, and updates.

2.2.2 Site set-up

The work area is to be set up so as not to contaminate areas on either side of the window. Prior to setting up the work area all non-fixed furniture, equipment and miscellaneous goods adjacent to the window should be removed from the area.

200 µm thick polythene sheeting is to be utilised as drop sheets on either side of the window to collect any debris and to prevent cross-contamination. The drop sheets should extend at least 2 metres from the window.

2.2.3 Removal procedure

The broken glass is to be removed as detailed within the contractor's Safe Work methods statement (SWMS). If mastic is found to be present on the glass pane, the glass is to be placed within 200 µm thick polythene bags and sealed for disposal as asbestos waste. If the glass is found to be free of mastic or if the mastic can be removed cleanly then the glass pane can be disposed of or recycled as normal.

An airless spray should be used to wet the asbestos mastic with a mix of water and wetting agent such as detergent, prior to attempting its removal.

The remaining mastic within the frame is to be scrapped out with the use of hand tools such as scrappers, screw drivers or chisels.

Note: No power tools are to be used during any mastic removal.

Mastic is to be removed as far as reasonably practicable. It is understood that corrugations are present within the aluminium frame which may prevent the removal of all of the mastic. It is expected that residual mastic will remain within the frame; however every effort should be made to remove as much mastic as reasonably practicable prior to the installation of the new window pane. A note to this effect should be placed on the certificate of works detailed within Appendix A.

The frame and tools are to be cleaned with wet rags. If the rags are unable to remove the residual mastic a solvent may be utilised.

The mastic removed along with rags and any debris and dust are to be placed within 200 µm thick polythene bags for disposal as asbestos waste.

Any debris or dust generated during the removal process must be removed via wet wiping and drop sheets are to be rolled onto themselves and placed within the 200 µm thick polythene bags for disposal as asbestos waste.

Following the installation of the new glass pane the edges of the window frame are to be sealed with non-asbestos mastic to ensure the remaining asbestos mastic is enclosed and cannot be accessed during normal activity in the area.

At the conclusion of all works the area is to be Decontaminated of all dust and debris with the use of wet wipes to ensure the area is clean and free of dust prior to allowing students and staff to return.

2.2.4 Decontamination

Personal Decontamination must be undertaken each time workers leave the asbestos work area and at the completion of the asbestos removal work. Personal Decontamination should be done within the asbestos work area where re-contamination cannot occur. Refer to WorkCover NSW How to Safely Remove Asbestos Code of Practice 2011 and the NSW WHS Regulation 2011 made under NSW WHS Act 2011 for personal Decontamination methods.

For non-friable (bonded) asbestos removal works a dry Decontamination area is to be set up at the entry point of the asbestos work area. This will include a weighed down sheet of 200µm thick polythene sheeting laid on the floor with access to an airless water spray bottle and rags or towels.

When leaving the work area all site personnel must make their way to the nominated dry Decontamination area, spray down their coveralls with water, remove their coveralls inside out and clean their masks and boots using the wet rags. The respirator must remain on during Decontamination and must only be removed on completion of Decontamination.

All equipment that is to leave the work area must also be Decontaminated in the dry Decontamination area with the use of wet rags.

Once the Decontamination process is complete contaminated rags and coveralls must be disposed of in 200µm polythene bags.

2.2.5 Containment, labelling and waste disposal

In accordance with Section 4.8 of WorkCover NSW How to Safely Remove Asbestos Code of Practice 2011, all asbestos containing materials removed or asbestos contaminated material must be either wrapped and sealed within 200 µm thick polythene or placed within 200 µm polythene bag/s that are no longer than 1200 mm and no wider then 900 mm wide. Refer to Section 4.8 for additional guidance.

Bags containing waste are to be sealed with duct tape via the goose neck method and placed and sealed within another 200 µm polythene bag for transport to an appropriate waste disposal facility licensed to accept asbestos waste.

Polythene sheeting parcels are to be wrapped additionally within 200 µm thick polythene sheeting for transport to an appropriate waste disposal facility licensed to accept asbestos waste.

Prior to leaving site all bags and parcels are to be labelled appropriately and in accordance with Appendix B of WorkCover NSW How to Manage and Control Asbestos in the Workplace Code of Practice 2011 and Section 4.8 of WorkCover NSW How to Safely Remove Asbestos.

As per Section 4.8 of WorkCover NSW How to Safely Remove Asbestos all waste drums or bins should be lined with plastic (minimum 200 µm thickness), and labels warning of the asbestos waste should be placed on the top and side of each drum or bin with the words, 'Danger: Asbestos Do not break seal' or similar warning.

As per Section 4.8 of WorkCover NSW How to Safely Remove Asbestos, if the volume or size of the asbestos waste cannot be contained within asbestos waste bags, drums or bins, a waste skip, vehicle tray or similar container in good condition should be used. The asbestos should be sealed in double-lined, heavy-duty plastic sheeting or double bagged before it is placed in the skip. However, non-friable asbestos waste may be placed directly into a skip or vehicle tray that has been double-lined with heavy-duty plastic sheeting (200 µm minimum thickness) provided it is kept damp to minimise the generation of airborne asbestos.

As per Section 4.8 of WorkCover NSW How to Safely Remove Asbestos, all asbestos waste must be disposed of as soon as is practicable at a licensed asbestos disposal site. The asbestos waste must be disposed of as soon as reasonably practicable, whether that is at the end of the removal job, when the waste containers are full or at the end of each day if the asbestos waste cannot be secured at the removal site.

Refer to both above mentioned documents for further information.

3. Statement of limitations

3.1 Scope of services

This hazardous materials control plan ('the report') has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Parsons Brinckerhoff (PB) ('scope of services'). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

3.2 Reliance on data

In preparing the report, PB has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ('the data'). Except as otherwise stated in the report, PB has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ('conclusions') are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. PB will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to PB.

3.3 Environmental conclusions

In accordance with the scope of services, PB has relied upon the data and has not conducted any environmental field monitoring or testing in the preparation of the report. The conclusions are based upon the data and visual observations and are therefore merely indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of contaminants or emissions.

Within the limitations imposed by the scope of services, the assessment of the site and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

3.4 Report for benefit of client

The report has been prepared for the benefit of the Client and no other party. PB assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of PB or for any loss or damage suffered by any other party in relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

3.5 Other limitations

PB will not be liable to update or revise the report to take into account any events, emergent circumstances or facts occurring or becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to nor ownership of the properties, buildings and structures referred to in the report, nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

Appendix A of WAMP

- Certificate of works

Certificate of works demountable window repair

Works undertaken compliant with window asbestos mastic procedure

Site details:

Schools

Date Time

Demountable No.

Competent person details:

Company

Contractor name

Details of repair/remediation works:

Location of window#

Pane of glass**

Details of work

Conclusion:

Has the asbestos mastic been removed as far as reasonably practicable? Yes ☐ No ◯

(If no make comment below)

Has residual asbestos mastic been sufficiently encapsulated with non-asbestos mastic? Yes ☐ No ◯

(If no make comment below)

Sign off:

I of

confirm that the asbestos mastic has been removed as far as reasonably practicable and the remaining mastic residue has been encapsulated with non-asbestos mastic. The area is now in a safe condition to be returned to normal occupation.

Signature

Name

Position

Company Date

Reference

 # Location of window:

In terms of describing the window location the following assumptions are made:

The elevation with the entrance shall be referred to as the 'front.' The elevation with no entrance shall be referred to as the 'back.' Looking at the front, windows shall be numbered 1 onwards from the left. Looking at the back, windows shall be numbered 1 onwards from the right.

Example: The fourth window from the left on the front of the demountable shall be given the identifying number – front-4.

**** Pane of glass:**

Typically a window has 4 panes. See diagram below:

Fixed pane	Slider
Hopper beneath fixed pane	Hopper beneath slider

Appendix B of WAMP

- Photographs

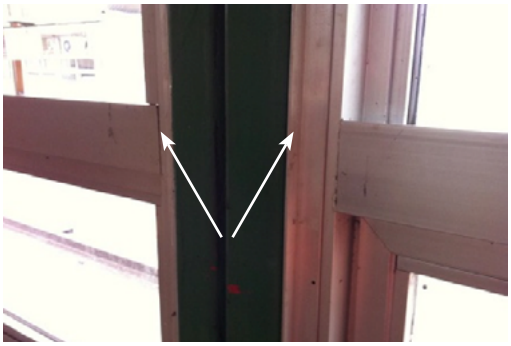
Photograph 01:
Old system demountable showing typical wall panels and windows – view from front

Photograph 02:
Old system demountable showing typical wall panels and windows – view from rear

Photograph 03:
Typical panels removed from demountable – red arrows show the location of the asbestos containing mastic on the aluminium frame of the panel

Photograph 04:
Typical panels showing location of asbestos containing mastic on aluminium frame

Photograph 05:
Typical windows – view from inside demountable



Photograph 06:
Position where asbestos containing mastic is used to seal the join between the steel frame of the demountable and the aluminium frame of the windows / panels

Photograph 07:
Asbestos containing mastic in the grove of the window where the glass pane is inserted

NSW GOVERNMENT | Education

WINDOW ASBESTOS PUTTY PROCEDURE

NSW GOVERNMENT SCHOOLS BUILDINGS

Revision	Details	Date	Amended by
00	Original	11 December 2012	
01	Date amended	22 November 2013	
02	Date amended	15 April 2014	
03	Date amended	3 June 2014	
04	Date amended	1 February 2015	

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Author: John G Batty

Signed:

Reviewer: Jason North

Signed:

Approved by: Jason North

Signed:

Date: See above

Distribution: 1 electronic PDF copy – DoE

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Please note that when viewed electronically this document may contain pages that have been intentionally left blank. These blank pages may occur because in consideration of the environment and for your convenience, this document has been set up so that it can be printed correctly in double-sided format.

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Appendix A Certificate of works

Glossary

Acronym	Definition
A	Amosite Asbestos (brown asbestos)
ACM	Asbestos containing Material
AS 1216	Standards Association of Australia, Classification and Class Labels for Dangerous Goods
AS 1319	Standards Association of Australia, Rules for the Design and Use of Safety Signs for the Occupational Environment
AS 1715	Standards Association of Australia, Selection, Use and Maintenance of Respiratory Protective Devices
AS 1716	Standards Association of Australia, Respiratory Protective Devices
C	Crocidolite Asbestos (blue asbestos)
CH	Chrysotile Asbestos (white asbestos)
Competent person	Contractor that has undertaken asbestos awareness training, has appropriate experience and has been inducted to this WAPP
EPA	Environment Protection Authority
Fibres/mL	Countable Fibre per Millilitre of Air Sampled
L/min	Litres per Minute of Air
Minor Works	Removal of non-friable asbestos putty to an extent of less than <10m2 or approximately 3-4 windows
NAD	No Asbestos Detected
NATA	National Association of Testing Authorities, Australia
NOHSC	National Occupational Health and Safety Commission
PPE	Personal Protective Equipment
RPE	Respiratory Protective Equipment
Trained Personnel	A person from the school, DoE, AMU, Public Works, FM contractor or hygienist; who has gone through an asbestos awareness training session that details the correct method of sampling putty for asbestos content
WAPP	Window Asbestos Putty Procedure (this document)

1. Introduction

This window asbestos putty procedure (WAPP) has been developed to assist with the management of asbestos putty associated with windows installed in NSW Goverment Schools.

This WAPP has been developed for the use of Department of Education (DoE), NSW Public Works and NSW Government school contractors that have been engaged to repair a window following the identification of damage such as a broken window.

Any repairs to windows fitted with asbestos putty must be undertaken by a competent person; that is, a contractor that has undergone at minimum an asbestos awareness training course, can demonstrate relevant experience and has been inducted into the use of this WAPP.

This WAPP only allows for the competent person to undertake remediation works that do not exceed 10m^2 of putty asbestos containing material. In respect of this value of 10m^2, a comparative linear amount is difficult to determine.

It is considered appropriate that this might not be typically greater than 3-4 windows. Please note that it is not expected that the amount of asbestos containing putty included within the removal of 3-4 windows is to exceed an amount of 10m^2, however it considered that a project of such size requires the involvement and guidance of a contractor working alongside a glazier.

If additional windows need to be repaired/ replaced or if the building is to undergo any refurbishment works, works to the windows or other asbestos containing materials must be undertaken by a contractor holding as a minimum a non-friable asbestos removal licence (ASB).

Please refer to Work Health and Safety Act and Regulations 2011 (NSW), WorkCover NSW How to Manage and Control Asbestos in the Workplace Code of Practice 2011, WorkCover NSW How to Safely Remove Asbestos Code of Practice 2011 and the DoE asbestos management plan (AMP), in particular Sections 7 and 9.

1.1 Background

It has been brought to the attention of the DoE that windows within its school buildings may contain asbestos putty. Typically this putty can be identified at the following locations:

a) Within the window frame where the glass pane is fixed to the external window frame

b) On the window frame where the window is fixed to the building brick or timber work

As it is anticipated that repair works will only be undertaken to the glass pane of the window and as any other asbestos putty should be enclosed and deemed to be stable and safe this WAPP shall only provide a procedure for the safe removal of small sections of asbestos putty while repairing a window.

2. Window Asbestos Putty Procedure (WAPP)

2.1 Determination if window is fitted with asbestos putty

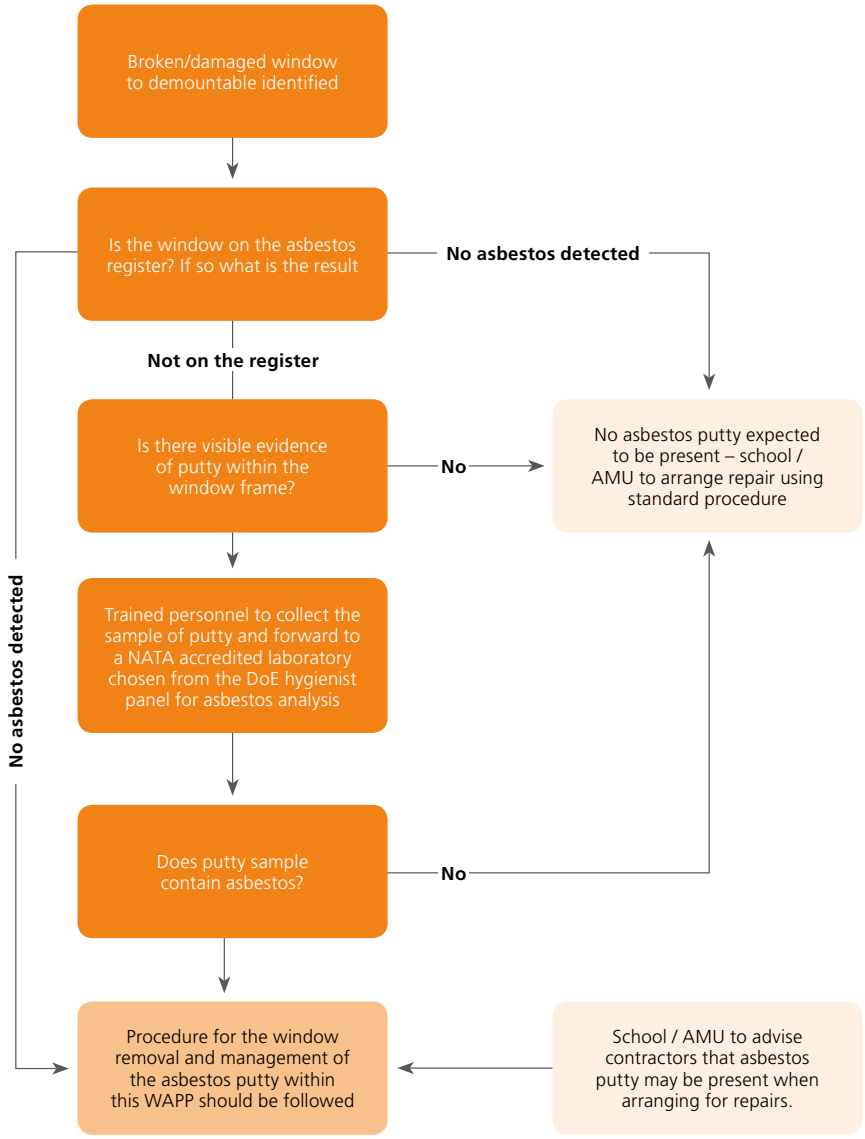

Figure 2.1 Broken window

2.2 Asbestos removal control plan – minor works

The following plan has been developed as a guide to assist with the safe removal of asbestos putty associated with the window frames of buildings identified as containing asbestos putty windows.

Each contractor is to assess the works to be done prior to commencement, noting that all asbestos removal works must be undertaken in accordance with the requirements of Work Health and Safety Act and Regulations 2011 (NSW), WorkCover NSW How to Safely Remove Asbestos Code of Practice 2011 and the DoE asbestos management plan (AMP).

Asbestos removal works are only to be undertaken outside of school hours as detailed within the DoE AMP.

All asbestos removal/remediation works must be documented and a certificate of works (see Appendix A) completed and provided to the Asset Management Unit (AMU) representative. The school asbestos register is to be updated with the applicable information.

2.2.1 PPE Requirements

All persons engaged in the asbestos removal and window replacement works should wear appropriate PPE including:

- Particulate respirator in accordance with AS 1715 and 1716. As a minimum it is recommended contractors are to be fitted with P2 disposable respirators;
- Disposable coveralls that provide particle-tight protection (Type 5) and limited splash-tight protection (Type 6);
- Safe eye protections such as safety glasses, goggles or face shields;
- Cut and slip resistant hand protection;
- Ankle high, steel capped safety boots; and
- Hard hats.

Please refer to relevant Australian Standard (AS) for further details, and updates.

2.2.2 Site set-up

The work area is to be set up so as not to contaminate areas on either side of the window. Prior to setting up the work area all non-fixed furniture, equipment and miscellaneous goods adjacent to the window should be removed from the area.

200 µm thick polythene sheeting is to be utilised as drop sheets on either side of the window to collect any debris and to prevent cross-contamination. The drop sheets should extend at least 2 metres from the window.

2.2.3 Removal procedure

The broken glass is to be removed as detailed within the contractor's Safe Work methods statement (SWMS). If putty is found to be present on the glass pane, the glass is to be placed within 200 µm thick polythene bags and sealed for disposal as asbestos waste. If the glass is found to be free of putty or if the putty can be removed cleanly then the glass pane can be disposed of or recycled as normal.

An airless spray should be used to wet the asbestos putty with a mix of water and wetting agent such as detergent, prior to attempting its removal.

The remaining putty within the frame is to be scrapped out with the use of hand tools such as scrappers, screw drivers or chisels.

Note: No power tools are to be used during any Putty removal.

Putty is to be removed as far as reasonably practicable. It is understood that corrugations may be present on the frame which may prevent the removal of all of the putty. It is expected that residual putty will remain within the frame; however every effort should be made to remove as much putty as reasonably practicable prior to the installation of the new window pane. A note to this effect should be placed on the certificate of works detailed within Appendix A.

The frame and tools are to be cleaned with wet rags. If the rags are unable to remove the residual putty a solvent may be utilised.

The putty removed along with rags and any debris and dust are to be placed within 200 µm thick polythene bags for disposal as asbestos waste.

Any debris or dust generated during the removal process must be removed via wet wiping and drop sheets are to be rolled onto themselves and placed within the 200 µm thick polythene bags for disposal as asbestos waste.

Following the installation of the new glass pane the edges of the window frame are to be sealed with non-asbestos putty to ensure the remaining asbestos putty is enclosed and cannot be accessed during normal activity in the area.

At the conclusion of all works the area is to be Decontaminated of all dust and debris with the use of wet wipes to ensure the area is clean and free of dust prior to allowing students and staff to return.

