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Hazardous Material Survey & Management Plan

Building 83 and 83C
Australian National University
Acton ACT, 2601

May 2013

This report MUST NOT be used as a removal specification

Client: Hindmarsh

CERTIFICATE OF APPROVAL FOR ISSUE OF DOCUMENTS

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1 PREFACE

This Hazardous Materials Survey and Management Plan (HMSMP) was commissioned by Hindmarsh in order to assure the occupants of Building 83 and 83C, Australian National University (ANU) the highest standards of occupational health and safety in relation to hazardous materials. The safe removal of hazardous materials must be undertaken by appropriately licensed and skilled personnel prior to the demolition of the premises.

The HMSMP contains sections covering the identification, evaluation and control of hazardous materials including asbestos containing materials (ACM), Lead Paint, Polychlorinated Biphenyls (PCB), Synthetic Mineral Fibre (SMF), Refrigerants and Fuel Storage Facilities (e.g. Underground Storage Tanks).

Robson Environmental Pty Ltd commenced the hazardous material survey on 11 May 2013. The information contained in this document will assist Hindmarsh in fulfilling their obligations under the latest editions of the following regulations/Acts:

- *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC: 2018 (2005)];
- *Code of Practice for the Safe Removal of Asbestos* [NOHSC: 2002 (2005)];
- Dangerous Substances (General) Regulation 2004;
- Work Health and Safety Act 2011;
- Work Health and Safety Regulations 2011;
- Dangerous Substances Act 2004;
- *National Code of Practice for the Safe Use of Synthetic Mineral Fibre* [NOHSC:2006(1990)]*;*
- *National Standard for Synthetic Mineral Fibres* [NOHSC:1004(1990)]*;*
- *Guide to Lead Paint Management, Part 2: Residential and Commercial Buildings* Standards Australia, AS 4361.2 - 1998*;*
- *Identification of PCB-Containing Capacitors; An information Booklet for Electricians and Electrical Contractors* ANZECC 1997*;* and
- *The Australian Refrigeration and Air-conditioning Code of Good Practice* Standards Australia, HB 40.1 – 2001*.*

2 EXECUTIVE SUMMARY

2.1 Purpose

This report presents the findings of a Hazardous Materials Survey conducted at Building 83 and 83C, Australian National University (ANU) Robson Environmental Pty Ltd commenced this survey on the 11 May 2013 at the request of Hindmarsh. The safe removal of hazardous materials must be undertaken by appropriately licensed and skilled personnel prior to the demolition of the premises.

2.2 Scope

The Hazardous Materials Survey undertaken at Building 83 and 83C, Australian National University (ANU) was non-destructive and non-intrusive in nature. The extent of the survey was limited to the following areas:

- Interior and exterior of the building; and
- Roof, amenities and immediate surrounding land.
- UST filler points and breather vents.

The survey did not include the inspection or assessment of the following areas:

- Subterranean areas (e.g. infill/soil)
- Concealed cavities
- Formwork and subterranean electrical cable ducts and water pipe ducts

2.3 Survey Methodology

The survey involved a visual inspection of accessible, representative, construction materials and the collection and analysis of materials suspected of being potentially hazardous to human health.

Hazardous materials assessed included asbestos containing materials (ACM), synthetic mineral fibre (SMF), polychlorinated biphenyls (PCB), lead containing paint, ozone depleting substances (ODS) and fuel storage facilities, e.g. underground storage tanks (UST).

The visual site inspection performed by Robson Environmental Pty Ltd, which included the sampling of representative materials suspected of being hazardous, was undertaken in accordance with relevant Standards and Codes. The particular sampling methodology used for each hazardous materials type is provided below:

Asbestos: The asbestos materials survey was conducted in accordance with the *Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)].* It involved a visual inspection of accessible representative construction materials suspected of containing asbestos. Materials were not sampled from all areas due to the uniformity of the materials used throughout the building(s). Samples were analysed in a National Association of Testing Authorities (NATA) accredited laboratory for the presence of asbestos by polarising light microscopy and/or X-ray diffraction.

Lead (Pb) Based Paints: In accordance with AS4361.2-1998 representative paint samples were collected from various paint coated surfaces identified on site.

A spot sample consisting of a 25mm square of paint coating was removed using a knife to expose the base substrate. All scrapings and portions of the paint from within the square's area were collected and placed in a sealed and marked container. A total of three spot samples were collected for each suspected paint coating.

Samples were analysed for their lead (Pb) content by Envirolab Services Pty Ltd – NATA accreditation number: 2901 using ICP/AES techniques and in-house Method No.4.

Within the same building, wherever a paint coating had a similar surface texture, colour etc. to a paint coating that had already been sampled because of its suspected lead content, it was presumed that these paint coatings were identical.

SMF: Synthetic Mineral Fibre (SMF) materials were visually identified. Where visual identification of the sampled material was unable to determine the presence of SMF, representative sample(s) were collected. The representative samples were analysed in a National Association of Testing Authorities (NATA) accredited laboratory for the presence of SMF by polarising light microscopy and dispersion staining.

PCBs: The information (make, type, capacitance etc.) recorded for each representative fluorescent light fitting capacitor suspected of containing PCB was cross-referenced against *ANZECC Identification of PCB Containing Capacitors – Information Booklet for Electricians and Electrical Contractors - 1997*.

This identification booklet provides a list of electrical equipment that is known to contain PCBs, and a list of electrical equipment known not to contain PCBs. Where the information recorded from the capacitor case(s) correlated exactly with the information listed in the ANZECC Information Booklet for known PCB-containing capacitors it was determined that PCBs were present in the capacitor under analysis.

Wherever a capacitor could not be identified in either list, this was noted in the PCB register as being a capacitor *'Suspected to contain PCBs'* and a recommendation made that an identical capacitor be submitted for analysis to a laboratory NATA registered for PCB analysis.

Ozone Depleting Substances: Visual examination of refrigerant gas labels affixed to representative air-conditioning and refrigeration units. Information concerning the ASHRAE/ARI refrigerant designated R number was noted for later cross-reference to relevant air-conditioning and refrigeration industry Codes of Practice and Guidelines.

In addition, the condition of the plant was noted and comment made as to possible refrigerant or lubricant leaks.

Where refrigerant gas labels are absent from representative air-conditioning and refrigeration plant, an assessment is made as to the likelihood of the plant using an ozone depleting substance, based on its age and condition.

Fuel Storage Facilities: The survey included a visual inspection for above ground storage tanks (AST) and underground storage tank (UST) filler points and breather vents.

2.4 Key Findings

Asbestos Findings

Asbestos identified during the survey are noted in Table 1A below.

Table 1A: ACM, locations and required actions

Type	ACM	Locations	Action to be taken
Friable	Insulation	To light fittings in female toilet and corridor outside the female toilet	Remove prior to demolition
Bonded Asbestos	Sheet	Ceiling sheet	
	Sheet	External perimeter eaves	
	Caulking	Window Caulking	
	Sheet	Asbestos cement sheet debris in ceiling space	Remove debris and all insulation, environmental clean of ceiling void prior to demolition
	Sheet	Verge under cloaking	Remove prior to demolition

Refer to Section 2.4 - Table 1B for presumed ACM and Section 3.2 for exclusions

Table 1B: Presumed ACM, concealed locations and required actions

Type	ACM	Locations	Action to be taken
The materials listed below while not identified on site, should be presumed to be present until a destructive survey confirms otherwise			
Presumed ACM	Asbestos cement sheet formwork and electrical cable duct / water pipe	Subterranean areas	Should subterranean areas be disturbed: implement an unexpected finds protocol and ensure works have undertaken asbestos awareness training

Prior to any planned demolition, refurbishment or maintenance, its effect upon any in situ asbestos must be established by reference to this document including amendments.

Lead Paint

The analytical results of paint sampling from Building 83 and 83C, ANU, revealed that there **was lead free paint present**. It should be assumed that all similar paint throughout the building contains comparable percentages of lead.

Lead Content	Location	Paint Colour	Required action
Lead Free Paint	Eastern Store room walls	Green	Leave & maintain
	Laboratory preparation area wall	Cream	Leave & maintain

Synthetic Mineral Fibre (SMF)

SMF was identified as blanket insulation throughout the roof and exterior walls of the building. The SMF was in a sealed location and in good condition.

Type	Material	Location & Material	Required action
SMF	Pink bonded insulation batts	Ceiling space	Remove prior to demolition
	Rockwool insulation	Ceiling space	
	Insulation to water heater	Water heater	

Polychlorinated Biphenyls (PCB)

Only non-PCB containing capacitors were identified to light fittings during the survey

Result	Make - Type	Location	Required action
Non PCB	UCC	Throughout	None required
	ELCO	Large Storeroom	None required

Ozone Depleting Substances (ODS)

ODS were not identified during the survey.

R Number	Location	Total	Required action
R410A	Throughout	3	Maintain

Above ground Storage (AST) & Underground Storage Tanks (UST)

No evidence of any above ground or underground fuel storage tanks was identified during the survey of Building 83 and 83C, ANU.

2.5 Key Recommendations

Asbestos

- All asbestos must be removed prior to demolition by an ACT licensed Asbestos Removalist and a clearance certificate issued by a licensed ACT Class A Asbestos Assessor.

- The asbestos debris identified in the ceiling void must be removed along with insulation. An environmental clean of the ceiling void must then be undertaken. All asbestos must be removed prior to demolition by an ACT licensed Asbestos Removalist and a clearance certificate issued by a licensed ACT Class A Asbestos Assessor.