2.2.4 Decontamination

Personal Decontamination must be undertaken each time workers leave the asbestos work area and at the completion of the asbestos removal work. Personal Decontamination should be done within the asbestos work area where re-contamination cannot occur.

For non-friable (bonded) asbestos removal works a dry Decontamination area is to be set up at the entry point of the asbestos work area. This will include a weighed down sheet of 200µm thick polythene sheeting laid on the floor with an airless water spray bottle and rags or towels.

When leaving the work area all site personnel must make their way to the nominated dry Decontamination area, spray down their coveralls with water, remove their coveralls inside out and clean their masks and boots using the wet rags. The respirator must remain on during Decontamination and must only be removed on completion of Decontamination.

All equipment that is to leave the work area must also be Decontaminated in the dry Decontamination area with the use of wet rags.

Once the Decontamination process is complete contaminated rags and coveralls must be disposed of in 200 mm polythene bags.

Refer to WorkCover NSW How to Safely Remove Asbestos Code of Practice 2011 and the NSW WHS Regulation 2011 made under NSW WHS Act 2011 for personal Decontamination methods.

2.2.5 Containment, labelling and waste disposal

In accordance with Section 4.8 of WorkCover NSW How to Safely Remove Asbestos Code of Practice 2011, all asbestos containing materials removed or asbestos contaminated material must be either wrapped and sealed within 200 mm thick polythene or placed within 200 mm polythene bag/s that are no longer than 1200 mm and no wider then 900 mm wide. Refer to Section 4.8 for additional guidance.

Bags containing waste are to be sealed with duct tape via the goose neck method and placed and sealed within another 200 mm polythene bag for transport to an appropriate waste disposal facility licensed to accept asbestos waste.

Polythene sheeting parcels are to be wrapped additionally within 200 mm thick polythene sheeting for transport to an appropriate waste disposal facility licensed to accept asbestos waste.

Prior to leaving site all bags and parcels are to be labelled appropriately and in accordance with Appendix B of WorkCover NSW How to Manage and Control Asbestos in the Workplace Code of Practice 2011 and Section 4.8 of WorkCover NSW How to Safely Remove Asbestos.

As per Section 4.8 of WorkCover NSW How to Safely Remove Asbestos all waste drums or bins should be lined with plastic (minimum 200 mm thickness), and labels warning of the asbestos waste should be placed on the top and side of each drum or bin with the words, 'Danger: Asbestos Do not break seal' or similar warning.

As per Section 4.8 of WorkCover NSW How to Safely Remove Asbestos, if the volume or size of the asbestos waste cannot be contained within asbestos waste bags, drums or bins, a waste skip, vehicle tray or similar container in good condition should be used. The asbestos should be sealed in double-lined, heavy-duty plastic sheeting or double bagged before it is placed in the skip. However, non-friable asbestos waste may be placed directly into a skip or vehicle tray that has been double-lined with heavy-duty plastic sheeting (200 mm minimum thicknesses) provided it is kept damp to minimise the generation of airborne asbestos.

As per Section 4.8 of WorkCover NSW How to Safely Remove Asbestos, all asbestos waste must be disposed of as soon as is practicable at a licensed asbestos disposal site. The asbestos waste must be disposed of as soon as reasonably practicable, whether that is at the end of the removal job, when the waste containers are full or at the end of each day if the asbestos waste cannot be secured at the removal site.

Refer to both above mentioned documents for further information.

3. Statement of limitations

3.1 Scope of services

This hazardous materials control plan ('the report') has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Parsons Brinckerhoff (PB) ('scope of services'). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

3.2 Reliance on data

In preparing the report, PB has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ('the data'). Except as otherwise stated in the report, PB has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ('conclusions') are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. PB will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to PB.

3.3 Environmental conclusions

In accordance with the scope of services, PB has relied upon the data and has not conducted any environmental field monitoring or testing in the preparation of the report. The conclusions are based upon the data and visual observations and are therefore merely indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of contaminants or emissions.

Within the limitations imposed by the scope of services, the assessment of the site and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

3.4 Report for benefit of client

The report has been prepared for the benefit of the Client and no other party. PB assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of PB or for any loss or damage suffered by any other party in relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

3.5 Other limitations

PB will not be liable to update or revise the report to take into account any events, emergent circumstances or facts occurring or becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to nor ownership of the properties, buildings and structures referred to in the report, nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

Appendix A of WAPP

- Certificate of works

Certificate of works buildings window repair

Works undertaken compliant with window asbestos putty procedure

Site details:

Schools

Date Time

Demountable No.

Competent person details:

Company

Contractor name

Details of repair/remediation works:

Location of window#

Pane of glass**

Details of work

Conclusion:

Has the asbestos mastic been removed as far as reasonably practicable? Yes ◯ No ◯

(If no make comment below)

Has residual asbestos mastic been sufficiently encapsulated with non-asbestos mastic? Yes ◯ No ◯

(If no make comment below)

Sign off:

I of

confirm that the asbestos mastic has been removed as far as reasonably practicable and the remaining mastic residue has been encapsulated with non-asbestos mastic. The area is now in a safe condition to be returned to normal occupation.

Signature

Name

Position

Company Date

Appendix I

- Panel contract brochure

NSW Government Contract 1300020

NSW GOVERNMENT | Education

DoE Occupational Hygienist Panel Contract

Briefing information sheet

Advice for school principals and facility managers, regarding responsibilities when using the Occupational Hygienist panel contract. To accompany Memorandum to Principals, Executive Directors and Institute Directors DN/15/00038.

General

- This contract provides Occupational Hygienist Services for the management of its assets to ensure compliance with the relevant legislation, including the NSW Work Health and Safety (WHS) Regulation 2011, particularly as this relates to asbestos as a licenced asbestos assessor.
- The Panel Contractors, providing these services are:
  - Parsons Brinckerhoff Australia Pty Ltd
  - GreencapNAA Pty Ltd (Previously known as Noel Arnolds and Associates)
  - AECOM Australia Pty Ltd
- The contract is for three (2013 – 2016) years, with a possible one year extension period.
- DoE has mandated the use of this panel contract for asbestos disturbance works such as; all capital works programs (both major and minor works), whether administered centrally via Public Works or DoE or regionally via AMU, school facilities maintenance contract (asbestos issues), programmed inspections to update Asbestos Registers, school funded or administered works and the fibro in-grounds program (both investigations and remediation works).
- All contractors working on asbestos issues in DoE schools are asbestos assessors, licenced with Workcover NSW.
- Panel contractor's services are also to be used for other analytical services such as: Hazardous Materials (HazMat) surveys, Air Quality assessments, lead contamination, water testing, training for asbestos sample taking and other investigations e.g. mobile phone towers.
- When needed, DoE will provide updated information on this contract via the DoE Intranet and this will include a Question/Answer section for issues as they arise, particularly issues identified on the Site Inspection and Test Plan (ITP) Report by schools or contractors:

  https://education.nsw.gov.au/asset-management/compliance-and-safety/asbestos-information

Any questions/issues, Principals have regarding the panel contract should be initially directed to the AMU Project Officer or reported on-line using: **compliance@det.nsw.edu.au**

Panel contractor responsibilities

It is generally the case that Panel Contractors will conform to the following, when there are programmed activities being undertaken on a school site e.g. update of Asbestos Registers.

For Urgent Works, such as critical WHS or Workcover related inspections, notification times may need to be dispensed with.

Notification

- Contractors should only contact schools after initial conformation by DoE is undertaken.
- Contractors will provide advice and inspection results to Asset Management Directorate.
- Contractors are required to notify school principals two weeks prior to any programmed activity, with additional confirmation 48 hours prior to arrival. At the commencement of the programmed activity process schools/colleges may be requested to accept a shorter notification period.
- A record of all notifications must be maintained by contractors.

Site induction briefing

- Contractors are required to participate as required with the normal site briefings provided by the school such as:
  - Site emergency procedures, access to amenities, site specific WHS issues and signing on.

Service/Works process

- Contractors will make contact with the Principal/Director or nominated person prior to commencing works to ensure student sensitive areas (e.g. toilets & change rooms) and locked secure areas can be accessed as needed.
- DoE supports the contractors being given free access to the remainder of sites to facilitate the service/works process. Where schools/colleges have a full time general assistant it would be beneficial if the contractor could be given support to facilitate access.

Sample (Asbestos) Collection

- Contractors may be required to take samples in some buildings. Such sampling (for asbestos) is to be undertaken in the absence of staff and students in the immediate area.
- Sampling (asbestos) is to be undertaken in full compliance with the Safe Work Method Statement agreed with DoE, which is fully in accordance with WorkCover and legislative requirements.

Completion, for programmed works

- The Contractor / DoE Site Inspection and Test (ITP) Report is to be signed off by the Principal/Director/delegate to verify attendance at the site for the times indicated.
- A signed ITP is required for the payment to contractors.

Reporting

- Electronic copies of reports (in DoE AMS file format) will be provided to DoE Asset Management Directorate with payment claims and the reports will be available to schools via "AMS on the web" at a later date.

School responsibilities

For programmed works, especially the update of Asbestos Registers, the following applies:

Prior to use of hygienist services:

- Advise staff the date the hygienist services/works is to be undertaken e.g. updating of Asbestos Registers, and any updated timeline advised by the contractor.
- When the Panel contractor initially contacts the school/college to schedule any works, a nominated person in addition to the Principal/Director must be specified. When programmed updates of Asbestos Registers is being undertaken, the Panel Contractor will seek advice from the School/College regarding any other facilities on site that may require inspection and activities that may impact on the inspection works e.g. DoE pre-school and defined events which may be underway during the use of hygienist services (for e.g. HSC, school examinations). It will generally not be practicable to alter programed hygienist services to accommodate local school activities.
- Where possible, negotiate for the General Assistant to be available on the day/s of service to assist regarding site access.

Note: For Urgent Works, such as critical WHS or Workcover related inspections, access will need to be expedited.

During the use of hygienist services, particularly asbestos surveys:

- The contractor is given supervised access to student sensitive spaces (toilets) at a convenient time and any space locked for security purposes.
- Contractors will need to walk freely around the site, making visual inspections of building externals and all habitable internal spaces. It may be necessary for contractors to briefly enter occupied spaces to visually inspect surfaces.
- Some sites will require detailed inspection of buildings or particular spaces which are suspected to contain asbestos containing materials (ACM); such inspections may take some time and require samples to be taken. Other sites and buildings may be surveyed quickly due to buildings being of construction types with little or no ACM or certain buildings constructed after 1988 that are known not to contain ACM.
- The use of hygienist services may also require a photograph of each building inspected, to be taken for administrative purposes. Contractors have been advised that photographs must not include images which permit the identification of students or staff.
- The contractor may need to charge the battery for the survey tablet and have temporary storage of a large ladder and possibly lifting equipment to access high spaces. When there is a specific Work Health and Safety (WHS) requirements, some activities will need to be undertaken in the absence of staff and students or outside of school hours.

Compliance

- All contractors attending Department sites need to check the requirement of child protection check on: **www.kidsguardian.nsw.gov.au**
- All contractors attending sites must wear photo ID indicating they are employees of a Panel Contractor, and must sign in using the FMC site log book.
- The Department/Public Works will arrange random audits of hygienist services works to ensure compliance with contract requirements.

Specific advice: programmed works – update of Asbestos Registers

- DoE undertook a state-wide survey of schools in 2007/8, which resulted in the creation of an Asbestos Register for all DoE owned facilities; school, TAFE and administrative offices. The Work, Health and Safety (WHS) 2011 Legislation, made additional requirements for Asbestos Registers. DoE is using this panel contract to ensure fully compliance with WHS 2011 legislation.
- Programmed surveys of schools to update Asbestos Registers will focus on schools with large numbers of unresolved asbestos occurrences i.e. assumed asbestos materials, no access spaces, spaces requiring inspection due to building changes, ceiling voids, subfloor areas and vinyl under carpet. This program will supplement asbestos registers being updated as a result of major and minor capital works.
- The use of asbestos containing materials in school building construction ceased prior to 1987, so all facilities constructed prior to 1988 will be surveyed but schools/ colleges wholly constructed after 1988 will only be given a superficial inspection to confirm the construction type/age.
- At the conclusion of the update, the results of materials testing will be incorporated into individual school/college Asbestos Registers. Other site information will also be referenced in the Registers relating to existing grounds occurrences of asbestos (Site Specific Asbestos Management Plan) and known demountable buildings on site.
- All updated registers should be stored with the DoE Asbestos Management Plan (2015). The DoE Asbestos Management Plan (AMP) is available on the DoE Intranet and will be provided for schools in the 2015 school year.
- All school and colleges can access current Asbestos Registers via the DoE Asset Management System (AMS on the Web).

Panel contract inclusion

- Department owned facilities including schools and administration centres on DoE sites will be inspected. This includes Department operated pre-schools, behaviour schools/ out of School Hour care centres located on Department sites and Department owned facilities leased to others.
- Building externals and all habitable internal building spaces and service spaces such as store rooms, plant rooms, electrical rooms/cabinets, under floor areas, ceiling spaces will be inspected.
- It is essential that Asbestos Registers updates are able to resolve all spaces with; assumed asbestos materials, no access spaces, spaces requiring inspection due to building changes, ceiling voids, subfloor areas and vinyl under carpet. Every support should be given to Panel Contractors to resolve these issues.

Panel contract exclusions

- Accommodation leased to DoE will not be surveyed, as an Asbestos Register is required to be maintained by the owner of the building.

Panel contractor details

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haley.bates@aecom.com

Any change in the contact details can be found online at:
https://education.nsw.gov.au/asset-management/compliance-and-safety/asbestos-information

Site Inspection and Test Plan (ITP) Report

Both the Principal (Principals Delegate or Facility Manager) and Contractors representative are required to initial that each of the following has been completed:

DoE Site (Schools):		**School code:**	
Principal/Director name:		**Signature:**	
Principal/Director delegate (name):		**Signature:**	
Contractor (business name):			
Contract Surveyor name:		**Signatures:**	

Contract Requirement

		Principal/Director/ nominated person initials	Contractors initials
A. Briefing			
A briefing has been provided to the Principal/Director and/or nominated person		initial above	initial above
B. Arrival (First day)			
Time/s and Date/s of Arrival from School	Time (am/pm) : Date (dd/mm/yy) / /	initial above	initial above
C. Departure (Last day)			
Time/s and Date/s of Departure from School	Time (am/pm) : Date (dd/mm/yy) / /	initial above	initial above
D. Personnel			
Names of Panel Contractor and personnel attending the site		initial above	initial above
E. Date of Form completion	Time (am/pm) : Date (dd/mm/yy) / /	initial above	initial above
F. Unresolved issues			
Note any unresolved issues regarding the inspection are listed to the right		initial above	initial above

A copy of this schedule should be retained by the school and contractor (original). The contractor is required to affix this schedule to claims for payment.

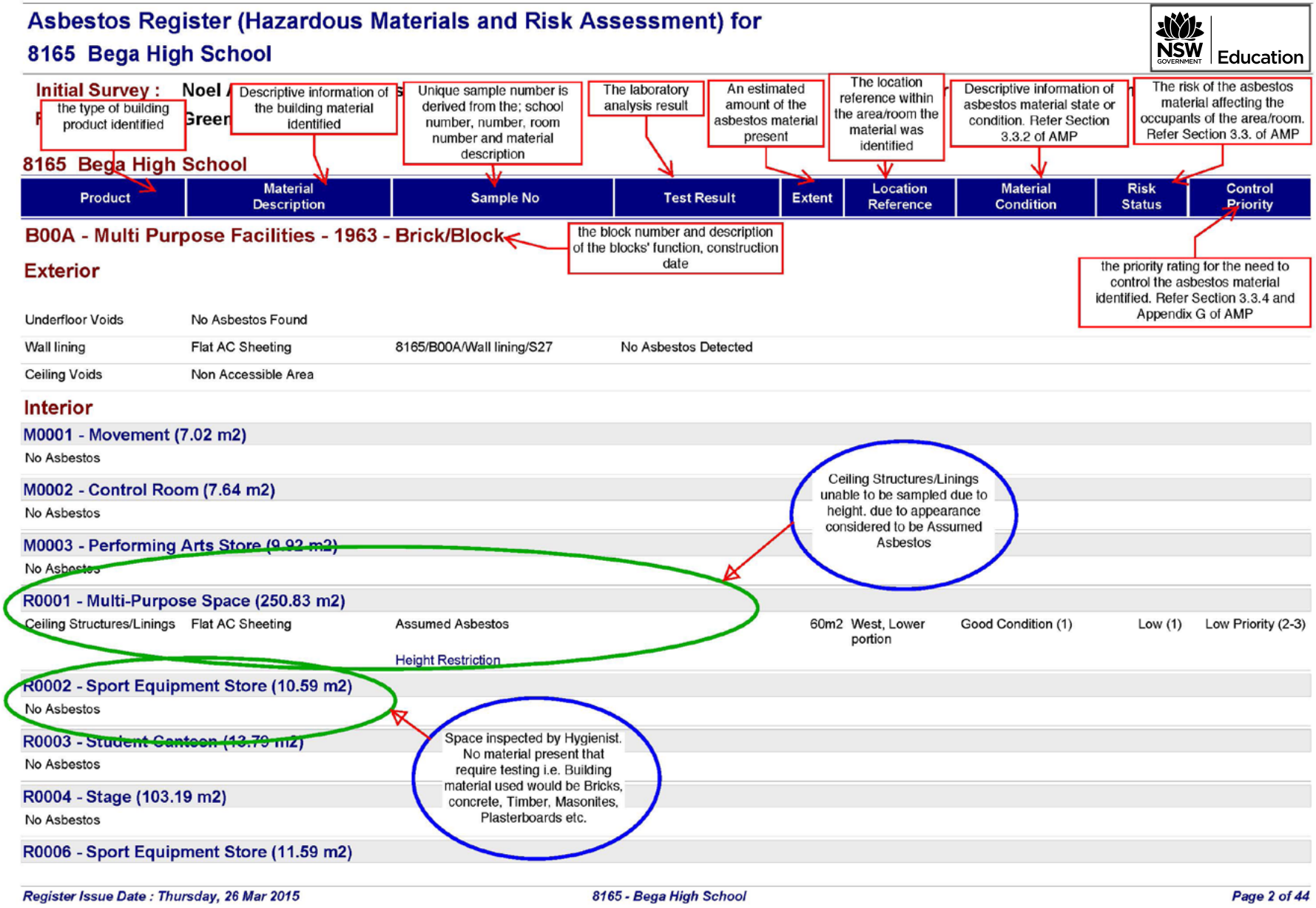
Contractors must also sign the maintenance contract site log book daily on arrival and departure.

Appendix J

Notes on the asbestos survey 2008 and update of information

How to read asbestos register

- Asbestos register – permanent facilities
- Asbestos register – demountable facilities
- Asbestos register – list of electronic files
- Asbestos register – site specific AMP (where applicable)


Asbestos Register (Hazardous Materials and Risk Assessment) for
8165 Bega High School
NSW GOVERNMENT Education
Initial Survey : Noel
the type of building product identified
Descriptive information of the building material identified
Unique sample number is derived from the; school number, number, room number and material description
The laboratory analysis result
An estimated amount of the asbestos material present
The location reference within the area/room the material was identified
Descriptive information of asbestos material state or condition. Refer Section 3.3.2 of AMP
The risk of the asbestos material affecting the occupants of the area/room. Refer Section 3.3. of AMP
8165 Bega High School
Product
Material Description
Sample No
Test Result
Extent
Location Reference
Material Condition
Risk Status
Control Priority
B00A - Multi Purpose Facilities - 1963 - Brick/Block
the block number and description of the blocks' function, construction date
Exterior
the priority rating for the need to control the asbestos material identified. Refer Section 3.3.4 and Appendix G of AMP
Underfloor Voids No Asbestos Found
Wall lining Flat AC Sheeting 8165/B00A/Wall lining/S27 No Asbestos Detected
Ceiling Voids Non Accessible Area
Interior
M0001 - Movement (7.02 m2)
No Asbestos
M0002 - Control Room (7.64 m2)
No Asbestos
M0003 - Performing Arts Store (9.92 m2)
No Asbestos
Ceiling Structures/Linings unable to be sampled due to height. due to appearance considered to be Assumed Asbestos
R0001 - Multi-Purpose Space (250.83 m2)
Ceiling Structures/Linings Flat AC Sheeting Assumed Asbestos 60m2 West, Lower portion Good Condition (1) Low (1) Low Priority (2-3)
Height Restriction
R0002 - Sport Equipment Store (10.59 m2)
No Asbestos
Space inspected by Hygienist. No material present that require testing i.e. Building material used would be Bricks, concrete, Timber, Masonites, Plasterboards etc.
R0003 - Student Canteen (13.79 m2)
No Asbestos
R0004 - Stage (103.19 m2)
No Asbestos
R0006 - Sport Equipment Store (11.59 m2)
Register Issue Date : Thursday, 26 Mar 2015
8165 - Bega High School
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Asbestos Register (Hazardous Materials and Risk Assessment) for
8582 Bossley Park High School

NSW GOVERNMENT Education

The type of building product identified

Descriptive information of the building material indentified

Unique sample number is derived from the; school number, block number, room number and material description

The laboratory analysis result

An estimated amount of the asbestos material present

The location reference within the area/room the material was identified

Descriptive information of the asbestos materials' state or condition. Section 3.3.2 of AMP

The risk of the asbestos material effecting the occupants within the area/room. Refer Section 3.3 of AMP

8582 Bossley Park High School

Product	Material Description	Sample No	Test Result	Extent	Location Reference	Material Condition	Risk Status	Control Priority
B00A - General Learning/Science Learning/Library - 1988 - Brick/Block								
Exterior								
Eaves Linings	Flat AC Sheeting	8582/B00A/Eaves Linings/S2	No Asbestos Detected					
Ceiling Voids	Requires Inspection							
Underfloor Voids	Requires Inspection							
Interior								
M0002 - Tiered Learning Area (22.03 m2)								
No Asbestos								
R0003 - Staff Study (15.5 m2)								
Vinyl Tiles (Under Floor Covering/Carpet)	No Asbestos Found							
R0004 - General Learning Space (48.29 m2)								
Vinyl Tiles (Under Floor Covering/Carpet)	No Asbestos Found							
R0006 - General Learning Space (41 m2)								
In-fill-panel	Flat FC Sheet	8582/B00A/R0008/In-fill-panel/S3	No Asbestos Detected					
R0007 - General Learning Space (47.97 m2)								
Vinyl Tiles (Under Floor Covering/Carpet)	No Asbestos Found							
R0008 - Study Space (15.66 m2)								
In-fill-panel	Flat FC Sheet	8582/B00A/R0008/In-fill-panel/S3	No Asbestos Detected					
R0009 - General Learning Space (48.03 m2)								
Vinyl Tiles (Under Floor Covering/Carpet)	No Asbestos Found							
R0011 - Main Area (437.55 m2)								

The block number and description of the blocks' function and construction date

The priority rating for the need to control the asbestos material identified. Refer Section 3.3.4 and Appendix G of AMP

Eave linings material that may contain asbestos sampled and found not to contain asbestos.

The room number and description of the rooms' function

Some building product used as in-fill panel in Room R0005, R0006 and R0008; Sample results for Room R0008 used.

Register Issue Date : Thursday, 26 Mar 2015 *8582 - Bossley Park High School* *Page 2 of 45*

Appendix K

DoE hazardous materials (asbestos) register

Schools to insert current asbestos registers

- Asbestos register, from AMS on the web
- Site specific AMPs (where applicable) from AMS on the web

Notes

Notes

Notes

Notes

Asbestos Register

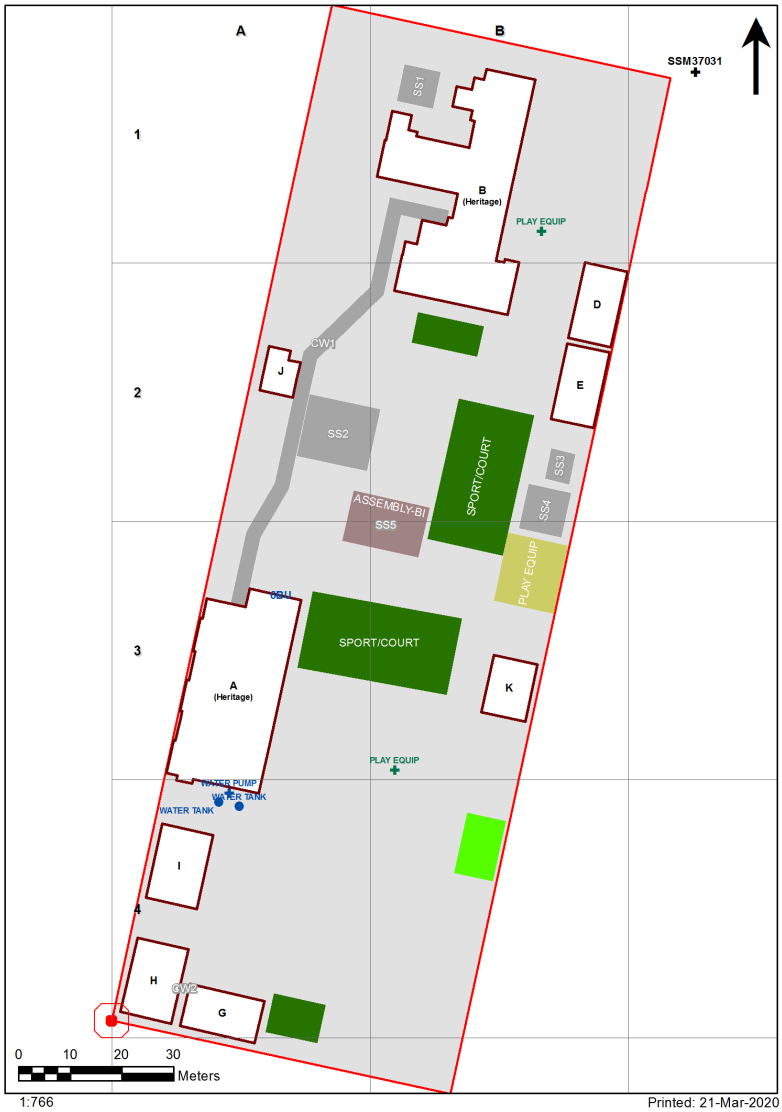
(Hazardous Materials and Risk Assessment)

School:	**Sutherland Public School (3136)**
Region:	**Sydney AMU**
State Electorate:	**Heathcote**
Local Government Area:	**Sutherland**

Last Reviewed By:	AECOM 29-OCT-2014
Last Revised By:	

Historical Fibro In Grounds Investigations/Events	**No**
No previous investigations have been recorded against the school. However, asbestos containing materials maybe present in grounds from time to time and caution must be exercised prior to any grounds disturbance.	

3136 - Sutherland Public School
Site Plan (11321)



Preface to Asbestos Register

Limitations

Asbestos Registers established (first surveyed 2007/08) and maintained for the Department of Education (DoE) are limited in extent, in that:

1. All inspections and surveys of materials and finishes in DoE facilities are non-disturbance, with
2. Samples undertaken by hygienist to determine whether a sample is an Asbestos Containing Material (ACM),
3. The hygienist may apply a single sample to like materials within a space and adjoining spaces, but not normally between buildings,
4. Successive inspections have reduced any inconclusive records such as 'assumed asbestos' in difficult to access areas, by undertaking additional sampling with lifting devices.
5. In compliance with WHS Act 2011 and WHS Regulations 2017, additional inspections have been undertaken in ceiling spaces and sub-floor areas where access is possible.
    - Where the ground floor is slab on ground, no inspection is made beneath the slab.
    - Where fibro fragments (ACM taken for sampling) are located in ceiling spaces or sub floor voids air monitoring is normally undertaken at time of sampling, and clearance undertaken as soon as practicable.
6. No attempt has been made to identify any ACM that is hidden from view or encapsulated within
    - Any wall cavity
    - Sub floor area, particularly formwork for slabs in/on ground,
    - Services (that may use ACM) such as: pipe lagging, asbestos cement pipes, flues.
7. All known ACM in Grounds (Fibro in Grounds) is made available in associated site specific asbestos management plans in DoE electronic files. Notwithstanding information provided, ACM may be present in grounds from time to time and caution must be exercised prior to any grounds disturbance.

Use of the Asbestos Register

Prior to any disturbance works being undertaken in a building to which this asbestos register applies it will be necessary to confirm the extent of any ACM by a disturbance investigation:

- If the building was built prior to 2003
- If any ACM has been identified in the Asbestos Register for the building.

Update of Asbestos Registers

Asbestos Register Data is updated regularly by the DoE Hygienist Panel via the Online Asbestos Register Tool (Managed by Business Systems, School Infrastructure NSW). Internal users can view the latest edition of the Asbestos Register in the AMS.

Please note: The Department's external website may not contain the latest revision of the Asbestos Register.

Notes 1: Vermiculite

- During 2018/19, all vermiculite occurrences in DoE schools identified in 2007/08, were 'composite tested' in accordance with a safe work NSW agreed procedure. This required multiple testing of all vermiculite occurrences.
- During the period 2007/08 to 2018/19, some vermiculite has been over sheeted and a warning is indicated for schools where this has happened.

Note 2: DoE website link for information is here:

https://www.schoolinfrastructure.nsw.gov.au/about-us/workingwithus/schools-asbestos-register.html
https://education.nsw.gov.au/about-us/strategies-and-reports/our-reports-and-reviews/schools-asbestos-register

Note 3: Material Condition Assessment

The material condition assessment descriptors from Section 3 of the Asbestos Management Plan (AMP) is extracted below. Please read the AMP in its entirety for further information.

3.3.2.1 Material condition assessment

The OART records the material condition of identified ACM in the following format:

Rating	Description
Good condition (1)	For non-friable asbestos that is sealed and has no visible damage. This primarily related to asbestos cement (AC) sheet and vinyl tiles
Minimal damage (2)	For non-friable asbestos that has a very small amount of damage, eg hairline cracks.
Some damage / unsealed (3)	For non-friable asbestos with significant breakage or several small areas where material has been damaged, revealing loose asbestos fibres. Non-friable asbestos that is unsealed.
Poor condition (4)	For non-friable asbestos that has extensive damage. Visible asbestos debris
Friable asbestos (5)	Any occurrence of friable asbestos

Product	Material Description	Extent	Location	Material Condition	Risk Status	Remediation Priority	Result
B00A - General Learning/Administration - 1929 - Brick/Block							
Exterior							
Eaves Linings	Flat AC Sheeting	100m2	North facing, South facing, East facing, West facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Voids	Assumed Asbestos						
Interior							
B00A - R0007 - General Storeroom - 18.91 m2							
Floor Coverings Res/Textile	Vinyl Tiles	19m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R0008 - Communal Space - 113.68 m2							
No Asbestos							
B00A - R0009 - Raised Platform - 21.39 m2							
No Asbestos							
B00A - R0010 - Duplicating Workroom - 7.97 m2							
No Asbestos							
B00A - R0011 - Security Store - 10.08 m2							
No Asbestos							
B00A - R0013 - Staff Toilet - 3.31 m2							
Ceiling Structures/Linings	Flat AC Sheeting	4m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R0014 - General Storeroom - 5.85 m2							
Floor Coverings Res/Textile	Vinyl Tiles	6m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R0016 - Main Switch Board - .48 m2							
No Asbestos							
B00A - R0017 - External Movement - 2.2 m2							
No Asbestos							
B00A - R0020 - Stairs - 19.81 m2							
No Asbestos							
B00A - R0021 - Deputy Principal - 10.44 m2							
No Asbestos							
B00A - R0022 - Clerical/Printing - 47.09 m2							
No Asbestos							
B00A - R0023 - Staff Kitchen - 8.83 m2							
No Asbestos							
B00A - R0024 - Staff Room - 37.81 m2							
No Asbestos							
B00A - R0025 - Special Programs Room - 47.09 m2							
No Asbestos							
B00A - R0026 - Home Base - 47.09 m2							
No Asbestos							
B00A - R0027 - Home Base - 47.6 m2							
No Asbestos							
B00A - R0028 - Movement - 63.02 m2							
No Asbestos							
B00A - R0029 - Movement - 38.05 m2							
No Asbestos							
B00A - R0030 - Stairs - 5.3 m2							
No Asbestos							
B00A - R0031 - Principal - 15.35 m2							

No Asbestos							
B00A - R1006 - Cleaning Distributed Store - 8.53 m2							
Ceiling Structures/Linings	Flat AC Sheeting	9m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1008 - Staff Room Annexe - 20.48 m2							
Floor Coverings Res/Textile	Vinyl Tiles	21m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Flat AC Sheeting	21m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1009 - General Storeroom - 19.87 m2							
Floor Coverings Res/Textile	Vinyl Tiles	20m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Flat AC Sheeting	20m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Wall Linings Internal	Flat AC Sheeting	20m2	North facing, East facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1013 - Stairs - 16.83 m2							
No Asbestos							
B00A - R1015 - Home Base - 49.75 m2							
Ceiling Structures/Linings	Flat AC Sheeting	50m2	All Surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1016 - Home Base - 49.15 m2							
Ceiling Structures/Linings	Flat AC Sheeting	50m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1017 - Home Base - 49.15 m2							
Ceiling Structures/Linings	Flat AC Sheeting	50m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1018 - Home Base - 77.55 m2							
Ceiling Structures/Linings	Flat AC Sheeting	78m2	All Surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1019 - Home Base Store - 22.68 m2							
Ceiling Structures/Linings	Flat AC Sheeting	23m2	All Surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1020 - Movement - 90.17 m2							
Ceiling Structures/Linings	Flat AC Sheeting	90m2	All Surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1021 - Stairs - 15.94 m2							
No Asbestos							
B00A - R1022 - Practical Activity Area - 28.39 m2							
Ceiling Structures/Linings	Flat AC Sheeting	29m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1023 - Toilet - Lobby - 1.84 m2							
Ceiling Structures/Linings	Flat AC Sheeting	4m2	Upper portion	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1024 - Staff Toilet - 2 m2							
Ceiling Structures/Linings	Flat AC Sheeting	4m2	Upper portion	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1025 - Staff Toilet - 2.02 m2							
Ceiling Structures/Linings	Flat AC Sheeting	4m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1026 - Toilet - Lobby - 1.84 m2							
Ceiling Structures/Linings	Flat AC Sheeting	4m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R9001 - General Assistant/Bulk Store - 18.91 m2							
No Asbestos							
B00A - R9002 - General Storeroom - 37.38 m2							
No Asbestos							

B00A - R9003 - Movement - 19.36 m2							
Wall Linings Internal	Flat AC Sheeting	2m2	West facing, Upper portion	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R9004 - Movement - 4.99 m2							
Wall Linings Internal	Flat AC Sheeting	3m2	East facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R9005 - Drinking Facilities - 21.58 m2							
No Asbestos							
B00A - R9006 - General Storeroom - 24.85 m2							
No Asbestos							
B00A - R9008 - External Movement - 2.32 m2							
No Asbestos							
B00A - R9009 - Stairs - 13.96 m2							
No Asbestos							
B00A - R9010 - General Storeroom - 47.77 m2							
No Asbestos							
B00B - General Learning/Library - 1892 - Brick/Block							
Exterior							
Eaves Linings	Flat AC Sheeting	120m2	North facing, South facing, East facing, West facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Voids	Assumed Asbestos						
Underfloor Voids	Assumed Asbestos						
Interior							
B00B - R0001 - Home Base - 46.89 m2							
No Asbestos							
B00B - R0002 - Home Base - 46.02 m2							
No Asbestos							
B00B - R0003 - Home Base - 45.69 m2							
No Asbestos							
B00B - R0004 - Home Base - 46.55 m2							
No Asbestos							
B00B - R0005 - Reading Area - 46.55 m2							
Ceiling Structures/Linings	Flat AC Sheeting	47m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R0006 - Library Office/Workroom - 20.64 m2							
No Asbestos							
B00B - R0008 - K.L.A. Store - 5.76 m2							
No Asbestos							
B00B - R0010 - Movement - 59.73 m2							
No Asbestos							
B00B - R0011 - General Storeroom - 23.46 m2							
No Asbestos							
B00B - R0012 - External Movement - 1.09 m2							
Ceiling Structures/Linings	Flat AC Sheeting	2m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R0013 - Movement - 73.15 m2							
No Asbestos							
B00B - R0014 - Home Base - 51.92 m2							
No Asbestos							
B00B - R0015 - Home Base - 52.26 m2							
No Asbestos							

B00B - R0016 - Staff Room Annexe - 12.63 m2							
No Asbestos							
B00B - R0017 - External Movement - 1.1 m2							
No Asbestos							
B00B - R0018 - General Storeroom - 16.92 m2							
No Asbestos							
B00B - R0019 - External Movement - 1.14 m2							
No Asbestos							
B00B - R0020 - Cleaning Distributed Store - 3.94 m2							
No Asbestos							
B00B - R0021 - Staff Toilet - 5.75 m2							
No Asbestos							
B00B - R0022 - Reading Area - 142.06 m2							
No Asbestos							
B00D - General Learning - 1947 - Timber							
Exterior							
No Asbestos							
Interior							
B00D - R0003 - External Movement - 16.19 m2							
No Asbestos							
B00D - R0004 - General Storeroom - 7.59 m2							
No Asbestos							
B00D - R0006 - Practical Activities - 1hb - 19.01 m2							
No Asbestos							
B00D - R0007 - Withdrawal Space - 1hb - 27.39 m2							
No Asbestos							
B00D - R0008 - Home Base - 46.53 m2							
No Asbestos							
B00E - General Learning - 1947 - Timber							
Exterior							
No Asbestos							
Interior							
B00E - R0002 - External Movement - 26.29 m2							
No Asbestos							
B00E - R0003 - Practical Activities - 1hb - 19.01 m2							
No Asbestos							
B00E - R0004 - Home Base - 75.19 m2							
No Asbestos							
B00G - Other-Regional Use - 1947 - Timber							
Exterior							
No Asbestos							
Interior							
B00G - R0001 - Other - Regional Use - 24.99 m2							
No Asbestos							
B00G - R0002 - Other - Regional Use - 65.28 m2							
Ceiling Structures/Linings	Flat AC Sheeting	66m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00G - R0003 - Other - Regional Use - 27.52 m2							
Ceiling Structures/Linings	Flat AC Sheeting	28m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00H - Other-Regional Use - 1950 - Timber							

Exterior							
Underfloor Voids	Assumed Asbestos						
Interior							
B00H - R0001 - Other - Regional Use - 27.48 m2							
No Asbestos							
B00H - R0002 - Other - Regional Use - 7.02 m2							
No Asbestos							
B00H - R0003 - Other - Regional Use - 11.03 m2							
Ceiling Structures/Linings	Flat AC Sheeting	12m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00H - R0004 - Other - Regional Use - 14.47 m2							
Ceiling Structures/Linings	Flat AC Sheeting	15m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00H - R0005 - Other - Regional Use - 10.56 m2							
No Asbestos							
B00H - R0006 - Other - Regional Use - 10.59 m2							
No Asbestos							
B00H - R0007 - Other - Regional Use - 14.51 m2							
No Asbestos							
B00H - R0008 - Other - Regional Use - 11.15 m2							
No Asbestos							
B00H - R0009 - Other - Regional Use - 30.03 m2							
Ceiling Structures/Linings	Flat AC Sheeting	31m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00I - Other-After School Care - 1950 - Timber							
Exterior							
No Asbestos							
Interior							
B00I - R0001 - External Movement - 27.9 m2							
No Asbestos							
B00I - R0002 - General Storeroom - 27.64 m2							
No Asbestos							
B00I - R0003 - Out Of School Hours Care Centre - 85.88 m2							
Floor Coverings Res/Textile	Vinyl Tiles	45m2	South facing, East facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - Pupil Facilities - 1984 - Brick/Block							
Exterior							
No Asbestos							
Interior							
B00J - R0001 - Movement - 13.54 m2							
Ceiling Structures/Linings	Flat AC Sheeting	14m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - R0002 - Canteen Office/Store - 2.74 m2							
Floor Coverings Res/Textile	Vinyl Tiles	3m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Flat AC Sheeting	3m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - R0003 - Canteen Office/Store - 2.47 m2							
Ceiling Structures/Linings	Flat AC Sheeting	3m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Floor Coverings Res/Textile	Vinyl Tiles	3m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - R0004 - Canteen - 17.47 m2							

Ceiling Structures/Linings	Flat AC Sheeting	18m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Floor Coverings Res/Textile	Vinyl Tiles	18m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - R0005 - Movement - 2.67 m2							
Ceiling Structures/Linings	Flat AC Sheeting	3m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - R0006 - Staff Toilet - 2.7 m2							
Ceiling Structures/Linings	Flat AC Sheeting	3m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00K - Pupil Facilities/Building Services - 2010 - Brick/Veneer							
Exterior							
No Asbestos							
Interior							
B00K - R0001 - External Movement - 22.67 m2							
No Asbestos							
B00K - R0002 - Cleaning Distributed Store - 3.52 m2							
No Asbestos							
B00K - R0003 - Toilets - Boys - 24.3 m2							
No Asbestos							
B00K - R0004 - Toilets - Girls - 32.71 m2							
No Asbestos							

Demountables

There are no Demountable(s) Located at this school as per the AMS records as of 25-Aug-2022

Appendix D

Data Quality Objective

Appendix D
Data Quality Objective
38-54 and 66 Eton Street, Sutherland

D1.0 Data Quality Objectives

The DSIC has been devised broadly in accordance with the seven-step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).