- All Asbestos identified in this report should be inspected on a yearly basis by a Class A asbestos assessor to ensure no deterioration of the ACM has occurred

- **All Identified ACM should be labelled with approved asbestos warning labels or signs. Due to stigma associated with asbestos and to avoid malicious damage to ACM, labelling can be kept to discrete areas. Where labelling can not be undertaken, Management must adopt strict administrative controls to ensure ACM is not subject to accidental damage.**

- Any asbestos containing material requiring removal must be removed by an ACT licensed Asbestos Removalist as per the Code of *Practice for the Safe Removal of Asbestos, 2nd Edition* [NOHSC: 2002 (2005)].

SMF

- If these materials are to be disturbed during refurbishment appropriate PPE should be worn. SMF materials being removed should be done so using effective dust control procedures. Refer to Appendix C for further general information on SMF.

ODS

- All refrigeration and air-conditioning plant should be regularly checked and maintained in accordance with the manufacturer guidelines. Refer to Appendix C for further general information on ODS.

UST

- No infrastructure generally associated with USTs was identified during the survey.

Demolition

Robson Environmental Pty Ltd recommends that prior to any demolition, our office be contacted. Our Class A Asbestos Assessor can attend the site to observe the demolition process, advise as necessary and in the event of asbestos or other hazardous materials being located, assist with assessing the extent, type and condition of materials as required.

Robson Environmental Pty Ltd also provides a range of occupational hygiene services in relation to the removal of asbestos material as well as contaminated land advice in relation to hydrocarbon contamination.

To assist with the tendering process Robson Environmental could be engaged to attend the walkthrough to show the extent of ACM and to respond to questions of clarification.

3 INTRODUCTION

The following Hazardous Material Survey and Management Plan (HMSMP) has been designed to address the safe control of hazardous materials identified at Building 83 and 83C, ANU. It covers current requirements for asbestos management as at 11 May 2013 only and must therefore be updated to comply with any future changes to legislative requirements. The safe removal of hazardous materials must be undertaken by appropriately licensed and skilled personnel prior to the demolition of the premises.

This HMSMP includes the following:

- a register of all identified hazardous materials;
- extent, form, condition and risks associated with nominated hazardous materials;
- labelling requirements for identified hazardous materials;
- a timetable for managing risks including priorities for removal or control of ACM and for reviewing risk assessments;
- responsibilities of all persons involved in hazardous materials management;
- procedures to address incidents or spillage involving ACM;
- safe work and removal methods; and
- guidelines on reviewing and updating the HMSMP and hazardous materials register.

3.1 Requirements for the HMSMP

This HMSMP must be held on site for ready access. All personnel undertaking any repair or maintenance work must be provided with a copy of the HMSMP before commencement of work.

Maintenance, trade and other personnel must be instructed not to remove or damage identified ACM. If ACM is identified in the area where work will be undertaken it must be removed before work begins.

Removal of ACM must be undertaken by an ACT licensed Asbestos Removalist in accordance with the *Code of Practice for the Safe Removal of Asbestos, 2nd Edition* [NOHSC: 2002 (2005)].

3.2 Exclusions

The HMSMP commissioned by the client was destructive and intrusive in nature.

The survey undertaken was limited to those areas available for access at the time of building inspection. Only the areas accessible to the surveyors at the time of the building inspection are included in this HMSMP.

Unless specifically noted, the survey did not cover exterior ground surfaces and sub-surfaces (e.g. infill/soil) or materials other than normal building fabric such as materials in laboratories or special purpose facilities.

At the time of survey no access was gained to materials and / or void areas located behind, above, or attached to any sampled or assumed ACM.

The HMSMP does not include the areas, locations and equipment items to which the surveyors could not gain access at the time of inspection.

Some other areas which *may* conceal asbestos include:

Material	Location
Asbestos cement sheet formwork and electrical cable/water pipe duct	Sub-ground floor slab

No absolute determination can be made regarding the possibility of concealed or inaccessible hazardous materials or items in the areas, locations and equipment listed in the table above until access is gained to allow for inspection.

Materials and equipment in any non-accessed area should therefore be assumed to contain ACM, SMF, lead paint, PCB and ODS (the nominated hazardous materials) and be treated appropriately until assessment and sample analysis confirm otherwise.

Samples were not taken where the act of sampling would endanger the surveyor(s) or affect the structural integrity of the item concerned.

The presence of ACM to pipe work that is not readily visible, or that would require the full removal and replacement of overlying non-asbestos insulation to confirm, has not been investigated.

This HMSMP, although extensive, is not intended for and must not be used as a specification or method statement for any future asbestos removal project. In this instance detailed plans, quantities etc. would be required.

Before any refurbishment or hazardous material removal projects, the contractor(s) carrying out the work must fully acquaint themselves with the extent of the hazardous materials, particularly in those areas which may need full or partial demolition in order to determine the exact extent and location of such materials.

Care should be taken when demolishing or excavating to determine the existence or otherwise of hazardous materials. For example subsurface pipes and drains, revealed through excavation may be constructed of asbestos cement. Wherever a material is uncovered or revealed and it is suspected to be hazardous, it should be assumed to be hazardous and treated appropriately until such time as assessment and sample analysis of the material confirms otherwise.

Until this confirmation occurs the building work must cease in the immediate vicinity of the suspect material and a Class A Asbestos Assessor must issue a Clearance Certificate before the building work can recommence in the affected area.

To ensure contextual integrity, this HMSMP must always be read in its entirety and should never be referred to in part only.

3.3 Limitations

This report is based on the information obtained by Robson Environmental Pty Ltd at the time of building inspection. Robson Environmental Pty Ltd will not update this report; nor take into account any event(s) occurring after the time that its assessment was conducted.

As both the range and use of manufactured products containing asbestos was extremely widespread, Robson Environmental Pty Ltd cannot accept responsibility for any consequential loss or damage that results from non-recognition of a material that may later be established to contain asbestos. For example, certain textured wall and ceiling finishes may contain small traces of asbestos fibre. In situ, textured finishes are often composed of assorted batches of product, or may have been repaired/patched at various times. It is therefore always a possibility that the samples collected may not always be representative of the entire material.

While Robson Environmental Pty Ltd has taken all care and attention to ensure that this report includes the most accurate information available, it has been unable to examine any inaccessible materials or materials hidden from view.

Under normal construction practices some materials are “built in” or “randomly applied”. These materials are therefore not readily accessible and can only be exposed through demolition or damage to the structure or finishes. Access to a material may also be prevented or restricted by “in service” or operational equipment, or where to obtain access contravenes a relevant statutory requirement or code of practice. (e.g. electrical switchboards) Consequently, while all reasonable care and attention was taken in compiling this report no guarantee to its completeness can be given.

Robson Environmental Pty Ltd has taken all care to ensure that this report includes the most accurate information available, where it uses test results prepared by other persons it relies on the accuracy of the test results in preparing this report. In providing this report Robson Environmental Pty Ltd does not warrant the accuracy of such third party test results.

4 ASBESTOS SURVEY RESULTS

4.1 Survey Details

The survey of Building 83 and 83C, ANU commenced 11 May 2013. The survey included all accessible areas of the buildings. For further asbestos management information, refer to Appendix D.

4.2 Survey Methodology

The survey involved a visual inspection and subsequent sampling and analysis of suspect asbestos materials in a National Association of Testing Authorities (NATA) laboratory using polarising light microscopy and/or X-ray diffraction. Samples were a representative selection of materials suspected of containing asbestos. Samples were not taken from all areas due to the uniformity of the materials used throughout the building.

4.3 Sample Analysis

Table 2: Mineralogical Analysis of Samples for Asbestos using Polarising Light Microscopy

Sample reference	Sample location	Sample type	Composition Asbestos type
4266 – A1	**Store room – Eastern wing – Off -White fibrous sheeting**	**Sheet**	**Chrysotile asbestos detected**
4266 – A2	**North-side, east end – Off - White fibrous sheeting, painted yellow**	**Sheet**	**Chrysotile asbestos detected**
4266 – A3	Cleaners Cupboard – wall sheet. Pale brown fibrous sheeting, painted yellow	Sheet	No asbestos detected
4266 – A4	Laboratory Prep. Area - Black flooring	VFT	No asbestos detected
4266 – A5	Temperature/Humidity control room – Blue flooring	VFT	No asbestos detected
4266 – A6	**Switch Board 7 – Dark brown fibrous layer, with black surface**	**Sheet**	**Chrysotile asbestos detected**
4266 – A7	Cooling tower – Black bituminous lump	Bitumen	No asbestos detected

Sample reference	Sample location	Sample type	Composition Asbestos type
4266 – A8	Hot house 11 mastic to windows – Brown lump	Mastic	No asbestos detected
4266 – A9	Hot house 11 Bench tops – Pale grey fibrous sheeting	Sheet	No asbestos detected
4266 – A10	Hot house 10 mastic to windows – White lump	Mastic	No asbestos detected
4266 – A11	Hot House 9 mastic to windows – White lump	Mastic	No asbestos detected
4266 – A12	Hot house 9 Bench tops – Pale grey fibrous sheeting	Sheet	No asbestos detected
4266 – A13	Hot house 8 mastic to windows – White lump	Mastic	No asbestos detected
4266 – A14	Hot house 7 mastic to windows – Brown lump	Mastic	No asbestos detected
4266 – A15	Hot house 7 bench tops – Pale grey fibrous sheeting	Sheet	No asbestos detected
4266 – A16	Hot house 6 bench tops – Grey lump	Sheet	No asbestos detected
4266 – A17	Hot house 6 bench tops – pale grey fibrous sheeting	Sheet	No asbestos detected
4266 – A18	Hot house 5 mastic to windows – Off-white lump	Mastic	No asbestos detected
4266 – A19	Hot house 5 bench tops – Pale grey fibrous sheeting	Sheeting	No asbestos detected
F0504	**To window of eastern store room**	**Caulking**	**Chrysotile Asbestos Detected**
F0505	Exterior sheet	Sheet	No Asbestos Detected
F0506	VFT debris in subfloor	VFT	No Asbestos Detected
F0507	Sheet debris in subfloor	Sheet	No Asbestos Detected

Sample reference	Sample location	Sample type	Composition Asbestos type
F0508	Wall sheet to bathrooms	Sheet	No Asbestos Detected
F0509	Blue VFT in kitchen area	VFT	No Asbestos Detected
F0510	**Sheet debris in ceiling space**	**Sheet**	**Chrysotile Asbestos Detected**
F0511	Sheet to lower walls of greenhouse	Sheet	No Asbestos Detected
F0512	Mastic to walls of greenhouse	Mastic	No Asbestos Detected
F0513	**Verge under cloaking**	**Sheet**	**Amosite, Crocidolite and Chrysotile Asbestos Detected**
F0514	**To light fittings in female toilet and corridor**	**Insulation**	**Chrysotile Asbestos Detected**

Chrysotile	**=**	**white asbestos**
Amosite	**=**	**grey or brown asbestos**
Crocidolite	**=**	**blue asbestos**

It should be noted that the above samples were a representative selection of materials suspected of containing asbestos.

Materials were not sampled from all areas due to the consistency of the materials used throughout the premises.

On-site inspections and an examination of the building register within this report should be undertaken prior to the commencement of any asbestos removal programme.

4.4 Risk Assessment

The purpose of the risk assessment is to enable informed decisions to be made concerning the control of ACM.

As per NOHSC: 2018(2005), the risk assessment should take account of the identification information in the Asbestos Register, including:

- type of ACM (bonded or friable)
- condition and location of ACM
- whether the ACM is likely to be disturbed due to its condition and location; and
- the likelihood of exposure

Types of ACM

Bonded ACM	Bonded ACM is any material that contains asbestos bound into a stable matrix. It may consist of cement or various resins/binders and cannot be reduced to a dust by hand pressure. As such it does not present an exposure hazard unless cut, abraded, sanded or otherwise disturbed. Therefore, the exposure risk from bonded ACM is negligible during normal building occupation. *Note: if bonded ACM is damaged or otherwise deteriorated, the risk assessment must be reviewed to reflect a higher potential for exposure to asbestos fibres. A Class A Asbestos Assessor should perform the risk assessment.*
Friable ACM	Friable ACM can be crumbled or reduced to a dust by hand pressure when dry and can represent a significant exposure hazard. Examples of friable asbestos are hot water pipe lagging, severely damaged asbestos cement sheet, limpet spray to structural beams and electrical duct heater millboard.

ACM CONDITION RATING

1	**Severe**	Deteriorated surface in extremely poor condition
2	**Poor**	Deteriorated material
3	**Normal**	Stable asbestos with little damage
4	**Good**	Well sealed stable surfaces in accessible locations

ACM RISK RATING

A	**Very High**	Exposure to airborne asbestos as a consequence of extremely minor disturbance
B	**High**	Exposure to airborne asbestos likely as a consequence of significant disturbance
C	**Medium**	Exposure to airborne asbestos unlikely during normal building use
D	**Low**	No exposure to airborne asbestos during normal building use

4.5 Asbestos Register

The Asbestos Register details the type, location, risk assessment and action required for all identified ACM. The register should be accessed to inform all decisions made concerning control of ACM. Action taken to control ACM must be recorded in this register in order to comply with the *Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018(2005)]*.

Table 3A: Asbestos Register

ACM [1]	Sample No.	Item No.	ACM type	Locations	Condition Rating	Risk Rating	Approx Quantity	Recommended Management Action	Action Undertaken	Assessor / Date assessed
Friable Asbestos	F0514	1	Insulation	To light fittings in female toilet and corridor	3	B	-	Remove prior to demolition		
Bonded Asbestos	4266 – A1	2	Sheet	Store room ceiling sheet– Eastern wing – Off -White fibrous sheeting	4	D	10m^2			
	4266 – A2	3	Sheet	Eave Sheet – Off -White fibrous sheeting, painted yellow	4	D	60m			
	4266 – A6	4	Sheet	Switch Board 7 – Dark brown fibrous layer, with black surface	4	D	1m^2		Removed	11 May 2013
	F0504	5	Caulking	Store room windows	4	D	10m^2			
	F0510	6	Sheet	Sheet debris in ceiling space	2	C	-	Remove debris and all insulation, environmental clean of ceiling void prior to demolition		
	F0513	7	Sheet	Verge under cloaking	4	D	-	Remove prior to demolition		

1. See Section 10 Asbestos management for management options
2. RA = Referred to another sample as being the same material

Refer to Section 2.4 Table 1B for presumed ACM and Section 3.2 for exclusions

Table 3B: Register of Sampled materials (which have been confirmed as non ACM)

NON ACM SAMPLE REGISTER			
Sample number	**Item No.**	**Material**	**Locations**
4266 – A3	8	Sheet	Cleaners Cupboard – wall sheet. Pale brown fibrous sheeting, painted yellow
4266 – A4	9	VFT	Laboratory Prep. Area - Black flooring
4266 – A5	10	VFT	Temperature/Humidity control room – Blue flooring
4266 – A7	11	Bitumen	Cooling tower – Black bituminous lump
4266 – A8	12	Mastic	Hot house 11 mastic to windows – Brown lump
4266 – A9	13	Sheet	Hot house 11 Bench tops – Pale grey fibrous sheeting
4266 – A10	14	Mastic	Hot house 10 mastic to windows – White lump
4266 – A11	15	Mastic	Hot House 9 mastic to windows – White lump
4266 – A12	16	Sheet	Hot house 9 Bench tops – Pale grey fibrous sheeting

NON ACM SAMPLE REGISTER			
Sample number	**Item No.**	**Material**	**Locations**
4266 – A13	17	Mastic	Hot house 8 mastic to windows – White lump
4266 – A14	18	Mastic	Hot house 7 mastic to windows – Brown lump
4266 – A15	19	Sheet	Hot house 7 bench tops – Pale grey fibrous sheeting
4266 – A16	20	Sheet	Hot house 6 bench tops – Grey lump
4266 – A17	21	Sheet	Hot house 6 bench tops – pale grey fibrous sheeting
4266 – A18	22	Mastic	Hot house 5 mastic to windows – Off-white lump
4266 – A19	23	Sheeting	Hot house 5 bench tops – Pale grey fibrous sheeting
F0505	24	Sheet	Exterior sheet
F0506	25	VFT	VFT debris in subfloor
F0507	26	Sheet	Sheet debris in subfloor

NON ACM SAMPLE REGISTER			
Sample number	**Item No.**	**Material**	**Locations**
F0508	27	Sheet	Wall sheet to bathrooms
F0509	28	VFT	Blue VFT in kitchen area
F0511	29	Sheet	Sheet to lower walls of greenhouse
F0512	30	Mastic	Mastic to walls of greenhouse

Refer to Section 2.4 - Table 1B for presumed ACM and Section 3.2 for exclusions

5 LEAD PAINT SURVEY RESULTS

5.1 Introduction

Lead paint is defined by the Australian Standard (AS 4361.2 – 1998 *Guide to lead paint management Part 2: Residential and Commercial buildings*) as a paint or component coat of a paint system containing lead or lead compounds, in which the lead content (calculated as lead metal) is in excess of 1.0% by weight of the dry film as determined by laboratory testing.

Further, the Standard for the Uniform Scheduling of Drugs and Poisons (National Drugs and Poisons Schedule Committee July 2000) classifies paints having more than 0.25% lead as First Schedule Paint and prohibits their manufacture, supply or use.

It has been shown that the dust generated from dry sanding or abrasive blast cleaning of paints with a lead concentration of > 0.25% can have sufficient content to produce exposure levels that exceed those that define a 'lead task' in NOHSC 1012.

Therefore, paints with a lead concentration greater than 0.25% (if they are to be removed) must be treated as a lead paint (i.e. subject to the regulations in NOHSC 1012).

5.2 Results

Paint samples were collected from Building 83 and 83C, ANU and analysed for lead content. Where paints were collected, samples were analysed by Amdel – NATA accreditation number: 1526.

Table 4 presents lead composition in paints, with results presented as a percentage concentration of lead contained within the sampled materials. Despite the fact that sampling methodologies require that three (3) paint sub-samples be taken for each sampled product, only maximum values are presented below. Due to the inherent heterogeneity of lead concentrations in applied liquids this maximum reading is presented as it represents an upper level of lead concentrations throughout a heterogeneous product and aids in interpretation of risk assessment and management recommendations. For detailed results of analysed paint samples refer to Appendix A.

Table 4: Lead Composition in Paint by Inductively-Coupled Plasma Spectroscopy

Sample No.	Item No's	Sample location	Colour	Lead in Paint %
4266 – P1(a, b, c)	Pb1	Eastern Store room walls	Green	<0.05
4266 – P2(a, b, c)	Pb2	Laboratory Preparation area walls	Cream	<0.05

Notes:

Lead Paint **(> 1.0% Pb)**

First Schedule Paint **(> 0.25% Pb)**

Lead-free Paint **(≤ 0.25% Pb)**

5.3 Discussion and Conclusion

The analytical results of paint sampling from Building 83 and 83C, ANU, revealed that no lead paint present. It should be assumed that all similar paint throughout the building contains comparable percentages of lead.

Refer to Appendix D for safe lead paint removal procedures.

6 SYNTHETIC MINERAL FIBRE (SMF) SURVEY RESULTS

6.1 Introduction

SMF is a generic term used to collectively describe a number of amorphous (non-crystalline) fibrous materials including glass fibre, mineral wool (Rockwool and Slagwool) and ceramic fibre. Generally referred to as SMF, these materials are also known as 'Man-Made Mineral Fibres' (MMMF).