Step	Summary
1: State the problem	The objective of the investigation is to assess the contamination status of the three proposed Option areas for the proposed new hall at Sutherland Primary School with respect to the proposed development and land use. A preliminary conceptual site model (CSM) has been prepared (Section 8) for the proposed development. The project team consisted of experienced environmental engineers and scientists working in the roles of Project Principal, Project Reviewer, Project Manager, field staff.
2: Identify the decisions / goal of the study	The site history has identified possible contaminating previous uses and features which are identified in the CSM (Section 8). The CSM identifies the associated contaminants of potential concern (COPC) and the likely impacted media. The site assessment criteria (SAC) for each of the COPC are detailed in Appendix G. The decision is to establish whether or not the results fall below the SAC or whether or not the 95% upper confidence limit of the sample population falls below the SAC. On this basis, an assessment of the site's suitability from a contamination perspective will be derived and a decision made on whether (or not) further assessment and / or remediation will be required.
3: Identify the information inputs	Inputs to the investigation included site history information, site features and uses, field observations, sub-surface profile and the results of analysis of samples to measure the concentrations of COPC identified in the CSM (Section 8) at the site using NATA accredited laboratories and methods, where possible. The SAC for each of the COPC are detailed in Appendix G.
4: Define the study boundaries	The lateral boundaries of the DSIC are shown on Drawing 1, Appendix A (being the three options nominated by SINSW). The vertical boundaries were to the maximum depth of boreholes drilled, generally ranging between 2.1 m to 4 m bgl.
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with SAC (Appendix G, based on NEPC (2013)). Where guideline values are absent, other sources of guideline values accepted by NEPC (2013) shall be adopted where possible.

Step	Summary
	Where a sample result exceeds the adopted criterion, a further site-specific assessment will be made as to the risk posed by the presence of that contaminant(s). Initial comparisons will be with individual results then, where required, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL)) to assess potential risks posed by the site contamination. Quality control results are to be assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPDs should generally be below 30%; for field blanks, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in Appendix J.
6: Specify the performance or acceptance criteria	Baseline condition: Contaminants at the site and/or statistical analysis of data (in line with NEPC (2013)) exceed human health and environmental SAC and pose a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the site and statistical analysis of data (in line with NEPC (2013)) comply with human health and environmental SAC and as such, do not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true.
7: Optimise the design for obtaining data	As the purpose of the sampling program is to assess for potential contamination across the site, the sampling program is reliant on professional judgement to identify and sample the potentially affected areas. Further details regarding the proposed sampling plan are presented in Section 8.

D2.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

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Appendix E

Fieldwork Methodology

Appendix E
Fieldwork Methodology
38-54 and 66 Eton Street, Sutherland NSW

E1.0 Guidelines

The following key guidelines were consulted for the field work methodology:

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013).
- NSW EPA Sampling design part 1 – application, Contaminated Land Guidelines August 2022.

E2.0 Soil Sampling

Soil sampling was carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures for the project comprised:

- Collect soil samples directly from the spiral auger at regular depths;
- Collect 10% replicate samples for QC purposes;
- Use of disposable sampling equipment including use of a new nitrile gloves for each sample collected to prevent cross contamination;
- Decontamination of the lead auger at each borehole using a 3% phosphate free detergent (Decon 90) and distilled water;
- Transfer of samples into laboratory prepared glass jars and bags (with appropriate preservatives for analytes) and capping immediately with Teflon lined lids;
- Labelling of sampling containers with individual and unique identification, including project number, sample identification and sample depth;
- Placement of sample containers and bags into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

E3.0 References

ASTM D7663-12. (2018). *Standard Practice for Active Soil Gas Sampling in the Vadose Zone for Vapour Intrusion Evaluations.* 2018 e1 (editorial change to 2012 revision): American Society for Testing and Materials.

HEPA. (2020). *PFAS National Environmental Management Plan (NEMP).* Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (2020). *Assessment and Management of Hazardous Ground Gases.* NSW Environment Protection Authority.

USEPA. (1999a). *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air.* Second Edition: United States Environment Protection Agency.

USEPA. (1999b). *Compendium Method TO-15 Determination of Volatile Organic Compounds (VOCs) In Air Collected in Specially-Prepared Canisters and Analysed By Gas Chromatography Mass Spectrometry (GC/MS).* United States Environment Protection Agency.

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Appendix F

Borehole Log

BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 112.4 AHD
EASTING: 320800.2
NORTHING: 6232529.2
DIP/AZIMUTH: 90°/--

BORE No: BH01
PROJECT No: 224456.00
DATE: 27/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
112	0.1	ASPHALTIC CONCRETE			0.1				
		FILL/ Gravelly SAND: fine to coarse, grey to dark grey, fine to medium angular igneous gravel, dry, apparently well compacted		E	0.2				
	0.35	FILL/ SAND: fine to medium, dark grey, with clay nodules, moist		E*	0.5				
	0.6	CLAY CI-CH: medium to high plasticity, red-brown and pale grey, w<PL, stiff, residual			0.6				
				E	0.9				
	1	Below 1.0m: very stiff			1.0				1
111				S			3,7,10 N = 17		
					1.45				
	2								2
110	2.4	SHALE: dark grey and orange-brown, very low strength, highly weathered, Hawkesbury Sandstone			2.5				
		Below 2.6m: low strength		S			10,25/100 refusal		
	2.75	Bore discontinued at 2.75m Refusal			2.75				
	3								3
109									
	4								4
108									

RIG: Comacchio 205 **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 2.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *BD01/20230927TM Taken from 0.5-0.6m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 112.8 AHD
EASTING: 320819
NORTHING: 6232525.6
DIP/AZIMUTH: 90°/--

BORE No: BH02
PROJECT No: 224456.00
DATE: 27/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	ASPHALTIC CONCRETE			0.1				
	0.2	FILL/ CLAY: medium plasticity, red-brown and brown, trace fine to medium angular igneous gravel, w<PL		E	0.2				
		CLAY CI-CH: medium to high plasticity, red-brown and pale grey, w<PL, stiff, residual							
				E	0.5				
					0.6				
112									
				E	0.9				
	1	Below 1.0m: very stiff to hard			1.0				1
				S			6,12,15 N = 27		
					1.45				
111									
	2								2
	2.3	SHALE: dark grey and orange-brown, very low strength, highly weathered, Hawkesbury Sandstone							
					2.5				
		Below 2.7m: low strength		S			12,25,20/100 refusal		
110	2.9				2.9				
		Bore discontinued at 2.9m Refusal							
	3								3
109									
	4								4
108									

RIG: Comacchio 205 **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 2.5m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 112.3 AHD
EASTING: 320805.7
NORTHING: 6232519.7
DIP/AZIMUTH: 90°/--

BORE No: BH03
PROJECT No: 224456.00
DATE: 27/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
112	0.1	ASPHALTIC CONCRETE			0.1				
		FILL/ Gravelly SAND: fine to medium, dark grey, fine to medium angular igneous gravel, dry, apparently well compacted		E	0.2				
	0.3	CLAY CI-CH: medium to high plasticity, red-brown and pale grey, w<PL, stiff, residual		E	0.4				
				U	0.5				
					0.7				
				E	0.9				
	1	Below 1.0m: very stiff to hard			1.0				1
111				S			6,14,16 N = 30		
					1.45				
	2								2
110	2.3	SHALE: dark grey and orange-brown, very low strength, highly weathered, Hawkesbury Sandstone							
	2.55	Below 2.5m: low strength		S	2.5 2.55		10/50 refusal		
		Bore discontinued at 2.55m Refusal							
	3								3
109									
	4								4
108									

RIG: Comacchio 205 **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 2.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 111.6 AHD
EASTING: 320795.6
NORTHING: 6232498.8
DIP/AZIMUTH: 90°/--

BORE No: BH04
PROJECT No: 224456.00
DATE: 27/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
111	0	FILL/ Sandy SILT: low plasticity, brow to dark grey, trace rootlets							
				E	0.1				
					0.2				
				E	0.4				
					0.5				
				E*	0.9				
	1				1.0				1
				S			2,2,6 N = 8		
	1.3	CLAY CI-CH: medium to high plasticity, red-brown and pale grey, w<PL, stiff to very stiff, residual							
					1.45				
110				E	1.5				
					1.6				
				E	1.9				
	2				2.0				2
					2.5				
109				S			11,20,25/100 refusal		
	2.8	SHALE: dark grey and orange-brown, low strength, highly weathered, Hawkesbury Sandstone							
	2.9	Bore discontinued at 2.9m Refusal			2.9				
	3								3
108									
	4								4
107									

RIG: Comacchio 205 **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 2.5m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *BD02/20230927TM Taken from 0.9-1.0m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 111.7 AHD
EASTING: 320807.2
NORTHING: 6232493.5
DIP/AZIMUTH: 90°/--

BORE No: BH05
PROJECT No: 224456.00
DATE: 27/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
111	0.0	FILL/ Sandy SILT: low plasticity, brown to dark grey, trace rootlets		E	0.0–0.1				
				E	0.4–0.5				
	0.6	CLAY CI-CH: medium to high plasticity, red-brown and pale grey, w<PL, very stiff, residual		E	0.9–1.0				
	1			S	1.45		6,8,10 N = 18		
110	2								
	2.5	SHALE: dark grey and orange-brown, low strength, highly weathered, Hawkesbury Sandstone		S	2.5–2.55		10/50 refusal		
109	2.55	Bore discontinued at 2.55m Refusal							
	3								
108	4								
107									

RIG: Comacchio 205 **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 2.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 110.7 AHD
EASTING: 320826.7
NORTHING: 6232448.5
DIP/AZIMUTH: 90°/--

BORE No: BH06
PROJECT No: 224456.00
DATE: 27/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
110	0.0	FILL/ SAND: medium, grey-brown, with clay, trace tile fragments, moist		E	0.0–0.1				
	0.2	CLAY CI-CH: medium to high plasticity, red-brown and pale grey, w<PL, stiff, residual		E	0.4–0.5				
	1	Below 1.0m: very stiff		E	0.9–1.0				
				S	1.0–1.45		7,10,15 N = 25		
109	2								
	2.3	SHALE: dark grey and orange-brown, very low strength, highly weathered, Hawkesbury Sandstone		S	2.5		10,27,10/50 refusal		
108		Below 2.7m: low strength							
	2.85	Bore discontinued at 2.85m Refusal			2.85				
107	3								
	4								
106									

RIG: Comacchio 205 **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 2.5m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 111.5 AHD
EASTING: 320845.5
NORTHING: 6232450.5
DIP/AZIMUTH: 90°/--

BORE No: BH07
PROJECT No: 224456.00
DATE: 28/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
111	0.0			E	0.0–0.1				
	0.15	FILL/ SAND: fine to medium, brown, trace silt and rootlets, moist							
		FILL/ CLAY: medium plasticity, brown, trace fine igneous gravel, w<PL		E*	0.4–0.5				
	0.7	CLAY CI-CH: medium to high plasticity, red-brown and pale grey, w<PL, stiff, residual		E	0.9–1.0				
110	1			U	1.4				
		Below 1.4m: very stiff							
	2								
	2.3	SHALE: dark grey and orange-brown, very low strength, highly weathered, Hawkesbury Sandstone		S	2.5		11,30 refusal		
109		Below 2.7m: low strength							
	2.8	Bore discontinued at 2.8m Refusal			2.8				
	3								
108									
	4								
107									

RIG: Explora **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 2.5m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *BD03/20230928TM Taken from 0.4-0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 109.7 AHD
EASTING: 320824.1
NORTHING: 6232431.9
DIP/AZIMUTH: 90°/--

BORE No: BH08
PROJECT No: 224456.00
DATE: 27/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
109	0.0	FILL/ Gravelly SAND: fine to medium, grey to dark grey, fine to medium angular to sub-angular igneous gravel, dry		E	0.0 0.1				
	0.4	CLAY CI-CH: medium to high plasticity, red-brown and pale grey, w<PL, stiff, residual		E	0.4 0.5				
				U	0.6				
				E	0.9				
	1	Below 1.0m: very stiff to hard		S	1.0 1.45		10,12,19 N = 31		
108	2								
	2.5	SHALE: dark grey and orange-brown, low strength, highly weathered, Hawkesbury Sandstone		S	2.5		20/100 refusal		
107	2.6	Bore discontinued at 2.6m Refusal			2.6				
	3								
106	4								
105									

RIG: Comacchio 205 **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 2.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 109.5 AHD
EASTING: 320838.9
NORTHING: 6232418.2
DIP/AZIMUTH: 90°/--

BORE No: BH09
PROJECT No: 224456.00
DATE: 27/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
109	0.0	FILL/ Sandy SILT: low plasticity, dark grey-brown, fine to medium sand, w<PL		E	0.0 0.1				
	0.4	FILL/ CLAY: medium plasticity, red-brown and brown, trace fine igneous and ironstone gravel, w<PL, generally in a firm condition, possibly reworked natural		E U E	0.4 0.5 0.9				
108	1			S	1.0 1.45		1,3,2 N = 5		1
107	1.9	CLAY CI-CH: medium to high plasticity, red-brown and pale grey, w<PL, very stiff to hard, residual		E S	1.9 2.0 2.5		10,12,17 N = 29		2 3
106	3.8	SHALE: dark grey and orange-brown, low strength, highly weathered, Hawkesbury Sandstone			2.95				
105	4.0	Bore discontinued at 4.0m Refusal							4

RIG: Comacchio 205 **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 4.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 103.9 AHD
EASTING: 320793.3
NORTHING: 6232318.8
DIP/AZIMUTH: 90°/--

BORE No: BH10
PROJECT No: 224456.00
DATE: 28/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
103	0.0	FILL/ CLAY: low plasticity, brown, trace silt, ironstone gravel and rootlets, w<PL		E	0.0–0.1				
				E	0.4–0.5				
				U					
	0.8	CLAY CI-CH: medium to high plasticity, red-brown and pale grey, w<PL, stiff to very stiff, residual			0.8				
	1			E	0.9–1.0				1
				S			4,5,9 N = 14		
					1.45				
102	2								2
	2.1	SHALE: dark grey and orange-brown, very low strength with low strength iron indurated bands, highly weathered, Hawkesbury Sandstone							
	2.35	Below 2.3m: low to medium strength Bore discontinued at 2.35m Refusal							
101	3								3
100	4								4
99									

RIG: Explora **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 2.35m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 103.6 AHD
EASTING: 320821.7
NORTHING: 6232315
DIP/AZIMUTH: 90°/--

BORE No: BH11
PROJECT No: 224456.00
DATE: 28/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
103	0.0	FILL/ CLAY: low plasticity, brown, trace silt, ironstone gravel and rootlets, w<PL		E	0.0				
					0.1				
	0.2	CLAY CI-CH: medium to high plasticity, yellow-brown and red-brown, w<PL, stiff, residual		E	0.4				
					0.5				
					0.9				
	1	Below 1.0m: very stiff		E	1.0				1
102				S			6,10,12 N = 22		
					1.45				
	2								2
	2.3	SHALE: dark grey and orange-brown, very low strength with low strength iron indurated bands, highly weathered, Hawkesbury Sandstone							
101				S	2.5		14,15/80 refusal		
					2.77				
		Below 2.9m: low strength							
	3								3
	3.1	Bore discontinued at 3.1m Refusal		A	3.0 3.1				
100									
	4								4
99									

RIG: Explora **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid flight auger to 3.1m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure NSW
PROJECT: Proposed Multi-Purpose Medium Hall
LOCATION: 38-54 and 66 Eton Street, Sutherland

SURFACE LEVEL: 102.7 AHD
EASTING: 320786.2
NORTHING: 6232288
DIP/AZIMUTH: 90°/--

BORE No: BH12
PROJECT No: 224456.00
DATE: 28/9/2023
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
102	0.0	FILL/ CLAY: low plasticity, brown, trace silt, ironstone gravel and rootlets, w<PL		E	0.0				
					0.1				
	0.35	CLAY CI-CH: medium to high plasticity, yellow-brown, w<PL, stiff, residual		E	0.4				
					0.5				
	1	Below 1.0m: very stiff		E	0.9				1
					1.0				
				S			2,7,16 N = 23		
	1.5	SHALE: dark grey with pale grey fine grained sandstone bands, very low strength with low strength iron indurated bands, highly weathered, Hawkesbury Sandstone			1.45				
101									
	2	Below 1.9m: low strength		A	1.9				2
	2.1	Bore discontinued at 2.1m Refusal			2.1				
100	3								3
99	4								4
98									

RIG: Explora **DRILLER:** DB **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid flight auger to 2.1m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Sampling Methods

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Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with ‘Mix of Soil and Cobbles/Boulders’ with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- ‘Moist, dry of plastic limit’ or ‘w <PL’ (i.e. hard and friable or powdery).
- ‘Moist, near plastic limit’ or ‘w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- ‘Moist, wet of plastic limit’ or ‘w >PL’ (i.e. soils usually weakened and free water forms on the hands when handling).
- ‘Wet’ or ‘w ≈LL’ (i.e. near the liquid limit).
- ‘Wet’ or ‘w >LL’ (i.e. wet of the liquid limit).

Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $Is_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
Highly weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately weathered	MW	The whole of the rock material is discoloured , usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	No signs of decomposition or staining.
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

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Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

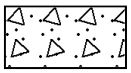
Symbols & Abbreviations

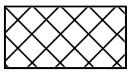
Graphic Symbols for Soil and Rock

General

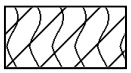
Asphalt

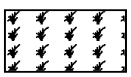
Road base


Concrete


Filling

Soils


Topsoil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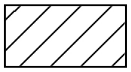
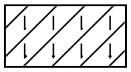
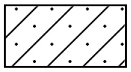
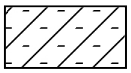
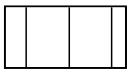

Clay

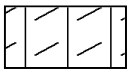

Silty clay

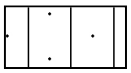

Sandy clay

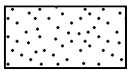
Gravelly clay

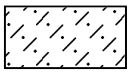

Shaly clay

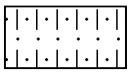

Silt


Clayey silt


Sandy silt

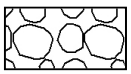

Sand

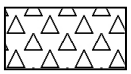

Clayey sand


Silty sand

Gravel

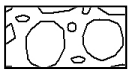
Sandy gravel


Cobbles, boulders

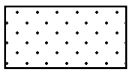

Talus

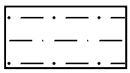
Sedimentary Rocks

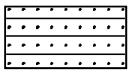
Boulder conglomerate

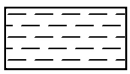

Conglomerate

Conglomeratic sandstone

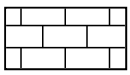

Sandstone


Siltstone

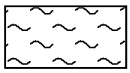

Laminite

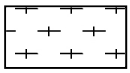

Mudstone, claystone, shale

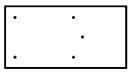
Coal


Limestone

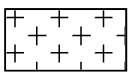
Metamorphic Rocks

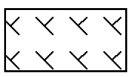

Slate, phyllite, schist

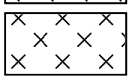

Gneiss

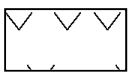

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia

Porphyry

Appendix G

Site Assessment Criteria

Appendix G
Site Assessment Criteria
38-54 and 66 Eton Street, Sutherland

G1.0 Introduction

G1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)* [NEPM] (NEPC, 2013).
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011).

G1.2 General

The SAC applied in the current investigation are informed by the CSM which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The following inputs are relevant to the selection and / or derivation of the SAC:

The proposed development comprises construction of a multi-purpose medium hall including toilets and a canteen.

- Land use: residential
  - Corresponding to land use category 'A', residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry)), also includes children's day care centres, preschools and primary schools.
- Soil type: The fill encountered across the three proposed Option areas consisted of CLAY and SAND overlaying by natural CLAY. For the purpose of this investigation SAND was selected as the soil type as it informs the most stringent criteria.

G2.0 Soils

G2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1 and Table 2.

Table 1: Health Investigation Levels (mg/kg)

Contaminant	HIL-A
Metals	
Arsenic	100
Cadmium	20
Chromium (VI)	100
Copper	6000
Lead	300
Mercury (total)	40
Nickel	400
Zinc	7400
PAH	
B(a)P TEQ	3
Total PAH	300
Phenols	
Pentachlorophenol	100
OCP	
DDT+DDE+DDD	240
Aldrin and dieldrin	6
Endosulfan	270
Endrin	10
Heptachlor	6
HCB	10
Methoxychlor	300
OPP	
Chlorpyrifos	160

Contaminant	HIL-A
PCB	
PCB	1

Table 2: Health Screening Levels (mg/kg)

Contaminant	HSL-A&B	HSL-A&B
SAND	**0 m to <1 m**	**1 m to <2 m**
Benzene	0.5	0.5
Toluene	160	220
Ethylbenzene	55	NL
Xylenes	40	60
Naphthalene	3	NL
TRH F1	45	70
TRH F2	110	240

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

Note that various depths to contamination are listed in Table 2. This is due to the potential depths between receptors (i.e., at ground or basement level) and the contaminant sources (e.g., fill and groundwater). Only the most conservative criteria are presented on the results tables in Appendix L.

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-A	DC HSL-IMW
Benzene	100	1100
Toluene	14 000	120 000
Ethylbenzene	4500	85 000
Xylenes	12 000	130 000
Naphthalene	1400	29 000
TRH F1	4400	82 000
TRH F2	3300	62 000

Contaminant	DC HSL-A	DC HSL-IMW
TRH F3	4500	85 000
TRH F4	6300	120 000

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

G2.2 Asbestos in Soil

A detailed asbestos assessment was not undertaken as part of this investigation as the method of sampling from boreholes does not support the sampling methods required for the detailed asbestos assessment. Therefore, the presence or absence of asbestos at a limit of reporting of 0.1 g/kg (AS:4964) has been adopted for this investigation as an initial screen.

G2.3 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 5 and Table 6, with inputs into their derivation shown in Table 4.

Table 4: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input	Rationale
Age of contaminants	"Aged"	Soils on site are > 2 years
pH	7 mg/kg	Average of measured pH values (7,6.3, 7.6)
CEC	8 $cmol_c$/kg	Average of measured CEC values (4,7.8,12)
Clay content	10%	Variable soil in some fill locations, conservative value of clay adopted
Traffic volumes	high	
State / Territory	NSW	

Table 5: Ecological Investigation Levels (mg/kg)

Contaminant	EIL-A-B-C
Metals	
Arsenic	100
Copper	180
Nickel	100

Contaminant	EIL-A-B-C
Chromium III	410
Lead	1100
Zinc	460
PAH	
Naphthalene	0.7
OCP	
DDT	180

Notes: EIL-A-B-C urban residential and public open space

G2.4 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 6.

Table 6: Ecological Screening Levels (mg/kg)

Contaminant	Soil Type	ESL-A-B-C
Benzene	Coarse	50
Toluene	Coarse	85
Ethylbenzene	Coarse	70
Xylenes	Coarse	105
TRH F1	Coarse/ Fine	180*
TRH F2	Coarse/ Fine	120*
TRH F3	Coarse	300
TRH F4	Coarse	2800
B(a)P	Coarse	0.7

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene
ESL-A-B-C urban residential and public open space

G2.5 Management Limits

In addition to appropriate consideration and application of the HSL and ESL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards; and
- Effects on buried infrastructure e.g., penetration of, or damage to, in-ground services.

The adopted management limits are in Table 7.

Table 7: Management Limits (mg/kg)

Contaminant	Soil Type	ML-A-B-C
TRH F1	Coarse	700
TRH F2	Coarse	1000
TRH F3	Coarse	2500
TRH F4	Coarse	10 000

Notes: TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene
ML-A-B-C residential, parkland and public open space

G3.0 Waste Classification

The waste classification was conducted with reference to NSW EPA *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA, 2014).

G4.0 References

CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater.* Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* NSW Environment Protection Authority.

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Appendix H

Table Summary Results

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Table H1: Summary of Laboratory Results – Metals, PAH, TRH, BTEX, Phenol, OCP, OPP, PCB

				Metals								PAH				TRH						BTEX				Phenol	OCP										OPP	PCB	Asbestos
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Phenol	DDT+DDE+DDD [c]	Aldrin + Dieldrin	Endrin	Hexachlorobenzene	Heptachlor	Methoxychlor	Total Chlordane	Mirex	Chlorpyriphos	Total PCB	Asbestos (50 g)
		PQL		4	0.4	1	1	1	0.1	1	1	0.1	0.05	0.5	0.05	25	50	25	50	100	100	0.2	0.5	1	1	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-
Sample ID	Depth	Sample Date	Soil Matrix	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	g
BH01	0.5 - 0.6 m	27/09/23	FILL/SAND	10	<0.4	33	22	23	0.1	17	150	<0.1	7	9.5	64	<25	<50	<25	<50	940	600	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	100	240	180	6	10	10	6	300	50	10	160	1	
BD01/20230927	-	27/09/23	FILL/SAND	5	<0.4	18	30	19	<0.1	22	150	<0.1	6.4	8.6	56	<25	<50	<25	<50	940	760	<0.2	<0.5	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH02	0.1 - 0.2 m	27/09/23	FILL/CLAY	8	<0.4	15	29	23	<0.1	6	31	<0.1	0.1	<0.5	1	<25	<50	<25	<50	390	580	<0.2	<0.5	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH03	0.4 - 0.5 m	27/09/23	CLAY	10	<0.4	26	16	24	<0.1	9	37	<0.1	1.4	2	14	<25	<50	<25	<50	490	460	<0.2	<0.5	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH04	0 - 0.1 m	27/09/23	FILL/SANDY SILT	5	<0.4	10	29	53	<0.1	8	100	<0.1	0.2	<0.5	2.1	<25	<50	<25	<50	330	460	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	100	240	180	6	10	10	6	300	50	10	160	1	
BH04	0.9 - 1 m	27/09/23	FILL/SANDY SILT	12	<0.4	30	23	77	0.1	6	88	<0.1	0.2	<0.5	1.8	<25	<50	<25	<50	190	330	<0.2	<0.5	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH05	0.4 - 0.5 m	27/09/23	FILL/SANDY SILT	8	<0.4	15	26	130	0.1	6	110	<0.1	0.71	0.9	6.2	<25	<50	<25	<50	240	340	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	100	240	180	6	10	10	6	300	50	10	160	1	
BH06	0 - 0.1 m	27/09/23	FILL/SAND	5	<0.4	13	21	65	<0.1	6	86	<0.1	0.4	<0.5	2.6	<25	<50	<25	<50	230	320	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	100	240	180	6	10	10	6	300	50	10	160	1	
BH07	0.4 - 0.5 m	28/09/23	FILL/CLAY	11	<0.4	20	21	93	<0.1	6	100	<0.1	0.4	<0.5	2.9	<25	<50	<25	<50	230	350	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	100	240	180	6	10	10	6	300	50	10	160	1	
BD03/20230928	-	28/09/23	FILL/CLAY	8	<1	19	17	88	<0.1	8	121	<0.5	<0.5	<0.5	<0.5	<10	<50	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH08	0 - 0.1 m	27/09/23	FILL/GRAVELLY SAND	6	<0.4	15	35	74	<0.1	14	110	<0.1	0.4	<0.5	3.9	<25	<50	<25	<50	150	260	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	100	240	180	6	10	10	6	300	50	10	160	1	
BH09	0 - 0.1 m	27/09/23	FILL/SANDY SILT	5	<0.4	13	30	54	0.1	13	150	<0.1	0.08	<0.5	0.4	<25	<50	<25	<50	300	400	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	100	240	180	6	10	10	6	300	50	10	160	1	
BH09	0.9 - 1 m	27/09/23	FILL/CLAY	11	<0.4	19	24	34	<0.1	6	44	<0.1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH10	0.4 - 0.5 m	28/09/23	FILL/CLAY	10	0.4	24	65	210	<0.1	5	210	<0.1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH11	0 - 0.1 m	28/09/23	FILL/CLAY	14	<0.4	28	10	50	<0.1	3	43	<0.1	<0.05	<0.5	<0.05	<25	<50	<25	<50	180	260	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	100	240	180	6	10	10	6	300	50	10	160	1	
BH12	0 - 0.1 m	28/09/23	FILL/CLAY	12	1	35	66	630	0.2	15	550	<0.1	<0.05	<0.5	0.1	<25	<50	<25	<50	210	280	<0.2	<0.5	<1	<1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	100	240	180	6	10	10	6	300	50	10	160	1	
BH12	0.4 - 0.5 m	28/09/23	CLAY	12	<0.4	32	11	86	<0.1	2	40	<0.1	<0.05	<0.5	<0.05	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	ND
				100	100	20	410	6000	180	300	1100	40	400	100	7400	460	3	170	0.7	3	300	120	45	180	110	300	2800	0.5	50	160	85	55	70	40	105	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH03	0.1 - 0.2 m	27/09/23	FILL/GRAVELLY SAND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10	0 - 0.1 m	28/09/23	FILL/CLAY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND
				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report **Blue** = DC exceedance **Red** = EGV-indirect exceedance HSL 0-<1 Exceedance

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Naphthalene reported as highest detection from the BTEXN or PAH suite, or if both results <PQL as lowest PQL

c EIL criteria applies to DDT only

d HIL for pentachlorophenol used as a screening HIL for total phenols

Site Assessment Criteria (SAC):

SAC based on generic land use thresholds for Residential A with garden/accessible soil

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

HIL	HIL-A (NEPC, 2013 or HEPA, 2020 (PFAS only))	EGV	EGV, all land uses, direct exposure (HEPA, 2020)
HSL (vapour intrusion)	HSL-A/B (NEPC, 2013)	ESL	Urban Residential and Public Open Space (NEPC, 2013)
DC	Direct contact HSL A Residential (Low density) (CRC CARE, 2011)	ML	Residential, Parkland and Public Open Space (NEPC, 2013)

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Table H2 : Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB, Asbestos - Preliminary Waste Classification

			Metals							TRH		BTEX				PAH				Phenol	OCP		OPP	PCB	Asbestos
			Arsenic	Cadmium	Total Chromium	Lead	TCLP Lead	Mercury (inorganic)	Nickel	TRH C6 - C9	TRH C10-C36	Benzene	Toluene	Ethylbenzene	Total Xylenes	Benzo(a)pyrene (BaP)	TCLP Benzo(a)pyrene (BaP)	Total PAHs	TCLP Total PAHs	Phenol	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Total PCB	Asbestos (50 g)
		PQL	4	0.4	1	1	0.03	0.1	1	25	50	0.2	0.5	1	1	0.05	0.0001	0.05		5	0.1	0.1	0.1	0.1	
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
BH01	0.5 - 0.6 m	27/09/23	10	<0.4	33	23	-	0.1	17	<25	1200	<0.2	<0.5	<1	<1	7	<0.0001	64	0.002	<5	<0.1	<0.1	<0.1	<0.1	ND
BD01/20230927	0 m		5	<0.4	18	19	-	<0.1	22	<25	1200	<0.2	<0.5	<1	<1	6.4	<0.0001	56	0.0024	-	-	-	-	-	-
BH02	0.1 - 0.2 m	27/09/23	8	<0.4	15	23	-	<0.1	6	<25	560	<0.2	<0.5	<1	<1	0.1	-	1	-	-	-	-	-	-	ND
BH03	0.4 - 0.5 m	27/09/23	10	<0.4	26	24	-	<0.1	9	<25	650	<0.2	<0.5	<1	<1	1.4	<0.0001	14	0.0004	-	-	-	-	-	ND
BH04	0 - 0.1 m	27/09/23	5	<0.4	10	53	-	<0.1	8	<25	500	<0.2	<0.5	<1	<1	0.2	-	2.1	-	<5	<0.1	<0.1	<0.1	<0.1	ND
BH04	0.9 - 1 m	27/09/23	12	<0.4	30	77	-	0.1	6	<25	220	<0.2	<0.5	<1	<1	0.2	-	1.8	-	-	-	-	-	-	ND
BH05	0.4 - 0.5 m	27/09/23	8	<0.4	15	130	0.06	0.1	6	<25	370	<0.2	<0.5	<1	<1	0.71	-	6.2	-	<5	<0.1	<0.1	<0.1	<0.1	ND
BH06	0 - 0.1 m	27/09/23	5	<0.4	13	65	-	<0.1	6	<25	320	<0.2	<0.5	<1	<1	0.4	-	2.6	-	<5	<0.1	<0.1	<0.1	<0.1	ND
BH07	0.4 - 0.5 m	28/09/23	11	<0.4	20	93	-	<0.1	6	<25	340	<0.2	<0.5	<1	<1	0.4	-	2.9	-	<5	<0.1	<0.1	<0.1	<0.1	ND
BH08	0 - 0.1 m	27/09/23	6	<0.4	15	74	-	<0.1	14	<25	170	<0.2	<0.5	<1	<1	0.4	-	3.9	-	<5	<0.1	<0.1	<0.1	<0.1	ND
BH09	0 - 0.1 m	27/09/23	5	<0.4	13	54	-	0.1	13	<25	440	<0.2	<0.5	<1	<1	0.08	-	0.4	-	<5	<0.1	<0.1	<0.1	<0.1	ND
BH09	0.9 - 1 m	27/09/23	11	<0.4	19	34	-	<0.1	6	<25	<50	<0.2	<0.5	<1	<1	<0.05	-	<0.05	-	-	-	-	-	-	ND
BH10	0.4 - 0.5 m	28/09/23	10	0.4	24	210	0.07	<0.1	5	<25	<50	<0.2	<0.5	<1	<1	<0.05	-	<0.05	-	-	-	-	-	-	ND
BH11	0 - 0.1 m	28/09/23	14	<0.4	28	50	-	<0.1	3	<25	170	<0.2	<0.5	<1	<1	<0.05	-	<0.05	-	<5	<0.1	<0.1	<0.1	<0.1	ND
BH12	0 - 0.1 m	28/09/23	12	1	35	630	0.1	0.2	15	<25	300	<0.2	<0.5	<1	<1	<0.05	-	0.1	-	<5	<0.1	<0.1	<0.1	<0.1	ND
BH12	0.4 - 0.5 m	28/09/23	12	<0.4	32	86	-	<0.1	2	<25	<50	<0.2	<0.5	<1	<1	<0.05	-	<0.05	-	-	-	-	-	-	ND
BH03	0.1 - 0.2 m	27/09/23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND
BH10	0 - 0.1 m	28/09/23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND
Waste Classification Criteria [f]																									
CT1			100	20	100	100	-	4	40	-	10000	10	288	600	1000	0.8	-	200	-	288	60	<50	4	<50	-
SCC1			500	100	1900	1500	-	50	1050	-	10000	18	518	1080	1800	10	-	200	-	518	108	<50	7.5	<50	-
TCLP1			-	-	-	-	5	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-
CT2			400	80	400	400	-	16	160	-	40000	40	1152	2400	4000	3.2	-	800	-	1152	240	<50	16	<50	-
SCC2			2000	400	7600	6000	-	200	4200	-	40000	72	2073	4320	7200	23	-	800	-	2073	432	<50	30	<50	-
TCLP2			-	-	-	-	20	-	-	-	-	-	-	-	-	-	0.16	-	-	-	-	-	-	-	-	-

CT1 exceedance TCLP1 and/or SCC1 exceedance CT2 exceedance TCLP2 and/or SCC2 exceedance Asbestos detection

- = Not tested, No criteria or Not applicable AD = Asbestos detected NAD = No Asbestos detected

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Total chromium used as initial screen for chromium(VI).

c Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)

d Criteria for scheduled chemicals used as an initial screen

e Criteria for Chlorpyrifos used as initial screen

f All criteria are in the same units as the reported results

PQL Practical quantitation limit

CT1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste

SCC1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

TCLP1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

CT2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste

SCC2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

TCLP2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

Appendix I

Laboratory Analytical Certificates

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Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	224456.00	**Suburb:**	Sutherland	**To:**	Envirolab Services
Project Manager:	Paul Gorman	**Order Number:**		**Sampler:** TM	12 Ashley St, Chatswood NSW 2067
Email:	paul.gorman@douglaspartners.com.au			**Attn:**	Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day				(02) 9910 6200 samplereceipt@envirolab.com.au
Prior Storage:	☑ Fridge ☐ Freezer ☑ Esky ☐ Shelf	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water M - Material	Container Type: G - glass P - plastic	Analytes: Combo 8a	Combo 3a	Combo 3	pH	CEC	BTEX	Asbestos					Notes/ Preservation/ Additional Requirements
	BH01	0.5	0.6	27.9.23	S	G	X											
	BH02	0.1	0.2	27.9.23	S	G		X										
	BH03	0.1	0.2	27.9.23	S	G							X					
	BH03	0.4	0.5	27.9.23	S	G		X										
	BH04	0	0.1	27.9.23	S	G	X											
	BH04	0.9	1	27.9.23	S	G		X		X	X							
	BH05	0.4	0.5	27.9.23	S	G	X											
	BH06	0	0.1	27.9.23	S	G	X											
	BH07	0.4	0.5	28.9.23	S	G	X			X	X							
	BH08	0	0.1	27.9.23	S	G	X											
	BH09	0	0.1	27.9.23	S	G	X											
	BH09	0.9	1	27.9.23	S	G		X										
	BH10	0	0.1	28.9.23	S	G							X					
	BH10	0.4	0.5	28.9.23	S	G		X										