SMF products are used extensively in commercial and residential buildings for thermal and acoustic insulation, and as a reinforcing agent in cement, plaster and plastic materials. In some specialised instances, SMF materials have also been used as alternatives to asbestos, especially where high temperature insulation properties are required.

There are two basic forms of SMF insulation ***bonded*** and ***unbonded*****.**

The ***bonded form*** is where adhesives, binding agents, facing/cladding, cement or other sealants have been applied to the SMF before delivery and the SMF product has a specific shape (e.g. a binding or sealing agents hold the SMF in a batt or blanket form). Some bonded SMF materials may also be clad in various coverings on one or more sides (e.g. a silver foil backing).

The ***unbonded form*** has no adhesives, binding agents, facing/cladding or sealants applied, and the SMF is a loose material (e.g. wet spray and loose fill).

6.2 Results

Table 5: Visual Assessment of Samples

Sample Reference	Item No's	Sample Location	Sample Type	Form
9116-SMF1	SMF1	Throughout Ceiling space	Pink Batts	Bonded
9116-SMF2	SMF2	Throughout Ceiling space	Rockwool	Bonded
9116-SMF3	SMF3	To hot water service	Internal insulation	Bonded

6.3 Conclusion

SMF was identified during the survey and is in sealed locations and in good condition.

If building works is likely to significantly disturb the insulation, the SMF materials should be removed using effective dust control procedures.

Refer to Appendix D for safe SMF handling and removal procedures.

7 POLYCHLORINATED BIPHENYLS (PCB) SURVEY RESULTS

7.1 Introduction

PCB is the common name for polychlorinated biphenyls. PCBs range in appearance from colourless, oily liquids to more viscous and increasingly darker liquids, to yellow then black resins, depending on the chlorine content of the PCB.

PCBs are chemically stable synthetic compounds that do not degrade appreciably over time or with exposure to high temperatures. The major use of PCBs was as an insulating fluid inside transformers and capacitors. Capacitors containing PCBs were installed in various types of equipment including domestic appliances, motors and fluorescent light fittings during the 1950's, 60's and 70's.

These applications generally do not present an immediate risk to human health or the environment as the equipment is sealed and contains relatively small amounts of PCB. The equipment can continue to be used safely provided that the capacitors do not leak.

The Australian and New Zealand Environment and Conservation Council (ANZECC) in its *PCB Management Plan* of *2003* stipulate cessation dates for the generation of PCB scheduled waste, the use of articles containing PCB scheduled waste, and the disposal of PCB scheduled waste*.

* PCB scheduled waste means any PCB material that has no further use that contains PCBs at levels at, or in excess of 50mg/kg and is of a quantity of 50g or more.

Small equipment items and capacitors found in households and commercial buildings that contain scheduled PCBs (i.e. at or in excess of 50mg/kg) are to be disposed of as scheduled PCB waste. Where the aggregate weight of the items or capacitors exceeds 10kg, they must be notified to the relevant Commonwealth, State or Territory Government agency prior to their disposal.

7.2 Results

Representative samples of fluorescent light fittings were inspected for PCB capacitors. Two types of non-PCB containing capacitor was identified during the survey.

Table 6: PCB and Non-PCB Containing Capacitors Identified During Survey

Result	Item No	Location	Make - Type	Capacitance (µF)	Remarks
Non-PCB	PCB1	Throughout	UCC	6.5 µf	No action required
	PCB2	Throughout	ELCO	8 µf ± 10 %	No action required

For further PCB management information refer to Appendix D.

8 OZONE DEPLETING SUBSTANCES SURVEY RESULTS

Building 83 and 83C, ANU was surveyed for the presence of air conditioning and refrigeration units that contain ozone depleting substances.

ODS are used for heat transfer in refrigeration and air conditioning systems, absorbing or releasing heat according to vapour pressure. Release of these substances to the atmosphere have the ability to cause long term atmospheric pollution that can lead to ozone depletion, global warming, petrochemical smog and acid rain.

The ozone depletion potential (ODP) of a fluorocarbon refrigerant gas, its global warming potential (GWP) and estimated atmospheric life (EAL) all contribute to its potential to deplete the stratospheric ozone layer and enhance the greenhouse effect (leading to global warming).

Chlorofluorocarbons (CFCs) contain chlorine and possess a large ODP, high GWP and long EAL. They are generally found in refrigeration and air-conditioning systems e.g. Centrifugal Chillers.

Hydrochlorofluorocarbons (HCFCs) are less saturated with chlorine than are CFCs and the hydrogen within these compounds give the HCFCs a much shorter EAL and lower ODP. They are generally found in refrigeration systems that are used for food display, cold stores and self contained, split, multi-split and central plant chillers used for building air-conditioning.

Hydrofluorocarbons (HFCs) are a class of replacement gases for CFCs. They do not contain chlorine or bromine and therefore do not deplete the ozone layer. While all HFCs have an ODP of zero, some do have a high GWP (e.g. R-404A, R-407B, R-125 etc).

Halons are synthetic chemical compounds that contain one or two carbon atoms, bromine and other halogens. They have a long atmospheric lifetime and cause very aggressive ozone depletion when breaking down in the stratosphere. Halons were introduced into Australia as fire-extinguishing agents in the early 1970s and quickly replaced many previously accepted fire-fighting products because of their superior fire-extinguishing characteristics and ease of use.

Halon 1211 was commonly used in portable fire extinguishers, while fixed fire protection systems, such as those that protect computer rooms and ship engine rooms, commonly contained Halon 1301.

Halon 1301 has an ODP that is 10 times greater that of CFCs, while Halon 1211 has an ODP 3 times greater than that of CFCs.

8.1 Results

Ozone Depleting Substances (ODS) were not identified during the survey at Building 83 and 83C, ANU.

Table 7: Chemical Properties of ODS & non-ODS located during survey

R Number	Item No	Location	Chemical name	ODP	GWP	EAL
Non-Ozone Depleting Substances						
R410A	ODS1	3 x office A/C units	HFC blend	0.0	1370	36

For further refrigerant management information refer to Appendix D.

9 FUEL STORAGE FACILITIES & DANGEROUS GOODS RESULTS

It is important to note that prior to the introduction of natural gas in the ACT in the 1980's, commercial premises generally utilised heating systems where boilers were fuelled by diesel or heating oils which were stored in USTs.

9.1 Results

No evidence of any above ground or underground fuel storage tanks was identified during the survey of Building 83 and 83C, ANU.

However there is a flammable liquids store present within the rear (west) of the building.

10 ASBESTOS MANAGEMENT

10.1 Control Measures

General requirements

- ACM identified as representing an exposure risk (see Table 3A Asbestos Register) should be removed or otherwise controlled.
- Any ACM that is not scheduled for immediate removal should be labelled with appropriate warnings and maintained in good condition.
- The location of ACM must be entered into the Asbestos Register.
- Maintenance and other personnel must be made aware of the location of ACM.
- The Asbestos Register must be freely available.
- Unless they have valid ACT Asbestos Removal licence, maintenance workers, trades or occupants shall not remove or knowingly damage identified ACM.
- Before any planned demolition, refurbishment or maintenance, its effect upon any in situ asbestos must be established by reference to this document, including amendments.

Accidental damage to ACM

If ACM is damaged or degraded through accident, ageing or misuse, the building manager should apply the following protocols.

- Determine if the damage is likely to affect nearby occupants through the release of asbestos dust (this may require advice from a licensed Class A Asbestos Assessor).
- Gently wet down the damaged section and cover with a heavy plastic sheet or equivalent to encapsulate the ACM. Close nearby windows if the ACM is to the exterior.
- If the damage is significant (i.e. the material is shattered or abraded) the ACM should be replaced as soon as is practicable. Minor damage (i.e. small cracks or holes) may be repaired in the short term using a sealant.
  All repairs or removal must be undertaken by a licensed Asbestos Removalist.
- Register the event in the HMSMP.

10.2 Management of ACM

The options for short to medium-term management of ACM are outlined below.

1. Defer action

✓ Appropriate when	✗ Not appropriate when	✓ Advantages	✗ Disadvantages
Negligible risk of exposure ***and*** Asbestos inaccessible and fully contained ***or*** Asbestos stable and not liable to damage	Possibility of deterioration or damage Airborne dust exceeds recommended exposure standard	No initial cost Cost of removal deferred	Hazard remains Need for continuing assessment Asbestos management program required

2. Encapsulate or seal[1]

✓ Appropriate when	✗ Not appropriate when	✓ Advantages	✗ Disadvantages
Removal difficult or not feasible Firm bond to substrate Damage unlikely Short life of structure	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

1. Seal through application of paint, lacquer or PVA spray

3. Removal

✓ Appropriate when	✗ Not appropriate when	✓ Advantages	✗ Disadvantages
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 in building; substitute required Possible contamination of whole building if removal is done poorly

10.3 Management Decision Record

Option 1: Defer action

Item no.	ACM and Location	Reason	Authorisation	Date

Option 2: Encapsulate or seal

Item no.	ACM and Location	Reason	Authorisation	Date

Option 3: Removal

Item no.	ACM and Location	Reason	Authorisation	Date

10.4 Timetable for Action

The timetable for action should be administered to ensure management has a clear plan for all works which may affect ACM in the workplace. This includes maintenance work, scheduled removal work and risk assessment reviews, which may impact ACM.

Table 8: Timetable for action

ACM removal/ work	Date of scheduled works	Details	Authorisation	Date
Asbestos review/audit	**Date of scheduled review**	**Details**	**Authorisation**	**Date**

11 RESPONSIBILITIES

11.1 Asbestos - Provision of Information

The building manager must:

- ensure the ACM register and all relevant information pertaining to asbestos in the workplace is freely available upon request
- provide occupants with up-to-date information relating to the condition and relative risk of ACM in the workplace
- provide information on the control measures in place to contain ACM-related risk, and
- provide information to staff and contractors on measures to be taken to ensure that they are not exposed to asbestos in the workplace, either through accident or negligence.

Management Action Record

Record all communication activities undertaken to inform staff/occupants of ACM in the workplace.

Action	Authorisation	Date

11.2 Updating the Risk Assessment

The *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC: 2018 (2005)] Section: 9.3.1 requires:

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

- **a risk assessment indicates the need for reassessment; or**
- **any ACM has been disturbed or moved**

A visual inspection of identified ACM should be undertaken as part of any review.

The Dangerous Substances (General) Regulations 2004 requires the review of the Asbestos Survey Management Plan to be carried out at intervals determined by the criteria set out in Chapter 3, Part 3.4, Section 326 of the Dangerous Substances (General) Regulations 2004; the maximum interval being 5 years. The new requirements state that an Asbestos Management Plan and Risk Assessments are required in addition to an Asbestos Register and Survey. Class A Asbestos Assessors at Robson Environmental Pty Ltd are able to produce these documents to comply with your obligations.

Each review should critically assess all asbestos management procedures and their effectiveness in:

- preventing exposure to asbestos fibres
- controlling access to asbestos
- highlighting the need for action to maintain or remove ACM, and
- maintaining the accuracy of the ASMP.

Details of any mitigating actions must be recorded in the Asbestos Register (Refer Table 3A).

11.3 Key Personnel

This section outlines the responsibilities of all persons involved in the safe management of ACM.

1. Building manager

Name:	
Contact details:	
Responsibilities:	*E.g. provision of information*

2. Occupational Health and Safety Representative

Name:	
Contact details:	
Responsibilities:	*E.g. keeping occupants informed of any changes to the status of ACM in the workplace*

3. Facilities Management (if applicable)

Name:	
Contact details:	
Responsibilities:	*E.g. arrange removal and repair works as required; maintaining the HMSMP*

4. Other

Name:	
Contact details:	
Responsibilities:	

12 ASBESTOS REMOVAL WORKS

12.1 Management Responsibilities

Where it has been determined that ACM is to be removed, management or the client must ensure that a risk assessment is performed before the removal work commences and that the removalist takes this risk assessment into account. The risk assessment must include the possibility of uncovering previously concealed ACM, and that concealed ACM is subsequently identified by a Class A Asbestos Assessor.

The client should provide a detailed scope of works prepared by a Class A Asbestos Assessor for the removalist, including potential hazards, details on areas, which contain asbestos and arrangements for clearance inspections and airborne fibre monitoring.

NOHSC: 2018(2005) describes the minimum requirements to be observed during any asbestos removal operation.

12.2 Removalist Responsibilities

Before the commencement of removal work, the licensed removal contractor must:

- Provide a site-specific Asbestos Removal Control Plan(ARCP)
- Ensure the removal is adequately supervised and carried out in a safe manner
- Ensure that the equipment used in the project is appropriate for the task
- Ensure all persons carrying out the removal are competent and trained for the type of work being carried out, and
- Demonstrate that they have a health surveillance program in accordance with the requirements of NOHSC: 2002(2005).

12.3 Licensing Requirements

All Asbestos Removalists in the ACT are licensed by the ACT Planning and Land Authority (ACTPLA).

As a minimum the holder of an ACT Asbestos Removal Licence is required to demonstrate practical experience in the industry for at least three years and possess a full and complete understanding of the requirements of:

- *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC: 2018 (2005)]
- *Code of Practice for the Safe Removal of Asbestos* [NOHSC: 2002 (2005)]

- Work Health and Safety Act 2011;
- Work Health and Safety Regulations 2011;
- ACT Dangerous Substances Act A2004-7.

ACTPLA specify requirements for authorising certifiers and builders as well as the respective requirements of ACT WorkCover and ACT NOWaste for the removal and transport of ACM.

12.4 Approval to Begin Asbestos Removal Works

- All removal methods and procedures are required to be undertaken in accordance with NOHSC: 2002(2005).
- Building management in conjunction with a licensed Class A Asbestos Assessor where required, will inform the asbestos removalist of the 'Scope of Works'.
- The licensed Class A Asbestos Assessor will be required to provide a clearance certificate on satisfactory completion of the works.

12.5 Work in Areas Containing Asbestos – Trades Personnel

- Work must not proceed under any circumstance without first contacting the building manager or authorised person.
- Refer to this HMSMP (including amendments) to determine if asbestos material is likely to be encountered in the general work area. If no asbestos is located in the area of intended work, the area may be entered by all relevant personnel on an unrestricted basis.
- Work in areas where asbestos will or is likely to be disturbed will only be given to persons licensed by ACTPLA and all access and works will be undertaken in accordance with the requirements of NOHSC: 2002(2005).

12.6 Emergency Work in Areas Containing Asbestos

- If emergency access is required contact the building manager.
- If the building manager determines that asbestos is likely to be disturbed, all works must be undertaken in accordance with the requirements of NOHSC: 2002(2005) that is, a licensed Asbestos Removalist must be contracted to undertake any asbestos removal works.
- A licensed Class A Asbestos Assessor will be required to provide a clearance certificate on satisfactory completion of the works.

12.7 Monitoring Arrangements

Control air monitoring should be performed when indicated by a Risk Assessment to ensure the control measures are effective.

All air monitoring must be performed by a competent person accredited by the National Association of Testing Authorities (NATA) to perform air sampling for asbestos. Sampling should be performed in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres* [NOHSC: 3003 (2005)].

It is the Asbestos Removalist's responsibility to ensure that the maximum fibre levels throughout asbestos removal and associated works does not equal or exceed the minimum practical detection limit of 0.01 fibres per millilitre of air (F/mL). If the airborne fibre levels are observed at or exceeding those specified below, the licensed Class A Asbestos Assessor will instruct the contractor to take the appropriate control /action as per NOHSC:2002(2005).

Table 9: Control levels and required actions

Control Level (airborne asbestos fibres/mL)	Control/Action
< 0.01	Continue with control measures
≥ 0.01	Review control measures
≥ 0.02	Stop removal work and find the cause

Source: [NOHSC: 2002(2005)]

12.8 Clearance Inspections

Following removal work, a licensed Class A Asbestos Assessor must undertake a clearance inspection before re-occupation of an asbestos work area.

All barriers and warning signs should remain in place until the area has been cleared.

12.9 ACM removal/maintenance record

The Asbestos Register, Section 4.5, Table 3A is to be completed by the building manager after receiving appropriate clearance certification from a licensed Class A Asbestos Assessor.

The 'Work Performed' and 'Asbestos Control Measure' Tables on the following page are required to be completed by the building manager.

1. Work Performed

Company name	Contact details	Date of work + job no.	Scope of work

2. Asbestos Control Measures

Work performed	Air monitoring/ decontamination	Clearance certificate issued	Other

3. Additional Information

13 SAFE ASBESTOS REMOVAL PROCEDURES

13.1 Friable ACM

The licensed Asbestos Removalist must provide a 'Safe Work Method Statement' (SWMS) and an 'Asbestos Removal Control Plan' (ARCP). An overview of the basic requirements for removal of friable ACM is provided here. Should any removal of friable asbestos be undertaken, specific work practices will be required.

Wet Removal

i. Obtain approval from the building manager to begin asbestos removal works.

ii. Inform the building occupants of intended asbestos removal works.

iii. Relocate all occupants in immediate and adjacent areas affected by the works.

iv. Rope or barricade the area adjacent to the removal area and place appropriate signage at the perimeter of the area for the removal of friable ACM.

v. Set up the removal area with appropriate materials (plastic, tape, etc.) and decontamination area to enable effective control of dust generated during removal of the friable asbestos (i.e. negative air units and wet decontamination facilities would be required for this type of removal).

vi. Protective clothing and a full face Power Air Purifying Respirator (PAPR) with a fitted P3 particulate filter (cartridge) respirator conforming to AS/NZS 1715:2009, a compressor with appropriate filters, airlines and associated equipment must be used during bulk removal of ***dry friable*** ACM. A particulate filter (P2 cartridge) powered air purifying respirator – (PAPR) conforming to AS/NZS 1715:2009 may be worn during wet removal and at the final clean and vacuuming stage.

vii. The ACM must be kept moist with a water mist spray during the removal of the material except where an electrical hazard exists.

viii. Hand tools are preferred over power tools, and high-speed abrasive power tools should not be used. If low-speed power tools are used they should be fitted with local exhaust ventilation dust control. The ARCP must detail the proposed decontamination method when power tools are to be used within the removal area.

ix. Removed asbestos and other materials are to be packed into plastic bags or containers marked as asbestos waste.

x. Asbestos products must not be re-used.

xi. All surfaces within the removal area to be thoroughly vacuumed to remove any asbestos residue.

xii. All surfaces must be Polyvinyl Acetate (PVA) sprayed to seal any microscopic asbestos fibres or wet-wiped (oil/solvent or water-soaked rag) to remove asbestos fibres.

xiii. Remove all asbestos containing material and all asbestos contaminated material from site for disposal in the approved manner.

xiv. Obtain a visual clearance certificate from a licensed Class A Asbestos Assessor.

Note: Air monitoring is required during the removal of friable ACM. The locations and frequency should be determined by a licensed Class A Asbestos Assessor.