Metals to analyse:			**LAB RECEIPT**
Number of samples in container:	**Transported to laboratory by:**		**Lab Ref. No:**
Send results to:	Douglas Partners Pty Ltd		**Received by:**
Address:	96 Hermitage Road, West Ryde NSW 211	**Phone:** (02) 9809 0666	**Date & Time:**
Relinquished by:	**Date:**	**Signed:**	**Signed:**

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No: 224456.00	**Suburb:** Sutherland		**To:** Envirolab Services
Project Manager: Paul Gorman			**Dispatch date:**

Lab ID	Sample ID			Date Sampled	Sample Type	Container Type	Analytes											Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To		S - soil W - water M -	G - glass P - plastic	Combo 8a	Combo 3a	Combo 3	pH	CEC	BTEX						
	BH11	0	0.1	28.9.23	S	G	X											
	BH12	0	0.1	28.9.23	S	G	X											
	BH12	0.4	0.5	28.9.23	S	G		X		X	X							
	BD01/20230927								X									Intra-laboratory (ELS)
	BD03/20230928								X									Inter-laboratory (ALS)
	TS											X						
	TB											X						

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 334613

Client Details

Client	Douglas Partners Pty Ltd
Attention	Paul Gorman
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**224456.00, Sutherland**
Number of Samples	20 Soil
Date samples received	05/10/2023
Date completed instructions received	05/10/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	12/10/2023
Date of Issue	12/10/2023

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Anthony Clark
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Loren Bardwell, Development Chemist
Lucy Zhu, Asbestos Supervisor
Priya Samarawickrama, Senior Chemist
Tim Toll, Chemist (FAS)

Authorised By
Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		334613-1	334613-2	334613-3	334613-4	334613-5
Your Reference	UNITS	BH01	BH02	BH03	BH04	BH04
Depth		0.5-0.6	0.1-0.2	0.4-0.5	0-0.1	0.9-1.0
Date Sampled		27/09/2023	27/09/2023	27/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	10/10/2023	10/10/2023	10/10/2023	10/10/2023	10/10/2023
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	104	96	107	98	99

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		334613-6	334613-7	334613-8	334613-9	334613-10
Your Reference	UNITS	BH05	BH06	BH07	BH08	BH09
Depth		0.4-0.5	0-0.1	0.4-0.5	0-0.1	0-0.1
Date Sampled		27/09/2023	27/09/2023	28/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	10/10/2023	10/10/2023	10/10/2023	10/10/2023	10/10/2023
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	107	116	111	112	109

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		334613-11	334613-12	334613-13	334613-14	334613-15
Your Reference	UNITS	BH09	BH10	BH11	BH12	BH12
Depth		0.9-1.0	0.4-0.5	0-0.1	0-0.1	0.4-0.5
Date Sampled		27/09/2023	28/09/2023	28/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	10/10/2023	10/10/2023	10/10/2023	10/10/2023	10/10/2023
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	97	109	109	106	110

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		334613-16	334613-17	334613-18
Your Reference	UNITS	BD01/20230927	TS	TB
Depth		-	-	-
Date Sampled		-	-	-
Type of sample		Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	10/10/2023	10/10/2023	10/10/2023
TRH C_6 - C_9	mg/kg	<25	[NA]	[NA]
TRH C_6 - C_{10}	mg/kg	<25	[NA]	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	[NA]	[NA]
Benzene	mg/kg	<0.2	99%	<0.2
Toluene	mg/kg	<0.5	100%	<0.5
Ethylbenzene	mg/kg	<1	101%	<1
m+p-xylene	mg/kg	<2	101%	<2
o-Xylene	mg/kg	<1	100%	<1
Naphthalene	mg/kg	<1	[NA]	[NA]
Total +ve Xylenes	mg/kg	<1	[NA]	[NA]
Surrogate aaa-Trifluorotoluene	%	108	98	114

svTRH (C10-C40) in Soil						
Our Reference		334613-1	334613-2	334613-3	334613-4	334613-5
Your Reference	UNITS	BH01	BH02	BH03	BH04	BH04
Depth		0.5-0.6	0.1-0.2	0.4-0.5	0-0.1	0.9-1.0
Date Sampled		27/09/2023	27/09/2023	27/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	08/10/2023	08/10/2023	08/10/2023	07/10/2023	07/10/2023
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	500	120	260	140	<100
TRH C_{29} - C_{36}	mg/kg	660	440	390	370	220
Total +ve TRH (C10-C36)	mg/kg	1,200	560	650	500	220
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	940	390	490	330	190
TRH >C_{34} -C_{40}	mg/kg	600	580	460	460	330
Total +ve TRH (>C10-C40)	mg/kg	1,500	970	950	800	520
Surrogate o-Terphenyl	%	91	95	86	87	83

svTRH (C10-C40) in Soil						
Our Reference		334613-6	334613-7	334613-8	334613-9	334613-10
Your Reference	UNITS	BH05	BH06	BH07	BH08	BH09
Depth		0.4-0.5	0-0.1	0.4-0.5	0-0.1	0-0.1
Date Sampled		27/09/2023	27/09/2023	28/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	07/10/2023	07/10/2023	07/10/2023	07/10/2023	07/10/2023
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	110	110	100	<100	140
TRH C_{29} - C_{36}	mg/kg	260	220	240	170	310
Total +ve TRH (C10-C36)	mg/kg	370	320	340	170	440
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	240	230	230	150	300
TRH >C_{34} -C_{40}	mg/kg	340	320	350	260	400
Total +ve TRH (>C10-C40)	mg/kg	580	540	580	420	700
Surrogate o-Terphenyl	%	88	82	88	84	90

svTRH (C10-C40) in Soil						
Our Reference		334613-11	334613-12	334613-13	334613-14	334613-15
Your Reference	UNITS	BH09	BH10	BH11	BH12	BH12
Depth		0.9-1.0	0.4-0.5	0-0.1	0-0.1	0.4-0.5
Date Sampled		27/09/2023	28/09/2023	28/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	08/10/2023	08/10/2023	08/10/2023	08/10/2023	08/10/2023
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	110	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	170	190	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	170	300	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	180	210	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	260	280	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	430	490	<50
Surrogate o-Terphenyl	%	73	84	89	88	97

svTRH (C10-C40) in Soil		
Our Reference		334613-16
Your Reference	UNITS	BD01/20230927
Depth		-
Date Sampled		-
Type of sample		Soil
Date extracted	-	06/10/2023
Date analysed	-	08/10/2023
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	500
TRH C_{29} - C_{36}	mg/kg	710
Total +ve TRH (C10-C36)	mg/kg	1,200
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	940
TRH >C_{34} -C_{40}	mg/kg	760
Total +ve TRH (>C10-C40)	mg/kg	1,700
Surrogate o-Terphenyl	%	91

PAHs in Soil						
Our Reference		334613-1	334613-2	334613-3	334613-4	334613-5
Your Reference	UNITS	BH01	BH02	BH03	BH04	BH04
Depth		0.5-0.6	0.1-0.2	0.4-0.5	0-0.1	0.9-1.0
Date Sampled		27/09/2023	27/09/2023	27/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	07/10/2023	07/10/2023	07/10/2023	07/10/2023	07/10/2023
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	2.7	<0.1	0.6	0.1	<0.1
Anthracene	mg/kg	1.2	<0.1	0.2	<0.1	<0.1
Fluoranthene	mg/kg	13	0.2	2.9	0.4	0.4
Pyrene	mg/kg	13	0.2	2.9	0.4	0.3
Benzo(a)anthracene	mg/kg	5.7	<0.1	1.3	0.2	0.2
Chrysene	mg/kg	5.2	0.1	1.2	0.2	0.2
Benzo(b,j+k)fluoranthene	mg/kg	9.3	0.2	2.2	0.4	0.3
Benzo(a)pyrene	mg/kg	7.0	0.1	1.4	0.2	0.2
Indeno(1,2,3-c,d)pyrene	mg/kg	2.4	<0.1	0.6	0.1	0.1
Dibenzo(a,h)anthracene	mg/kg	0.7	<0.1	0.2	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	3.0	0.2	0.8	0.2	0.1
Total +ve PAH's	mg/kg	64	1.0	14	2.1	1.8
Benzo(a)pyrene TEQ calc (zero)	mg/kg	9.5	<0.5	2.0	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	9.5	<0.5	2.0	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	9.5	<0.5	2.0	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	103	101	103	105	102

PAHs in Soil						
Our Reference		334613-6	334613-7	334613-8	334613-9	334613-10
Your Reference	UNITS	BH05	BH06	BH07	BH08	BH09
Depth		0.4-0.5	0-0.1	0.4-0.5	0-0.1	0-0.1
Date Sampled		27/09/2023	27/09/2023	28/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	07/10/2023	07/10/2023	07/10/2023	07/10/2023	07/10/2023
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.3	<0.1	<0.1	0.4	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Fluoranthene	mg/kg	1.1	0.4	0.5	0.8	0.2
Pyrene	mg/kg	1.1	0.4	0.5	0.7	0.1
Benzo(a)anthracene	mg/kg	0.6	0.2	0.3	0.4	<0.1
Chrysene	mg/kg	0.6	0.3	0.3	0.3	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	1	0.6	0.6	0.5	<0.2
Benzo(a)pyrene	mg/kg	0.71	0.4	0.4	0.4	0.08
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	0.2	0.2	0.2	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.4	0.3	0.3	0.2	<0.1
Total +ve PAH's	mg/kg	6.2	2.6	2.9	3.9	0.4
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.9	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	1	0.5	0.5	0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	1.0	0.6	0.6	0.6	<0.5
Surrogate p-Terphenyl-d14	%	98	100	103	102	106

PAHs in Soil						
Our Reference		334613-11	334613-12	334613-13	334613-14	334613-15
Your Reference	UNITS	BH09	BH10	BH11	BH12	BH12
Depth		0.9-1.0	0.4-0.5	0-0.1	0-0.1	0.4-0.5
Date Sampled		27/09/2023	28/09/2023	28/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	07/10/2023	07/10/2023	07/10/2023	07/10/2023	07/10/2023
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	0.1	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	97	98	101	101	98

PAHs in Soil		
Our Reference		334613-16
Your Reference	UNITS	BD01/20230927
Depth		-
Date Sampled		-
Type of sample		Soil
Date extracted	-	06/10/2023
Date analysed	-	07/10/2023
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	0.2
Acenaphthene	mg/kg	0.2
Fluorene	mg/kg	0.2
Phenanthrene	mg/kg	2.8
Anthracene	mg/kg	1.1
Fluoranthene	mg/kg	11
Pyrene	mg/kg	11
Benzo(a)anthracene	mg/kg	5.1
Chrysene	mg/kg	4.8
Benzo(b,j+k)fluoranthene	mg/kg	8.1
Benzo(a)pyrene	mg/kg	6.4
Indeno(1,2,3-c,d)pyrene	mg/kg	2.1
Dibenzo(a,h)anthracene	mg/kg	0.6
Benzo(g,h,i)perylene	mg/kg	2.7
Total +ve PAH's	mg/kg	56
Benzo(a)pyrene TEQ calc (zero)	mg/kg	8.6
Benzo(a)pyrene TEQ calc(half)	mg/kg	8.6
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	8.6
Surrogate p-Terphenyl-d14	%	96

Organochlorine Pesticides in soil						
Our Reference		334613-1	334613-4	334613-6	334613-7	334613-8
Your Reference	UNITS	BH01	BH04	BH05	BH06	BH07
Depth		0.5-0.6	0-0.1	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		27/09/2023	27/09/2023	27/09/2023	27/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	07/10/2023	07/10/2023	07/10/2023	07/10/2023	07/10/2023
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	102	96	100	103

Organochlorine Pesticides in soil					
Our Reference		334613-9	334613-10	334613-13	334613-14
Your Reference	UNITS	BH08	BH09	BH11	BH12
Depth		0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/09/2023	27/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	07/10/2023	07/10/2023	07/10/2023	07/10/2023
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	101	103	101	100

Organophosphorus Pesticides in Soil						
Our Reference		334613-1	334613-4	334613-6	334613-7	334613-8
Your Reference	UNITS	BH01	BH04	BH05	BH06	BH07
Depth		0.5-0.6	0-0.1	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		27/09/2023	27/09/2023	27/09/2023	27/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	07/10/2023	07/10/2023	07/10/2023	07/10/2023	07/10/2023
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Mevinphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phorate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Disulfoton	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion-Methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenthion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methidathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenamiphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phosalone	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Coumaphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	102	96	100	103

Organophosphorus Pesticides in Soil					
Our Reference		334613-9	334613-10	334613-13	334613-14
Your Reference	UNITS	BH08	BH09	BH11	BH12
Depth		0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/09/2023	27/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	07/10/2023	07/10/2023	07/10/2023	07/10/2023
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Mevinphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Phorate	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Disulfoton	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion-Methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenthion	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Methidathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenamiphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Phosalone	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Coumaphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	101	103	101	100

PCBs in Soil						
Our Reference		334613-1	334613-4	334613-6	334613-7	334613-8
Your Reference	UNITS	BH01	BH04	BH05	BH06	BH07
Depth		0.5-0.6	0-0.1	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		27/09/2023	27/09/2023	27/09/2023	27/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	07/10/2023	07/10/2023	07/10/2023	07/10/2023	07/10/2023
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	102	96	100	103

PCBs in Soil					
Our Reference		334613-9	334613-10	334613-13	334613-14
Your Reference	UNITS	BH08	BH09	BH11	BH12
Depth		0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/09/2023	27/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	07/10/2023	07/10/2023	07/10/2023	07/10/2023
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	101	103	101	100

Acid Extractable metals in soil						
Our Reference		334613-1	334613-2	334613-3	334613-4	334613-5
Your Reference	UNITS	BH01	BH02	BH03	BH04	BH04
Depth		0.5-0.6	0.1-0.2	0.4-0.5	0-0.1	0.9-1.0
Date Sampled		27/09/2023	27/09/2023	27/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	10/10/2023	10/10/2023	10/10/2023	10/10/2023	10/10/2023
Arsenic	mg/kg	10	8	10	5	12
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	33	15	26	10	30
Copper	mg/kg	22	29	16	29	23
Lead	mg/kg	23	23	24	53	77
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	0.1
Nickel	mg/kg	17	6	9	8	6
Zinc	mg/kg	150	31	37	100	88

Acid Extractable metals in soil						
Our Reference		334613-6	334613-7	334613-8	334613-9	334613-10
Your Reference	UNITS	BH05	BH06	BH07	BH08	BH09
Depth		0.4-0.5	0-0.1	0.4-0.5	0-0.1	0-0.1
Date Sampled		27/09/2023	27/09/2023	28/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	10/10/2023	10/10/2023	10/10/2023	10/10/2023	10/10/2023
Arsenic	mg/kg	8	5	11	6	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	15	13	20	15	13
Copper	mg/kg	26	21	21	35	30
Lead	mg/kg	130	65	93	74	54
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	0.1
Nickel	mg/kg	6	6	6	14	13
Zinc	mg/kg	110	86	100	110	150

Acid Extractable metals in soil						
Our Reference		334613-11	334613-12	334613-13	334613-14	334613-15
Your Reference	UNITS	BH09	BH10	BH11	BH12	BH12
Depth		0.9-1.0	0.4-0.5	0-0.1	0-0.1	0.4-0.5
Date Sampled		27/09/2023	28/09/2023	28/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	10/10/2023	10/10/2023	10/10/2023	10/10/2023	10/10/2023
Arsenic	mg/kg	11	10	14	12	12
Cadmium	mg/kg	<0.4	0.4	<0.4	1	<0.4
Chromium	mg/kg	19	24	28	35	32
Copper	mg/kg	24	65	10	66	11
Lead	mg/kg	34	210	50	630	86
Mercury	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Nickel	mg/kg	6	5	3	15	2
Zinc	mg/kg	44	210	43	550	40

Acid Extractable metals in soil				
Our Reference		334613-16	334613-21	334613-22
Your Reference	UNITS	BD01/20230927	BH01 - [TRIPLICATE]	BH12 - [TRIPLICATE]
Depth		-	0.5-0.6	0-0.1
Date Sampled		-	27/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil
Date prepared	-	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	10/10/2023	10/10/2023	10/10/2023
Arsenic	mg/kg	5	6	12
Cadmium	mg/kg	<0.4	<0.4	2
Chromium	mg/kg	18	32	39
Copper	mg/kg	30	26	92
Lead	mg/kg	19	22	500
Mercury	mg/kg	<0.1	<0.1	0.1
Nickel	mg/kg	22	24	23
Zinc	mg/kg	150	170	440

Misc Soil - Inorg						
Our Reference		334613-1	334613-4	334613-6	334613-7	334613-8
Your Reference	UNITS	BH01	BH04	BH05	BH06	BH07
Depth		0.5-0.6	0-0.1	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		27/09/2023	27/09/2023	27/09/2023	27/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg					
Our Reference		334613-9	334613-10	334613-13	334613-14
Your Reference	UNITS	BH08	BH09	BH11	BH12
Depth		0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/09/2023	27/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5

Misc Inorg - Soil				
Our Reference		334613-5	334613-8	334613-15
Your Reference	UNITS	BH04	BH07	BH12
Depth		0.9-1.0	0.4-0.5	0.4-0.5
Date Sampled		27/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil
Date prepared	-	09/10/2023	09/10/2023	09/10/2023
Date analysed	-	09/10/2023	09/10/2023	09/10/2023
pH 1:5 soil:water	pH Units	6.3	7.6	7.0

CEC				
Our Reference		334613-5	334613-8	334613-15
Your Reference	UNITS	BH04	BH07	BH12
Depth		0.9-1.0	0.4-0.5	0.4-0.5
Date Sampled		27/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil
Date prepared	-	10/10/2023	10/10/2023	10/10/2023
Date analysed	-	10/10/2023	10/10/2023	10/10/2023
Exchangeable Ca	meq/100g	6.7	11	3.6
Exchangeable K	meq/100g	0.2	0.4	0.1
Exchangeable Mg	meq/100g	0.9	0.5	0.2
Exchangeable Na	meq/100g	<0.1	<0.1	<0.1
Cation Exchange Capacity	meq/100g	7.8	12	4.0

Moisture						
Our Reference		334613-1	334613-2	334613-3	334613-4	334613-5
Your Reference	UNITS	BH01	BH02	BH03	BH04	BH04
Depth		0.5-0.6	0.1-0.2	0.4-0.5	0-0.1	0.9-1.0
Date Sampled		27/09/2023	27/09/2023	27/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	09/10/2023	09/10/2023	09/10/2023	09/10/2023	09/10/2023
Moisture	%	13	11	21	12	12

Moisture						
Our Reference		334613-6	334613-7	334613-8	334613-9	334613-10
Your Reference	UNITS	BH05	BH06	BH07	BH08	BH09
Depth		0.4-0.5	0-0.1	0.4-0.5	0-0.1	0-0.1
Date Sampled		27/09/2023	27/09/2023	28/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	09/10/2023	09/10/2023	09/10/2023	09/10/2023	09/10/2023
Moisture	%	11	15	20	7.4	24

Moisture						
Our Reference		334613-11	334613-12	334613-13	334613-14	334613-15
Your Reference	UNITS	BH09	BH10	BH11	BH12	BH12
Depth		0.9-1.0	0.4-0.5	0-0.1	0-0.1	0.4-0.5
Date Sampled		27/09/2023	28/09/2023	28/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/10/2023	06/10/2023	06/10/2023	06/10/2023	06/10/2023
Date analysed	-	09/10/2023	09/10/2023	09/10/2023	09/10/2023	09/10/2023
Moisture	%	20	19	23	26	22