13.2 Bonded ACM

The ACT licensed Asbestos Removalist must provide a SWMS and an ARCP. An overview of the basic requirements for removal of bonded ACM is provided here.

i. Obtain approval from the building manager to begin asbestos removal works.

ii. Inform the building occupants of intended asbestos removal works.

iii. Relocate all occupants in immediate and adjacent areas.

iv. Rope or barricade adjacent to the removal area and place appropriate signage at the perimeter.

v. Set up the removal and decontamination areas with appropriate materials (plastic, tape, etc.) to enable effective control of dust generated during removal of bonded ACM.

vi. Using protective clothing and a half face particulate filter (cartridge) respirator conforming to AS/NZS 1715:2009 remove ACM.

vii. Hand tools are preferred over power tools and high-speed abrasive power tools should not be used. If low-speed power tools are used they should be fitted with local exhaust ventilation dust control. Asbestos cement sheeting should be wetted during removal where safe.

viii. Removed contaminated materials are to be packed into disposal crates or wrapped in plastic sheeting.

ix. Asbestos products must not be re-used.

x. All surfaces within the removal area to be thoroughly vacuumed to remove any asbestos residue.

xi. All surfaces must be Polyvinyl Acetate (PVA) sprayed to seal any microscopic asbestos fibres or wet-wiped (oil/solvent or water-soaked rag) to remove asbestos fibres.

xii. Remove all asbestos containing material and all asbestos contaminated material from site for disposal in the approved manner.

xiii. Obtain a visual Clearance from a licensed Class A Asbestos Assessor.

Note: Air monitoring ***may* be required during the removal of bonded ACM. The need frequency and location should be determined by a licensed Class A Asbestos Assessor.**

14 FURTHER INFORMATION

14.1 Related Websites

Legislation www.legislation.act.gov.au

Safe Work Australia Council www.safeworkaustralia.gov.au (for Codes of Practice)

ACT NOWaste www.nowaste.act.gov.au

ORS WorkCover www.workcover.act.gov.au

Commonwealth Government website on asbestos-related diseases
www.healthinsite.gov.au/topics/Asbestos_and_Cancer

Safe Work Australia Council www.safeworkaustralia.gov.au

14.2 Useful Contacts

Additional information on asbestos can be obtained from the following organisations and agencies.

ACT Planning & Land Authority (ACTPLA)	Ground floor Mitchell Business Centre 160 Lysaght Street Mitchell ACT 2911 Phone: 02 6207 1923 Internet: www.actpla.act.gov.au Ground floor north Dame Pattie Menzies House 16 Challis Street Dickson ACT 2602 Phone: 02 6207 6309 Internet: www.actpla.act.gov.au
ACT Government	Phone: 13 22 81 Internet: www.asbestos.act.gov.au
ACT Work Safe	255 Canberra Avenue Fyshwick ACT 2609 Phone: 02 6205 0200 Email: worksafe@act.gov.au Internet: www.**worksafe**.**act**.gov.au

Australian Safety and Compensation Council (formerly NOHSC) and now Safe Work Australia	64 Northbourne Ave Canberra City ACT 2601 Phone: 02 6121 6000 Email: info@ascc.gov.au Internet: www.safeworkaustralia.gov.au
National Association of Testing Authorities (NATA)	PO Box 7507 Silverwater NSW 2128 Phone 02 9736 8222 Email: corpcomm@nata.asn.au Internet: www.nata.asn.au
Robson Environmental Pty Ltd	140 Gladstone St Fyshwick ACT 2609 Phone: 02 6239 5656 Email: admin@robsonenviro.com.au
Standards Australia	286 Sussex Street Sydney, NSW, 2000 Phone: 02 8206 6000 Email: sales@sai-global.com Internet: www.saiglobal.com

15 APPENDICES

15.1 APPENDIX A – Laboratory Reports

Asbestos

Amdel Ltd
ABN 30 008 127 802

Unit 2, 35 Cormack Road, Wingfield SA, 5013
PO Box 552, Port Adelaide BC, SA 5015
Phone: (08) 8440 7145 Facsimile: (08) 8440 7197

ASBESTOS IDENTIFICATION REPORT

CLIENT: Robson Environmental
ADDRESS: 9 Lyell Street, Fyshwick ACT 2609
JOB NO: 4266
CLIENT: Hindmarsh Pty Ltd
JOB LOCATION: ANU (Dickson Road Greenhouse)
RESULTS:

DATE: 7 October 2008
REPORT NO: 8AA0908M
PAGE NO: 1 of 2

Sample	Sample size	Description	Asbestos*	SMF*	OF*
4266 – A1	(b) 5x5x1	Off-white fibrous sheeting	Chrysotile		
4266 – A2	(a) 45x40x5	Off-white fibrous sheeting, painted yellow	Chrysotile		
4266 – A3	(a) 10x5x2	Pale brown fibrous sheeting, painted yellow	No		Yes
4266 – A4	(a) 40x35x2	Black flooring	No **		
4266 – A5	(a) 60x15x2	Blue flooring	No **		
4266 – A6	(a) 15x10x2	Dark brown fibrous layer, with black surface	Chrysotile		
4266 – A7	(a) 30x7x1	Black bituminous lump	No		
4266 – A8	(b) 40x10x3	Brown lump	No		
4266 – A9	(a) 80x40x10	Pale grey fibrous sheeting	No		Yes
4266 – A10	(b) 15x3x3	White lump	No		
4266 – A11	(b) 38x26x5	White lump	No		
4266 – A12	(a) 25x15x5	Pale grey fibrous sheeting	No		Yes
4266 – A13	(a) 60x12x5	White lump	No		
4266 – A14	(b) 30x10x4	Brown lump	No		

APPROVED IDENTIFIER: Naciye Haliloff
APPROVED SIGNATORY: Michael Till

The approximate dimensions (in mm) stated above refer to the size of (a) a single piece (b) largest of several particles (c) largest of many particles (d) volume in ml of unconsolidated particles (e) weight in grams of unconsolidated particles
* Detected by polarized light microscopy. ** No asbestos was detected by polarized light microscopy, but identification may not be possible due to adhering resins. Confirmation by another analytical technique is advised.
Note: Chrysotile is a fibrous silicate mineral commonly known as white asbestos, amosite is a fibrous silicate commonly known as brown or grey asbestos and crocidolite is a fibrous silicate commonly known as blue asbestos. SMF (Synthetic Mineral Fibre) is commonly known as glass fibre and OF (Organic Fibre) includes natural fibres (eg cellulose) and synthetic organic fibre but not high temperature fibres (eg Teflon fibres). A blank in the SMF or OF column implies not detected. Tr in the SMF or OF column indicates identification in Trace amount
The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibilities for the representivity of the sample(s) submitted.

SCOPE OF ACCREDITATION: Class 7.82.31: Qualitative identification of asbestos types in bulk samples by polarized light microscopy, *including dispersion staining.*

NATA

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NATA accreditation number: 1526
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Amdel Ltd
ABN 30 008 127 802

Unit 2, 35 Cormack Road, Wingfield SA, 5013
PO Box 552, Port Adelaide BC, SA 5015
Phone: (08) 8440 7145 Facsimile: (08) 8440 7197

ASBESTOS IDENTIFICATION REPORT

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DATE: 7 October 2008
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REPORT NO: 8AA0908M
JOB NO: 4266
CLIENT: Hindmarsh Pty Ltd
PAGE NO: 2 of 2
JOB LOCATION: ANU (Dickson Road Greenhouse)
RESULTS:

Sample	Sample size	Description	Asbestos*	SMF*	OF*
4266 – A15	(a) 45x40x5	Pale grey fibrous sheeting	No		Yes
4266 – A16	(b) 25x12x6	Grey lump	No		
4266 – A17	(a) 90x50x10	Pale grey fibrous sheeting	No		Yes
4266 – A18	(b) 12x15x4	Off-white lump	No		
4266 – A19	(a) 30x15x10	Pale grey fibrous sheeting	No		Yes

APPROVED IDENTIFIER: Naciye Haliloff
APPROVED SIGNATORY: Michael Till

The approximate dimensions (in mm) stated above refer to the size of (a) a single piece (b) largest of several particles (c) largest of many particles (d) volume in ml of unconsolidated particles (e) weight in grams of unconsolidated particles
* Detected by polarized light microscopy. ** No asbestos was detected by polarized light microscopy, but identification may not be possible due to adhering resins. Confirmation by another analytical technique is advised.
Note: Chrysotile is a fibrous silicate mineral commonly known as white asbestos, amosite is a fibrous silicate commonly known as brown or grey asbestos and crocidolite is a fibrous silicate commonly known as blue asbestos. SMF (Synthetic Mineral Fibre) is commonly known as glass fibre and OF (Organic Fibre) includes natural fibres (eg cellulose) and synthetic organic fibre but not high temperature fibres (eg Teflon fibres). A blank in the SMF or OF column implies not detected. Tr in the SMF or OF column indicates identification in Trace amount
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SCOPE OF ACCREDITATION: Class 7.82.31: Qualitative identification of asbestos types in bulk samples by polarized light microscopy, *including dispersion staining.*

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PO Box 552, Port Adelaide BC, SA 5015
Phone: (08) 8440 7145 Facsimile: (08) 8440 7197

ASBESTOS-FORMING MINERAL IDENTIFICATION REPORT

CLIENT: Robson Environmental — DATE: 7 October 2008

ADDRESS: 9 Lyell Street, Fyshwick ACT 2609 — REPORT NO: 8AA0908MX

JOB NO: 4266

CLIENT: Hindmarsh Pty Ltd — PAGE NO: 1 of 1

JOB LOCATION: ANU (Dickson Road Greenhouse)

RESULTS:

PROCEDURE
The samples were analysed by X-ray diffraction, which detects crystalline substances and minerals (including asbestos-forming minerals). Non-crystalline substances (eg glass, most organic compounds) are not detectable by this technique.

RESULTS
This report contains estimated percentages of asbestos-forming minerals based on X-ray diffraction analysis. These estimates have large and variable errors which depend on the nature of the sample (particularly its degree of heterogeneity and the nature of the matrix). They should be considered as approximations at best and no guarantee is given as to their accuracy.

Sample	Description	Chrysotile Est. %	Other minerals detected
4266 – A4	2mm thick black flooring	---	Calcite
4266 – A5	2mm thick blue flooring	---	Calcite, quartz, kaolinite

TESTING OFFICER: Naciye Haliloff

Note: Chrysotile is a fibrous silicate mineral commonly known as white asbestos. A dash (-) in the Chrysotile column implies not detected. The other minerals listed are fillers or pigments. They may include calcite (calcium carbonate), rutile (titanium dioxide – white pigment), aragonite (calcium carbonate found in shellgrit), kaolinite (white clay), dolomite (calcium magnesium carbonate) and goethite (brown iron oxide).
The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibilities for the representivity of the sample(s) submitted.

Effective Environmental Solutions

Unit 1
140 Gladstone Street
Fyshwick ACT 2609
P: 02 6239 5656 F:02 6239 5669
E: fibreid@robsonenviro.com.au
W: www.robsonenviro.com.au

Fibre Identification Certificate of Analysis

Report Number: 9116 Date of Report: 16.05.2013 Samples Taken by: Robson Environmental Page 1 of 2

Client Details		Laboratory Details	
Client:	Hindmarsh	Address:	140 Gladstone Street, Fyshwick, Canberra 2609
Attention:	Brendan Haverfield	Manager:	Ged Keane
Received:	13/05/13	Telephone:	02 6239 5656
Client Reference:	ANU building 83 – 83C	Fax:	02 6239 5669
Email/Tel.No:		Email:	fibreid@robsonenviro.com

Test Specification(s) Employed: AS4964 (2004) & In-House Procedure No.2

Methodology Summary

Samples of material are examined to determine the presence of asbestos fibres using AS4964 (2004) & In-House Procedure No.2 i.e. Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by **Polarised Light Microscopy** (**PLM**) in conjunction with **Dispersion Staining** (**DS**). Unequivocal identification of asbestos minerals present is made by assessing fibre properties to see whether the values are typical and consistent with published data. This provides a reasonable degree of certainty to determine whether a fibre under investigation is asbestiform or not. Careful application of the test procedure provides sufficient diagnostic clues to allow unequivocal identification of asbestos types, and so, to determine whether a sample contains asbestos or not. If sufficient diagnostic clues are absent, then positive identification of fibrous asbestos is not possible.

Client Supplied Samples

Robson Environmental is not responsible for the accuracy or competence of sampling carried by third parties. Sample location(s) and/or sample type(s) of third party samples delivered to the laboratory are given by the client at the time of delivery. Under these circumstances, Robson Environmental cannot be held responsible for the interpretation of the results shown. When the test certificate indicates that bulk samples were taken by the client, they are outside the scope of our NATA Accreditation for sampling. Robson Environmental takes responsibility of information reported only when a staff member takes the sample(s).

Reporting of Results

'Asbestos Detected': Asbestos detected by **Polarised Light Microscopy** (PLM), including **Dispersion Staining** (**DS**)
'No Asbestos Detected': No Asbestos detected by **Polarised Light Microscopy** (PLM), including **Dispersion Staining** (**DS**)
'UMF Detected': Mineral fibres of unknown type detected by **Polarised Light Microscopy** (PLM), including **Dispersion Staining** (**DS**). Confirmation by another independent analytical technique may be necessary.
"Hand-picked" refers to small discrete amounts of asbestos unevenly distributed in a large body of non-asbestos material.

Limit of Detection & Reporting Limit

Known limitations of the test procedure using **Polarised Light Microscopy** (**PLM**) are:

- **PLM** is a qualitative technique only;
- It does not cover identification of airborne or water-borne asbestos;
- The less encountered asbestos mineral fibres actinolite, anthophyllite and tremolite exhibit a wide range of optical properties that preclude unequivocal identification by **PLM** and **Dispersion Staining** (DS). Thus, the method is used to positively identify the three major asbestos minerals: amosite ("brown"), chrysotile ("white") and crocidolite ("blue");
- Valid identification requires that the sample material contains a sufficient quantity of the unknown fibres in excess of the practical detection limit used (in this case, **PLM** and **Dispersion Staining**, which has a calculated practical detection limit of 0.01-0.1% equivalent to 0.1-1g/kg (*AS4946-2004:App.A4*).

Results relate only to the sample(s) submitted for testing.
Test report must not be reproduced except in full.
Test report issued in accordance with NATA's accreditation requirements and compliance with ISO/IEC 17025.

Simon Saville
Approved Identifier

NATA
No. 3181

Simon Saville
Approved Identifier

Document issued in accordance with NATA's accreditation requirements and without alterations or erasure and must not be duplicated unless in full

9116_Fibre ID results_20130516 Page 1 of 2

Fibre Identification Certificate of Analysis

Laboratory Report Number: 9116 **Analyst:** Simon Saville **Page** 2 of 2

Sample No.	Client Ref.	Location	Physical Structure	Sample Description	Analysis of Fibrous Content
F0504		To window of eastern store room	Caulking	2grams	Chrysotile Asbestos Detected
F0505		Exterior sheet	Sheet	3grams	No Asbestos Detected
F0506		VFT debris in subfloor	VFT	12grams	No Asbestos Detected
F0507		Sheet debris in subfloor	Sheet	18grams	No Asbestos Detected
F0508		Wall sheet to bathrooms	Sheet	3grams	No Asbestos Detected
F0509		Blue VFT in kitchen area	VFT	6grams	No Asbestos Detected
F0510		Sheet debris in ceiling space	Sheet	29grams	Chrysotile Asbestos Detected
F0511		Sheet to lower walls of greenhouse	Sheet	5grams	No Asbestos Detected
F0512		Mastic to walls of greenhouse	Mastic	3grams	No Asbestos Detected
F0513		Verge under cloaking	Sheet	6grams	Crocidolite Asbestos Detected Amosite Asbestos Detected Chrysotile Asbestos Detected
F0514		To light fittings in female toilet	Insulation	≤1gram	Chrysotile Asbestos Detected

Simon Saville
Approved Identifier

NATA
No. 3181

Simon Saville
Approved Identifier

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9116_Fibre ID results_20130516 Page 2 of 2

Lead Paint

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 23191

Client:
Robson Environmental Pty Ltd
PO Box 112
Fyshwick
ACT 2609

Attention: John Robson

Sample log in details:

Your Reference:	**4266, ANU Dickson Rd Greenhouse**
No. of samples:	6 Paint Samples
Date samples received:	03/10/08
Date completed instructions received:	03/10/08

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:	7/10/08
Date of Preliminary Report:	Not Issued
Issue Date:	7/10/08

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This document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025.
Tests not covered by NATA are denoted with *.

Results Approved By:

Giovanni Agosti
Technical Manager

Envirolab Reference: 23191
Revision No: R 00

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ACCREDITED FOR TECHNICAL COMPETENCE

Client Reference: 4266, ANU Dickson Rd Greenhouse

Lead in Paint Our Reference: Your Reference Type of sample Date Sampled	UNITS ---------- ----------	23191-1 4266-P1(a) Paint 02/10/08	23191-2 4266-P1(b) Paint 02/10/08	23191-3 4266-P1(c) Paint 02/10/08	23191-4 4266-P2(a) Paint 02/10/08	23191-5 4266-P2(b) Paint 02/10/08
Lead in paint	%w/w	<0.05	<0.05	<0.05	<0.05	<0.05

Lead in Paint Our Reference: Your Reference Type of sample Date Sampled	UNITS ---------- ----------	23191-6 4266-P2(c) Paint 02/10/08
Lead in paint	%w/w	<0.05

Envirolab Reference: 23191
Revision No: R 00

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Client Reference: **4266, ANU Dickson Rd Greenhouse**

Method ID	Methodology Summary
Metals.4	Digestion of Paint chips for Lead determination by ICP-AES.

Client Reference: 4266, ANU Dickson Rd Greenhouse

QUALITY CONTROL Lead in Paint	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Lead in paint	%w/w	0.05	Metals.4	<0.05	[NT]	[NT]	LCS-1	104%

Envirolab Reference: 23191
Revision No: R 00

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Client Reference: **4266, ANU Dickson Rd Greenhouse**

Report Comments:

Asbestos was analysed by Approved Identifier: Not applicable for this job

INS: Insufficient sample for this test	NT: Not tested	PQL: Practical Quantitation Limit
RPD: Relative Percent Difference	NA: Test not required	LCS: Laboratory Control Sample
NR: Not requested	<: Less than	>: Greater than

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
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.
Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria:

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable. Surrogates: 60-140% is acceptable for general organics and 10-140% for SVOC and speciated phenols.