Moisture		
Our Reference		334613-16
Your Reference	UNITS	BD01/20230927
Depth		-
Date Sampled		-
Type of sample		Soil
Date prepared	-	06/10/2023
Date analysed	-	09/10/2023
Moisture	%	16

Asbestos ID - soils						
Our Reference		334613-1	334613-2	334613-3	334613-4	334613-5
Your Reference	UNITS	BH01	BH02	BH03	BH04	BH04
Depth		0.5-0.6	0.1-0.2	0.4-0.5	0-0.1	0.9-1.0
Date Sampled		27/09/2023	27/09/2023	27/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Sample mass tested	g	Approx. 75g	Approx. 100g	Approx. 85g	Approx. 65g	Approx. 85g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		334613-6	334613-7	334613-8	334613-9	334613-10
Your Reference	UNITS	BH05	BH06	BH07	BH08	BH09
Depth		0.4-0.5	0-0.1	0.4-0.5	0-0.1	0-0.1
Date Sampled		27/09/2023	27/09/2023	28/09/2023	27/09/2023	27/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Sample mass tested	g	Approx. 65g	Approx. 55g	Approx. 80g	Approx. 65g	Approx. 75g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		334613-11	334613-12	334613-13	334613-14	334613-15
Your Reference	UNITS	BH09	BH10	BH11	BH12	BH12
Depth		0.9-1.0	0.4-0.5	0-0.1	0-0.1	0.4-0.5
Date Sampled		27/09/2023	28/09/2023	28/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Sample mass tested	g	Approx. 60g	Approx. 75g	Approx. 70g	Approx. 55g	Approx. 75g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO	NO	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils			
Our Reference		334613-19	334613-20
Your Reference	UNITS	BH03	BH10
Depth		0.1-0.2	0-0.1
Date Sampled		27/09/2023	28/09/2023
Type of sample		Soil	Soil
Date analysed	-	12/10/2023	12/10/2023
Sample mass tested	g	Approx. 80g	Approx. 55g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO	NO
Trace Analysis	-	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-OES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	334613-4
Date extracted	-			06/10/2023	1	06/10/2023	06/10/2023		06/10/2023	06/10/2023
Date analysed	-			10/10/2023	1	10/10/2023	10/10/2023		10/10/2023	10/10/2023
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	102	99
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	102	99
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	104	102
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	102	98
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	101	97
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	102	98
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	106	101
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	117	1	104	110	6	101	99

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	06/10/2023	06/10/2023		[NT]	[NT]
Date analysed	-			[NT]	14	10/10/2023	10/10/2023		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	14	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	14	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	14	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	14	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	14	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	14	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	14	106	107	1	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	334613-4
Date extracted	-			06/10/2023	1	06/10/2023	06/10/2023		06/10/2023	06/10/2023
Date analysed	-			07/10/2023	1	08/10/2023	08/10/2023		07/10/2023	07/10/2023
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	105	128
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	500	630	23	83	#
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	660	770	15	115	#
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	105	128
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	940	1100	16	83	#
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	600	730	20	115	#
Surrogate o-Terphenyl	%		Org-020	85	1	91	98	7	93	87

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	06/10/2023	06/10/2023		[NT]	[NT]
Date analysed	-			[NT]	14	08/10/2023	08/10/2023		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	14	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	14	110	110	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	14	190	180	5	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	14	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	14	210	210	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	14	280	250	11	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	14	88	89	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	334613-4
Date extracted	-			10/10/2023	1	06/10/2023	06/10/2023		06/10/2023	06/10/2023
Date analysed	-			10/10/2023	1	07/10/2023	07/10/2023		07/10/2023	07/10/2023
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	92
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	101	95
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.1	0	93	90
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	2.7	2.6	4	94	93
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	1.2	1.4	15	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	13	14	7	106	97
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	13	15	14	105	104
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	5.7	6.8	18	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	5.2	6.6	24	87	85
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	9.3	11	17	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	7.0	8.7	22	96	100
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	2.4	2.8	15	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.7	0.8	13	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	3.0	3.5	15	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	101	1	103	99	4	95	89

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	06/10/2023	06/10/2023		[NT]	[NT]
Date analysed	-			[NT]	14	07/10/2023	07/10/2023		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	0.2	67	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	14	0.1	0.4	120	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	0.3	100	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	14	<0.2	0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	14	<0.05	0.1	67	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	14	101	106	5	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	334613-4
Date extracted	-			06/10/2023	1	06/10/2023	06/10/2023		06/10/2023	06/10/2023
Date analysed	-			07/10/2023	1	07/10/2023	07/10/2023		07/10/2023	07/10/2023
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	92
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	90
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	81	81
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	75	73
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	94
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	103
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	102
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	72	86
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	70	76
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	80	111
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Mirex	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	101	1	100	96	4	98	90

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	06/10/2023	06/10/2023		[NT]	[NT]
Date analysed	-			[NT]	14	07/10/2023	07/10/2023		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Mirex	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	14	100	104	4	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	334613-4
Date extracted	-			06/10/2023	1	06/10/2023	06/10/2023		06/10/2023	06/10/2023
Date analysed	-			07/10/2023	1	07/10/2023	07/10/2023		07/10/2023	07/10/2023
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	101
Mevinphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Phorate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Disulfoton	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Parathion-Methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	91
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	68	89
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	95
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	94
Fenthion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	67	86
Bromophos-ethyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Methidathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fenamiphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	96
Phosalone	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Coumaphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	101	1	100	96	4	98	90

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	06/10/2023	06/10/2023		[NT]	[NT]
Date analysed	-			[NT]	14	07/10/2023	07/10/2023		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Mevinphos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Phorate	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Disulfoton	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Parathion-Methyl	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fenthion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Methidathion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Fenamiphos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Phosalone	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Coumaphos	mg/kg	0.1	Org-022/025	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	14	100	104	4	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	334613-4
Date extracted	-			06/10/2023	1	06/10/2023	06/10/2023		06/10/2023	06/10/2023
Date analysed	-			07/10/2023	1	07/10/2023	07/10/2023		07/10/2023	07/10/2023
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	77	91
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	101	1	100	96	4	98	90

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	14	06/10/2023	06/10/2023		[NT]	[NT]
Date analysed	-			[NT]	14	07/10/2023	07/10/2023		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	14	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	14	100	104	4	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	334613-4
Date prepared	-			06/10/2023	1	06/10/2023	06/10/2023		06/10/2023	06/10/2023
Date analysed	-			10/10/2023	1	10/10/2023	10/10/2023		10/10/2023	10/10/2023
Arsenic	mg/kg	4	Metals-020	<4	1	10	7	35	117	117
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	113	102
Chromium	mg/kg	1	Metals-020	<1	1	33	20	49	120	108
Copper	mg/kg	1	Metals-020	<1	1	22	32	37	113	119
Lead	mg/kg	1	Metals-020	<1	1	23	24	4	120	97
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.1	<0.1	0	110	113
Nickel	mg/kg	1	Metals-020	<1	1	17	17	0	111	104
Zinc	mg/kg	1	Metals-020	<1	1	150	170	12	116	96

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	14	06/10/2023	06/10/2023		[NT]	[NT]
Date analysed	-			[NT]	14	10/10/2023	10/10/2023		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	14	12	11	9	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	14	1	0.9	11	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	14	35	24	37	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	14	66	56	16	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	14	630	570	10	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	14	0.2	0.1	67	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	14	15	6	86	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	14	550	460	18	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	334613-4
Date prepared	-			06/10/2023	1	06/10/2023	06/10/2023		06/10/2023	06/10/2023
Date analysed	-			06/10/2023	1	06/10/2023	06/10/2023		06/10/2023	06/10/2023
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	102	100

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	14	06/10/2023	06/10/2023		[NT]	[NT]
Date analysed	-			[NT]	14	06/10/2023	06/10/2023		[NT]	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	14	<5	<5	0	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			09/10/2023	[NT]	[NT]	[NT]	[NT]	09/10/2023	[NT]
Date analysed	-			09/10/2023	[NT]	[NT]	[NT]	[NT]	09/10/2023	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	334613-5
Date prepared	-			10/10/2023	[NT]	[NT]	[NT]	[NT]	10/10/2023	10/10/2023
Date analysed	-			10/10/2023	[NT]	[NT]	[NT]	[NT]	10/10/2023	10/10/2023
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	91	118
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	104	102
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	90	99
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	88	89

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NA	Test not required
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PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
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Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
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Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Samples analysed out holding time for PH.

TRH Soil C10-C40 NEPM - # Percent recovery for the matrix spike is not possible to report as the high concentration of analytes in sample 334613-4ms have caused interference.

Acid Extractable Metals in Soil:
- The laboratory RPD acceptance criteria has been exceeded for 334613-1 for Cr. Therefore a triplicate result has been issued as laboratory sample number 334613-21.
- The laboratory RPD acceptance criteria has been exceeded for 334613-14 for Ni. Therefore a triplicate result has been issued as laboratory sample number 334613-22.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos according to ASB-001 asbestos subsampling procedure. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab/MPL recommends supplying 40-60g or 500ml of sample in its own container.
Note: Samples 334613-1-15, 19, 20 were sub-sampled from bags provided by the client.

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CERTIFICATE OF ANALYSIS 334613-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Paul Gorman
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**224456.00, Sutherland**
Number of Samples	Additional TCLP analysis
Date samples received	05/10/2023
Date completed instructions received	12/10/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	19/10/2023
Date of Issue	18/10/2023

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Liam Timmins, Organics Supervisor
Loren Bardwell, Development Chemist

Authorised By
Nancy Zhang, Laboratory Manager

TCLP Preparation - Acid						
Our Reference		334613-A-1	334613-A-3	334613-A-6	334613-A-12	334613-A-14
Your Reference	UNITS	BH01	BH03	BH05	BH10	BH12
Depth		0.5-0.6	0.4-0.5	0.4-0.5	0.4-0.5	0-0.1
Date Sampled		27/09/2023	27/09/2023	27/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
pH of soil for fluid# determ.	pH units	7.3	10.2	8.9	8.8	8.5
pH of soil TCLP (after HCl)	pH units	1.9	2.1	1.9	1.9	1.9
Extraction fluid used		1	1	1	1	1
pH of final Leachate	pH units	5.2	5.6	5.1	5.1	5.1

TCLP Preparation - Acid		
Our Reference		334613-A-16
Your Reference	UNITS	BD01/20230927
Depth		-
Date Sampled		-
Type of sample		Soil
pH of soil for fluid# determ.	pH units	8.4
pH of soil TCLP (after HCl)	pH units	1.9
Extraction fluid used		1
pH of final Leachate	pH units	5.3

Metals from Leaching Fluid pH 2.9 or 5				
Our Reference		334613-A-6	334613-A-12	334613-A-14
Your Reference	UNITS	BH05	BH10	BH12
Depth		0.4-0.5	0.4-0.5	0-0.1
Date Sampled		27/09/2023	28/09/2023	28/09/2023
Type of sample		Soil	Soil	Soil
Date extracted	-	17/10/2023	17/10/2023	17/10/2023
Date analysed	-	17/10/2023	17/10/2023	17/10/2023
Lead	mg/L	0.06	0.07	0.1

PAHs in TCLP (USEPA 1311)				
Our Reference		334613-A-1	334613-A-3	334613-A-16
Your Reference	UNITS	BH01	BH03	BD01/20230927
Depth		0.5-0.6	0.4-0.5	-
Date Sampled		27/09/2023	27/09/2023	-
Type of sample		Soil	Soil	Soil
Date extracted	-	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	16/10/2023	16/10/2023	16/10/2023
Naphthalene in TCLP	mg/L	0.0001	<0.0001	<0.0001
Acenaphthylene in TCLP	mg/L	<0.0001	<0.0001	<0.0001
Acenaphthene in TCLP	mg/L	0.0003	<0.0001	0.0003
Fluorene in TCLP	mg/L	0.0001	<0.0001	0.0001
Phenanthrene in TCLP	mg/L	0.0007	0.0002	0.0008
Anthracene in TCLP	mg/L	<0.0001	<0.0001	0.0002
Fluoranthene in TCLP	mg/L	0.0005	0.0001	0.0006
Pyrene in TCLP	mg/L	0.0003	0.0001	0.0004
Benzo(a)anthracene in TCLP	mg/L	<0.0001	<0.0001	<0.0001
Chrysene in TCLP	mg/L	<0.0001	<0.0001	<0.0001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.0002	<0.0002	<0.0002
Benzo(a)pyrene in TCLP	mg/L	<0.0001	<0.0001	<0.0001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.0001	<0.0001	<0.0001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.0001	<0.0001	<0.0001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.0001	<0.0001	<0.0001
Total +ve PAH's	mg/L	0.0020	0.0004	0.0024
Surrogate p-Terphenyl-d14	%	84	63	74

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Org-022/025	Leachates are extracted with Dichloromethane and analysed by GC-MS/GC-MSMS.

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	334613-A-12
Date extracted	-			17/10/2023	6	17/10/2023	17/10/2023		17/10/2023	17/10/2023
Date analysed	-			17/10/2023	6	17/10/2023	17/10/2023		17/10/2023	17/10/2023
Lead	mg/L	0.03	Metals-020	<0.03	6	0.06	0.1	50	91	91

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	334613-A-3
Date extracted	-			16/10/2023	1	16/10/2023	16/10/2023		16/10/2023	16/10/2023
Date analysed	-			16/10/2023	1	16/10/2023	16/10/2023		16/10/2023	16/10/2023
Naphthalene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	0.0001	<0.0001	0	87	75
Acenaphthylene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	<0.0001	<0.0001	0	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	0.0003	0.0003	0	79	76
Fluorene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	0.0001	0.0001	0	79	70
Phenanthrene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	0.0007	0.0007	0	81	77
Anthracene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	<0.0001	<0.0001	0	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	0.0005	0.0005	0	77	75
Pyrene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	0.0003	0.0003	0	82	71
Benzo(a)anthracene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	<0.0001	<0.0001	0	[NT]	[NT]
Chrysene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	<0.0001	<0.0001	0	74	71
Benzo(bjk)fluoranthene in TCLP	mg/L	0.0002	Org-022/025	<0.0002	1	<0.0002	<0.0002	0	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	<0.0001	<0.0001	0	106	79
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	<0.0001	<0.0001	0	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	<0.0001	<0.0001	0	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	1	<0.0001	<0.0001	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	66	1	84	77	9	80	70

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Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Anna Bui

From: Nancy Zhang
Sent: Thursday, 12 October 2023 5:14 PM
To: Paul Gorman
Cc: Setareh Pourkazemi; Irha Riaz; Anna Bui; Samplereceipt
Subject: RE: Results for Registration 334613 224456.00, Sutherland

Hi Paul,

All good, we'll get that organized.

ELW REF: 334613-A
TAT: STANDARD
DUE: 19/10/23
AB.

Kind Regards,

Nancy Zhang | Laboratory Manager, Sydney | Envirolab Services

Great Science. Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200
E NZhang@envirolab.com.au | W www.envirolab.com.au

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Samples will be analysed per our T&C's.

From: Paul Gorman <paul.gorman@douglaspartners.com.au>
Sent: Thursday, October 12, 2023 5:06 PM
To: Nancy Zhang <NZhang@envirolab.com.au>
Cc: Setareh Pourkazemi <Setareh.Pourkazemi@douglaspartners.com.au>; Irha Riaz <Irha.Riaz@douglaspartners.com.au>
Subject: RE: Results for Registration 334613 224456.00, Sutherland

CAUTION: This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Thanks Nancy.

Can we please schedule the following additional testing on standard turnaround:

1	BH01/0.5-0.6	TCLP PAH
3	BH03/0.4-0.5	TCLP PAH
16	BD01/20230927	TCLP PAH
6	BH05/0.4-0.5	TCLP lead
12	BH10/0.4-0.5	TCLP lead
14	BH12/0-0.1	TCLP lead

Thanks

Paul Gorman | Principal
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au

96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 8878 0632 | M: +61 427 949 878 | E: Paul.Gorman@douglaspartners.com.au

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

If you are not the intended recipient of this email, please notify us immediately and be aware that any disclosure, copying, distribution or use of the cont

From: Nancy Zhang <NZhang@envirolab.com.au>
Sent: Thursday, October 12, 2023 4:27 PM
To: Paul Gorman <paul.gorman@douglaspartners.com.au>
Subject: Results for Registration 334613 224456.00, Sutherland

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC/paperwork received from you
ESDAT Extracts
an Excel or .csv file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
customerservice@envirolab.com.au

How did we do? Send Feedback

Kind Regards,

Nancy Zhang | Laboratory Manager, Sydney | Envirolab Services

Great Science. Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200
E NZhang@envirolab.com.au | W www.envirolab.com.au

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AU: 1300 424 344 Sydney | Perth | Melbourne | Adelaide | Brisbane | Darwin

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Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Paul Gorman

Sample Login Details

Your reference	224456.00, Sutherland
Envirolab Reference	334613-A
Date Sample Received	05/10/2023
Date Instructions Received	12/10/2023
Date Results Expected to be Reported	19/10/2023

Sample Condition

Samples received in appropriate condition for analysis	Holding time exceedance
No. of Samples Provided	Additional TCLP analysis
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	6
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Please contact the laboratory within 24 hours if you wish to cancel the aformentioned testing. Otherwise testing will proceed as per the COC and hence invoiced accordingly.

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	TCLP Preparation - Acid	Lead	PAHs in TCLP (USEPA 1311)	On Hold
BH01-0.5-0.6	✓		✓	
BH02-0.1-0.2				✓
BH03-0.4-0.5	✓		✓	
BH04-0-0.1				✓
BH04-0.9-1.0				✓
BH05-0.4-0.5	✓	✓		
BH06-0-0.1				✓
BH07-0.4-0.5				✓
BH08-0-0.1				✓
BH09-0-0.1				✓
BH09-0.9-1.0				✓
BH10-0.4-0.5	✓	✓		
BH11-0-0.1				✓
BH12-0-0.1	✓	✓		
BH12-0.4-0.5				✓
BD01/20230927	✓		✓	
TS--				✓
TB				✓
BH03-0.1-0.2				✓
BH10-0-0.1				✓
BH01 - [TRIPLICATE]-0.5-0.6				✓
BH12 - [TRIPLICATE]-0-0.1				✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	224456.00	**Suburb:**	Sutherland	**To:**	Envirolab Services
Project Manager:	Paul Gorman	**Order Number:**		**Sampler:**	TM
					12 Ashley St, Chatswood NSW 2067
Email:	paul.gorman@douglaspartners.com.au			**Attn:**	Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day				(02) 9910 6200 samplereceipt@envirolab.com.au
Prior Storage:	☑ Fridge ☐ Freezer ☑ Esky ☐ Shelf	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water M - Material	Container Type: G - glass P - plastic	Analytes: Combo 8a	Combo 3a	Combo 3	pH	CEC	BTEX	Asbestos					Notes/ Preservation/ Additional Requirements
1	BH01	0.5	0.6	27.9.23	S	G	X											
2	BH02	0.1	0.2	27.9.23	S	G		X										
19	BH03	0.1	0.2	27.9.23	S	G							X					
3	BH03	0.4	0.5	27.9.23	S	G		X										
4	BH04	0	0.1	27.9.23	S	G	X											
5	BH04	0.9	1	27.9.23	S	G		X		X	X							
6	BH05	0.4	0.5	27.9.23	S	G	X											
7	BH06	0	0.1	27.9.23	S	G	X											
8	BH07	0.4	0.5	28.9.23	S	G	X			X	X							
9	BH08	0	0.1	27.9.23	S	G	X											
10	BH09	0	0.1	27.9.23	S	G	X											
11	BH09	0.9	1	27.9.23	S	G		X										
20	BH10	0	0.1	28.9.23	S	G							X					
12	BH10	0.4	0.5	28.9.23	S	G		X										

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 334613
Date Received: 5/10/23
Time Received: 1200
Received By: KW
Temp: Cool/Ambient 6°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

Metals to analyse:			**LAB RECEIPT**
Number of samples in container:		**Transported to laboratory by:**	**Lab Ref. No:** 334613
Send results to:	Douglas Partners Pty Ltd		**Received by:** Katy Wayne
Address:	96 Hermitage Road, West Ryde NSW 211	**Phone:** (02) 9809 0666	**Date & Time:** 5/10/23 1200
Relinquished by:		**Date:** **Signed:**	**Signed:**

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	224456.00	**Suburb:** Sutherland	**To:** Envirolab Services
Project Manager:	Paul Gorman		**Dispatch date:**

Lab ID	Sample ID: Location / Other ID	Sample ID: Depth From	Sample ID: Depth To	Date Sampled	Sample Type: S - soil W - water M -	Container Type: G - glass P - plastic	Analytes: Combo 8a	Combo 3a	Combo 3	pH	CEC	BTEX						Notes/ Preservation/ Additional Requirements
13	BH11	0	0.1	28.9.23	S	G	X											
14	BH12	0	0.1	28.9.23	S	G	X											
15	BH12	0.4	0.5	28.9.23	S	G		X		X	X							
16	BD01/20230927								X									Intra-laboratory (ELS)
–	BD03/20230928								X									Inter-laboratory (ALS)
17	TS											X						
18	TB											X						
																		#334613
																		5/10 KW

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Paul Gorman

Sample Login Details

Your reference	224456.00, Sutherland
Envirolab Reference	334613
Date Sample Received	05/10/2023
Date Instructions Received	05/10/2023
Date Results Expected to be Reported	12/10/2023

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	20 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	6
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Samples BH03 0.1-0.2 and BH10 0-0.1 received in a later delivery and therefore was added to the job as #19 and #20.

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Misc Inorg - Soil	CEC	Asbestos ID - soils
BH01-0.5-0.6	✓	✓	✓	✓	✓	✓	✓	✓			✓
BH02-0.1-0.2	✓	✓	✓				✓				✓
BH03-0.4-0.5	✓	✓	✓				✓				✓
BH04-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			✓
BH04-0.9-1.0	✓	✓	✓				✓		✓	✓	✓
BH05-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓			✓
BH06-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			✓
BH07-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH08-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			✓
BH09-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			✓
BH09-0.9-1.0	✓	✓	✓				✓				✓
BH10-0.4-0.5	✓	✓	✓				✓				✓
BH11-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			✓
BH12-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			✓
BH12-0.4-0.5	✓	✓	✓				✓		✓	✓	✓
BD01/20230927	✓	✓	✓				✓				
TS--	✓										
TB	✓										
BH03-0.1-0.2											✓
BH10-0-0.1											✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

CERTIFICATE OF ANALYSIS

Work Order	: **ES2334468**	Page	: 1 of 6
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR PAUL GORMAN	Contact	: Customer Services EM
Address	: 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 2114	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9809 0666	Telephone	: +61 3 8549 9600
Project	: 224456.00	Date Samples Received	: 06-Oct-2023 18:30
Order number	: ----	Date Analysis Commenced	: 11-Oct-2023
C-O-C number	: ----	Issue Date	: 16-Oct-2023 13:32
Sampler	: TM		
Site	: Sutherland		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD03/20230928	----	----	----	----
				Sampling date / time	[28-Sep-2023]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2334468-001	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**20.6**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		**8**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		**19**	----	----	----	----
Copper	7440-50-8	5	mg/kg		**17**	----	----	----	----
Lead	7439-92-1	5	mg/kg		**88**	----	----	----	----
Nickel	7440-02-0	2	mg/kg		**8**	----	----	----	----
Zinc	7440-66-6	5	mg/kg		**121**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD03/20230928	----	----	----	----
				Sampling date / time	[28-Sep-2023]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2334468-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**67.0**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**69.1**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**74.4**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**78.8**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**78.2**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**92.9**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**70.8**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**72.5**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD03/20230928	----	----	----	----
				Sampling date / time	[28-Sep-2023]	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2334468-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**90.6**	**----**	**----**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	63	125
Toluene-D8	2037-26-5	67	124
4-Bromofluorobenzene	460-00-4	66	131

QUALITY CONTROL REPORT

Work Order	: **ES2334468**	Page	: 1 of 7
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR PAUL GORMAN	Contact	: Customer Services EM
Address	: 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 2114	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9809 0666	Telephone	: +61 3 8549 9600
Project	: 224456.00	Date Samples Received	: 06-Oct-2023
Order number	: ----	Date Analysis Commenced	: 11-Oct-2023
C-O-C number	: ----	Issue Date	: 16-Oct-2023
Sampler	: TM		
Site	: Sutherland		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

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

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 5354654)									
ES2334468-001	BD03/20230928	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	19	18	6.5	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	8	5	33.2	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	9	20.5	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	17	24	32.4	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	88	95	7.9	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	121	125	3.1	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5354655)									
ES2334468-001	BD03/20230928	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5353493)									
ES2334969-006	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5353493) - continued									
ES2334969-006	Anonymous	EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES2334968-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5351849)									
ES2334209-005	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES2334206-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5353494)									
ES2334969-006	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES2334968-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5351849)									
ES2334209-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES2334206-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5353494)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5353494) - continued									
ES2334969-006	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES2334968-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 5351849)									
ES2334209-005	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES2334206-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5354654)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	109	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	114	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	120	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	110	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	108	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	102	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	102	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5354655)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	113	70.0	125
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5353493)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	101	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	99.6	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	99.2	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	96.4	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	101	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	103	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	102	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	103	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	99.0	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	101	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	98.0	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	104	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	99.0	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	98.0	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	97.7	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	96.1	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5351849)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	110	72.2	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5353494)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	125	75.0	129

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5353494) - continued								
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	116	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	110	71.0	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5351849)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	111	72.4	133
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5353494)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	124	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	111	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	112	63.0	131
EP080: BTEXN (QCLot: 5351849)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	99.6	76.0	124
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	100	78.5	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	96.4	77.4	121
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	96.0	78.2	121
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	96.3	81.3	121
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	112	78.8	122

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5354654)							
ES2334468-001	BD03/20230928	EG005T: Arsenic	7440-38-2	50 mg/kg	95.5	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	96.9	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	83.7	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	89.6	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	102	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	93.0	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	94.1	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5354655)							
ES2334468-001	BD03/20230928	EG035T: Mercury	7439-97-6	5 mg/kg	95.6	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5353493)							
ES2334968-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	95.2	70.0	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5353493) - continued							
ES2334968-001	Anonymous	EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.9	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5351849)							
ES2334206-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	96.0	60.4	142
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5353494)							
ES2334968-001	Anonymous	EP071: C10 - C14 Fraction	----	480 mg/kg	90.4	73.0	137
		EP071: C15 - C28 Fraction	----	3100 mg/kg	98.9	53.0	131
		EP071: C29 - C36 Fraction	----	2060 mg/kg	104	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5351849)							
ES2334206-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	93.3	61.1	142
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5353494)							
ES2334968-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	87.7	73.0	137
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	101	53.0	131
		EP071: >C34 - C40 Fraction	----	890 mg/kg	97.4	52.0	132
EP080: BTEXN (QCLot: 5351849)							
ES2334206-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	94.4	62.1	122
		EP080: Toluene	108-88-3	2.5 mg/kg	101	66.6	119
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	105	67.4	123
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	106	66.4	121
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	112	70.7	121
		EP080: Naphthalene	91-20-3	2.5 mg/kg	107	61.1	115

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2334468**	Page	: 1 of 4
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR PAUL GORMAN	Telephone	: +61 3 8549 9600
Project	: 224456.00	Date Samples Received	: 06-Oct-2023
Site	: Sutherland	Issue Date	: 16-Oct-2023
Sampler	: TM	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
BD03/20230928	**28-Sep-2023**	**----**	----	----	**12-Oct-2023**	12-Oct-2023	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
BD03/20230928	**28-Sep-2023**	**12-Oct-2023**	26-Mar-2024	✓	**12-Oct-2023**	26-Mar-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
BD03/20230928	**28-Sep-2023**	**12-Oct-2023**	26-Oct-2023	✓	**13-Oct-2023**	26-Oct-2023	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BD03/20230928	**28-Sep-2023**	**12-Oct-2023**	12-Oct-2023	✓	**16-Oct-2023**	21-Nov-2023	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
BD03/20230928	**28-Sep-2023**	**11-Oct-2023**	12-Oct-2023	✓	**11-Oct-2023**	12-Oct-2023	✓
Soil Glass Jar - Unpreserved (EP071)							
BD03/20230928	**28-Sep-2023**	**12-Oct-2023**	12-Oct-2023	✓	**13-Oct-2023**	21-Nov-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
BD03/20230928	**28-Sep-2023**	**11-Oct-2023**	12-Oct-2023	✓	**11-Oct-2023**	12-Oct-2023	✓
Soil Glass Jar - Unpreserved (EP071)							
BD03/20230928	**28-Sep-2023**	**12-Oct-2023**	12-Oct-2023	✓	**13-Oct-2023**	21-Nov-2023	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
BD03/20230928	**28-Sep-2023**	**11-Oct-2023**	12-Oct-2023	✓	**11-Oct-2023**	12-Oct-2023	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
PAH/Phenols (SIM)	EP075(SIM)	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2334468**

Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR PAUL GORMAN	Contact	: Customer Services EM
Address	: 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 2114	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: paul.gorman@douglaspartners.com.au	E-mail	: ALSEnviro.Melbourne@alsglobal.com
Telephone	: +61 02 9809 0666	Telephone	: +61 3 8549 9600
Facsimile	: +61 02 9809 4095	Facsimile	: +61-2-8784 8500
Project	: 224456.00	Page	: 1 of 2
Order number	: ----	Quote number	: EM2017DOUPAR0002 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Sutherland		
Sampler	: TM		

Dates

Date Samples Received	: 06-Oct-2023 18:30	Issue Date	: 10-Oct-2023
Client Requested Due Date	: 16-Oct-2023	Scheduled Reporting Date	: **16-Oct-2023**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 16.2'C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

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

Matrix: **SOIL**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	SOIL - EA055-103 Moisture Content	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES2334468-001	[28-Sep-2023]	BD03/20230928	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE INVOICES

- A4 - AU Tax Invoice (INV)	Email	apinvoices@douglaspartners.com.au

ESDAT ESDAT

- EDI Format - ESDAT (ESDAT)	Email	ESdat_AU+douglaspartners@ESdatLabSync.net

PAUL GORMAN

- *AU Certificate of Analysis - NATA (COA)	Email	paul.gorman@douglaspartners.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	paul.gorman@douglaspartners.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	paul.gorman@douglaspartners.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	paul.gorman@douglaspartners.com.au
- Chain of Custody (CoC) (COC)	Email	paul.gorman@douglaspartners.com.au
- EDI Format - ESDAT (ESDAT)	Email	paul.gorman@douglaspartners.com.au
- EDI Format - XTab (XTAB)	Email	paul.gorman@douglaspartners.com.au

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	224456.00	**Suburb:**	Sutherland	**To:**	Envirolab Services
Project Manager:	Paul Gorman	**Order Number:**		**Sampler:**	TM
Email:	paul.gorman@douglaspartners.com.au			**Attn:**	Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day				12 Ashley St, Chatswood NSW 2067
Prior Storage:	☑ Fridge ☐ Freezer ☑ Esky ☐ Shelf	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)		(02) 9910 6200 samplereceipt@envirolab.com.au

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water M - Material	Container Type: G - glass P - plastic	Analytes: Combo 8a	Combo 3a	Combo 3	pH	CEC	BTEX	Asbestos					Notes/ Preservation/ Additional Requirements
1	BH01	0.5	0.6	27.9.23	S	G	X											
2	BH02	0.1	0.2	27.9.23	S	G		X										
19	BH03	0.1	0.2	27.9.23	S	G							X					
3	BH03	0.4	0.5	27.9.23	S	G		X										
4	BH04	0	0.1	27.9.23	S	G	X											
5	BH04	0.9	1	27.9.23	S	G		X		X	X							
6	BH05	0.4	0.5	27.9.23	S	G	X											
7	BH06	0	0.1	27.9.23	S	G	X											
8	BH07	0.4	0.5	28.9.23	S	G	X			X	X							
9	BH08	0	0.1	27.9.23	S	G	X											
10	BH09	0	0.1	27.9.23	S	G	X											
11	BH09	0.9	1	27.9.23	S	G		X										
20	BH10	0	0.1	28.9.23	S	G							X					
12	BH10	0.4	0.5	28.9.23	S	G		X										

Environmental Division Sydney
Work Order Reference
ES2334468
Telephone : +61-2-8784 8555

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

334613

Date Received: 5/10/23
Time Received: 1200
Received By: KW
Temp: ~~Cool~~/Ambient
Cooling: Ice/~~Icepack~~ 6°C
Security: ~~Intact~~/Broken/None

Metals to analyse:

Number of samples in container:		**Transported to laboratory by:**	ANDREW 6/10/23
Send results to:	Douglas Partners Pty Ltd		
Address:	96 Hermitage Road, West Ryde NSW 211	**Phone:** (02) 9809 0666	
Relinquished by:	ELS SYD Jenna Nguyen 06/10/23, 1200	**Date:**	**Signed:** 6:30pm

LAB RECEIPT

Lab Ref. No:	334613
Received by:	Katy Wayne
Date & Time:	5/10/23 1200
Signed:	

Appendix J

Data Quality Assurance and Data Quality Control

Appendix J
Data Quality Assurance and Quality Control
38-54 and 66 Eton Street, Sutherland NSW

J1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA / QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other field QC samples are included in the QA / QC tables at the end of this appendix.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis (some samples analysed out of holding time of pH)	C PC
Intra-laboratory replicates	5% of primary samples; <30% RPD (Refer to Table QA1)	C PC
Inter-laboratory replicates	5% of primary samples; <30% RPD (refer Table QA1)	C PC
Trip Spikes	1 per sampling event; 60-140% recovery (refer Table QA2)	C
Trip Blanks	1 per sampling event; <PQL (refer Table QA3)	C
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Laboratory Duplicate	1 per lab batch; As laboratory certificate	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C

Item	Evaluation / Acceptance Criteria	Compliance
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes:
C = compliance; PC = partial compliance; NC = non-compliance

As noted in Tables QA1, elevated RPDs were reported for a number of analytes soil sample pairs. The exceedances are not, however, considered to be of concern given that:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred;
- Replicate pairs being collected from fill soils which by its nature is heterogeneous;
- Replicates, rather than homogenised duplicates, were used to minimise risk of volatile loss, hence greater variability can be expected;
- Most of the recorded concentrations being relatively close to the PQL;
- The majority of RPDs within a replicate pair being within the acceptable limits; Any other reason you have should also be included; and
- All other QA / QC parameters met the DQIs.

Given the RPD results and the relative consistency of the reported analyte concentrations across the sample batches, the non conformance in the RPD compliance is not considered to have impacted adversely on the reliability of the data.

A trip spike and trip blank were taken into the field during the soil sampling. No analytes were recorded above the PQL in the trip blank samples analysed (Table QA3, at the end of this appendix). All results in the trip spike samples were within the acceptable range of recovery (Table QA2, at the end of this Appendix).

In summary, the QC data is determined to be of sufficient quality to be considered acceptable for the assessment.

J2.0 Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs) as outlined in NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013):

- Completeness: a measure of the amount of usable data from a data collection activity;
- Comparability: the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness: the confidence (qualitative) of data representativeness of media present on-site;

- Precision: a measure of variability or reproducibility of data; and
- Accuracy: a measure of closeness of the data to the 'true' value.

Table 2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	A systematic sampling method was adopted for effective coverage of the investigation areas, allowing for inaccessible portions.
	Preparation of borehole logs, sample location plan and chain of custody records.
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody.
	A portion of the supplied samples were sub-sampled from the jars for asbestos testing. However, this is not considered to be of concern given that no asbestos was detected in the analysed samples, whether from bags or jars .
	Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM).
	Completion of chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section J1.0.
Comparability	Using appropriate techniques for sample recovery (given the absence of obvious volatile contamination sources), storage and transportation, which were the same for the duration of the project.
	Experienced sampler used.
	Use of NATA registered laboratories, with test methods the same or similar between laboratories.
	Generally satisfactory results for field and laboratory QC samples.
Representativeness	Representative samples were collected at various depths. It is possible due to the sampling method that some of the shallow fill was mixed with deeper soils during sampling.
	Sample numbers recovered and analysed are considered to be representative of the accessible area during pre-demolition investigation and complying with DQOs.
	Samples were extracted and analysed within holding times, apart from pH which is not considered to adversely impact on the quality of the data.
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	RPD of >30% exceedances occurred for field duplicates in multiple samples between primary and secondary samples. However, the concentrations of all samples analysed were either below the SAC.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been generally complied with.

In terms of representativeness, the DSIC report discusses the significance of elevated contaminant concentrations where they occurred, and that the concentrations do not adversely impact on the suitability of the site for the proposed development. The report also recommends further assessment for waste classification if soils are to be removed from the site. It is considered that these discussions and recommendations address the potential cross contamination of samples during sampling.

J3.0 Conclusion

Based on the results of the field QA and field and laboratory QC, and evaluation against the DQIs it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

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Table QA1: Relative Percentage Difference Results – Replicates

Lab Report No	Sample ID	Lab	Depth	Sample Date	Units	Metals								PAH				TRH						BTEX			
						Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes
334613	BD01/20230927	ELS	-		mg/kg	5	<0.4	18	30	19	<0.1	22	150	<0.1	6.4	8.6	56	<25	<50	<25	<50	940	760	<0.2	<0.5	<1	<1
334613	BH01	ELS	0.5 - 0.6 m	27/09/23	mg/kg	10	<0.4	33	22	23	0.1	17	150	<0.1	7	9.5	64	<25	<50	<25	<50	940	600	<0.2	<0.5	<1	<1
				Difference		5	0	15	8	4	0	5	0	0	0.6	0.9	8	0	0	0	0	0	160	0	0	0	0
				RPD		**67%**	0%	**59%**	**31%**	19%	0%	26%	0%	0%	9%	10%	13%	0%	0%	0%	0%	0%	24%	0%	0%	0%	0%
334613	BD03/20230928	ALS	-		mg/kg	8	<1	19	17	88	<0.1	8	121	<0.5	<0.5	<0.5	<0.5	<10	<50	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5
334613	BH07	ELS	0.4-0.5 m	28/09/2023	mg/kg	11	0.4	20	21	93	<0.1	6	100	<0.1	0.4	<0.5	2.9	<25	<50	<25	<50	230	350	<0.2	<0.5	<1	<1
				Difference		3	0.3	1	4	5	0	2	21	0.4	0.1	0	2.4	15	0	15	0	130	250	0	0	0.4	0.4
				RPD		**32%**	**86%**	5	21%	6%	0%	29%	19%	**133%**	22%	0%	**141%**	**86%**	0%	**86%**	0%	**79%**	**86%**	0%	0%	**67%**	**67%**

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Table QA2: Trip Blank Results

				BTEX			
Sample ID	Media Sampled	Units	Sample Date	Benzene	Toluene	Ethylbenzene	o-Xylene
Trip Blank	Soil	mg/kg	27/09/2023	<0.2	<0.5	<1	<1

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Table QA3: Trip Spike Results – (% Recovery)

				BTEX				
Sample ID	Media sampled	Units	Sample Date	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
Trip Spike	Soil	mg/kg	27/09/2023	99	100	101	100	101