Envirolab Reference: 23191
Revision No: R 00

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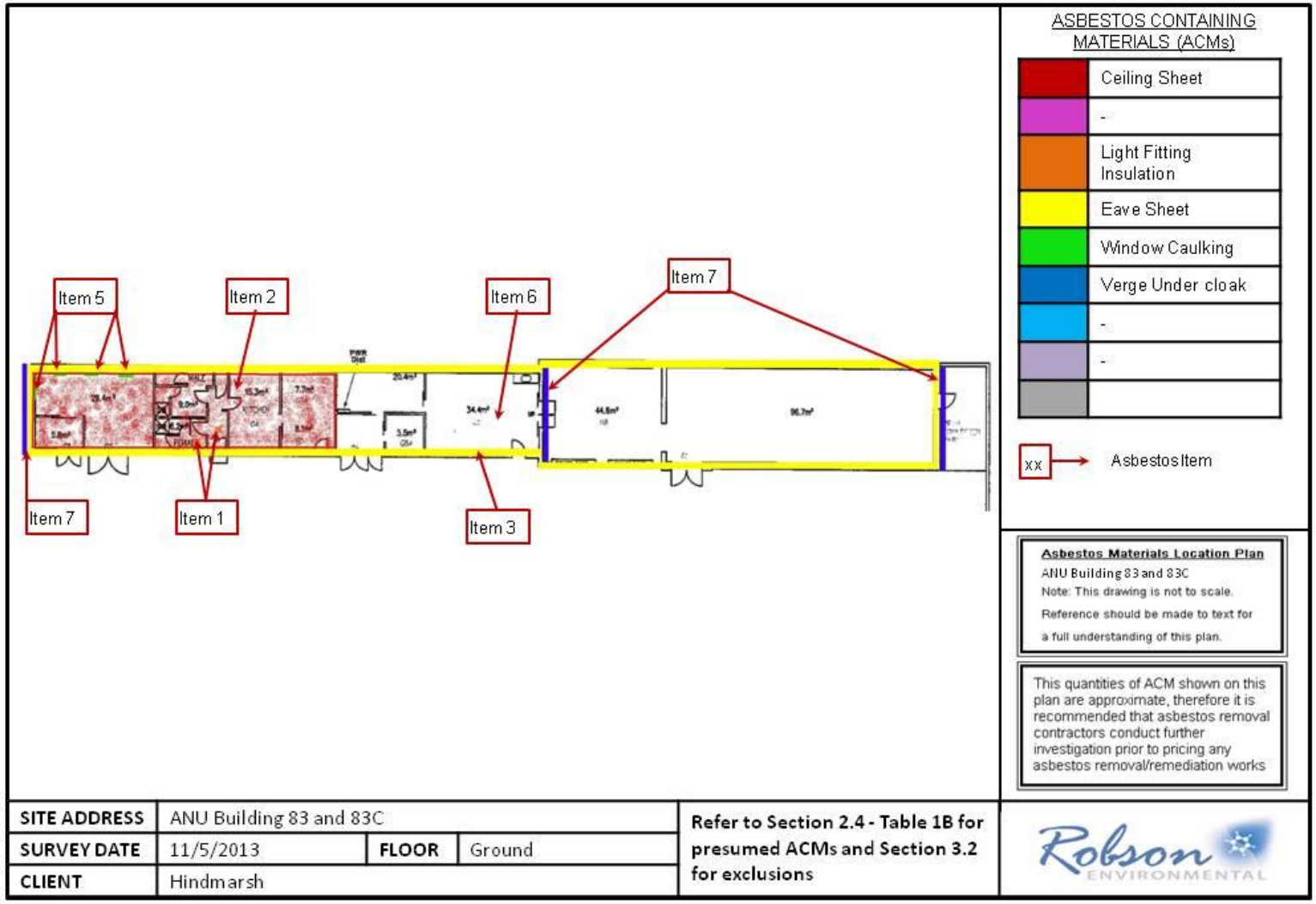
ACCREDITED FOR TECHNICAL COMPETENCE

15.2 APPENDIX B – Plans



15.3 APPENDIX C – HAZMAT Item Locations & Representative Photographs

ASBESTOS			
ITEM NO	**ACM DESCRIPTION**	**ACM LOCATIONS**	**PHOTOGRAPH**
1	Insulation	To light fittings in female toilet and corridor	
2	Sheet	Store room Ceiling sheet – Eastern wing – Off -White fibrous sheeting	
3	Sheet	Eave Sheet – Off -White fibrous sheeting, painted yellow	
4	Sheet	Switch Board 7 – Dark brown fibrous layer, with black surface	Removed

ASBESTOS			
ITEM NO	**ACM DESCRIPTION**	**ACM LOCATIONS**	**PHOTOGRAPH**
5	Caulking	Store room windows	
6	Sheet	Sheet debris in ceiling space	
7	Sheet	Verge under cloaking	

SYNTHETIC MINERAL FIBRE			
ITEM NO	**MATERIAL**	**LOCATIONS**	**PHOTOGRAPH**
SMF1	Pink Batts	Ceiling Space	
SMF2	Rockwool	Ceiling Space	
AMF3	Internal Insulation	Hot Water Service	

15.4 APPENDIX D – Hazardous Material Management Information

ASBESTOS

Some 3000 products have been manufactured using asbestos, of which cement sheeting, pipe insulation, textiles, gaskets, vinyl floor tiles and fire door cores are the most commonly encountered. The mineral asbestos (i.e. Crocidolite, Chrysotile and Amosite and other forms) is classified by the National Occupational Health and Safety Commission as a Category 1 carcinogen. If respirable asbestos fibres are inhaled they may cause an inflammatory response, which in turn may lead to asbestosis (scarring of the lung), mesothelioma (cancer of the pleura or peritoneum) or lung cancer.

It is illegal under Commonwealth, State and Territory legislation to manufacture asbestos building materials or to reuse asbestos products.

Asbestos sheeting or ‘fibro’ is bonded into a stable matrix and as such does not present an exposure hazard unless it is cut, abraded, sanded or otherwise disturbed.

Any type of work on or removal of sheeting has the potential to release asbestos fibres, which in turn can be inhaled. It is therefore critical to maintain the integrity of these materials. If damage is inevitable through physical impact, the asbestos material must be removed or otherwise encapsulated with reference to the *Code of Practice for the Safe Removal of Asbestos* [NOHSC:2002(2005)] and ACT WorkCover and ACT Planning and Land Authority requirements.

LEAD PAINT

Introduction

Lead in paint (as lead carbonate) is found extensively in homes and commercial and industrial buildings built pre-1970. Although Australian industry has generally phased out lead content in paint, levels of below 1 percent are still permitted and industrial application of high-lead paint to residential/commercial dwellings may still continue.

Lead-base paint may be a health issue if it becomes mobile in the environment or if ingested. For this reason sealing or safe removal of paint is strongly recommended particularly where it is flaking or exposed to the elements.

Assessment Criteria

Lead paint is defined by the Australian Standard (AS 4361.2 – 1998 *Guide to lead paint management Part 2: Residential and Commercial buildings*) as a paint or component coat of a paint system containing lead or lead compounds, in which the lead content (calculated as lead metal) is in excess of 1.0% by weight of the dry film as determined by laboratory testing.
Further, the Standard for the Uniform Scheduling of Drugs and Poisons (National Drugs and Poisons Schedule Committee July 2000) classifies paints having more than 0.25% lead as First Schedule Paint and prohibits their manufacture, supply or use.

It has been shown that the dust generated from dry sanding or abrasive blast cleaning of paints with a lead concentration of 0.25% can have sufficient content to produce exposure levels that exceed those that define a ‘lead task’ in NOHSC 1012.

Therefore paints with a lead concentration greater than 0.25% (if they are to be removed) must be treated as a lead paint (i.e. subject to the regulations in NOHSC 1012).

Lead Paint Management and Recommendations

The following information uses Australian Standard (AS 4361.2 – 1998) as the primary reference. Lead paint and first schedule paints in residential and commercial premises may be managed in one of four ways:

- Leave undisturbed;
- Stabilised (i.e. over painting or encapsulation);
- Abated (i.e. removed); or
- A combination of the three management options may be required.

Should removal be chosen, a high degree of skill, preparation and risk minimisation is required to avoid lead exposure, as dry sanding of lead levels as low as 0.25% can generate high lead dust. Therefore the Wet Scraping and Wet Sanding methods are amongst the safest methods available.

Strict adherence to the guidelines described in AS 4361.2 – 1998 will best ensure minimisation of risk. During this process personal protective equipment and waste containment equipment is essential and children, pregnant women and persons not directly engaged in the process should not be present. General workers may undertake this process providing they adhere strictly to the guidelines, however, a specialist lead paint removal contractor is recommended for extensive paint removal works.

Where remediation is required it is important to minimise ongoing maintenance costs by ensuring that the works are undertaken by a professional who is able to give a significant time guarantee of the painted surfaces at the completion of the works. The following website lists contactors by postcodes that have been included based on their indicated skills and training in working safely with lead paint. http://www.lead.org.au/paintersall.html These contractors should however be assessed by current performance prior to engagement.

Lead Paint Removal and Containment

- Avoid dry sanding or any actions which create dust;
- Place ground sheets around the work area ensuring all paint debris are contained. Remove accumulated debris frequently to prevent its spread into surrounding areas using a vacuum cleaner fitted with a HEPA filter;
- Minimise the spread of debris, dust and fumes by avoiding dust-generating activities during windy conditions. Seal all windows and heating/cooling system duct registers to prevent dust or fumes from contaminating adjacent areas. Use negative air pressure for interior work;
- Use personal respirators according to AS/NZS 1715 [2009];
- Use disposable clothing; and
- Wipe down all surfaces using a wet cloth and dispose of all clothing, equipment and plastic used during paint removal as Hazardous Waste.

Responsibilities of Owners and Contractors

According to AS 4361.2 – 1998 owners of residences or commercial buildings that may contain lead should:

- Manage the property in such a manner as to effectively control any health risk to occupants, contractors or others;
- Ensure occupants are sufficiently informed about and protected from the hazards associated with lead paint; and
- If management work is to be undertaken, inform immediate neighbours about the nature of the work.

Contractors should:

- Obtain appropriate accreditation to undertake the proposed level of remedial work involving lead paint and have the required level of specialized training; and
- Undertake the contracted work in such a way as to protect the health and safety of employees, tenants and the general public.

SYNTHETIC MINERAL FIBRE

SMF refers to man-made mineral fibrous materials commonly used for their insulating and reinforcing properties. The amorphous (non-crystalline) materials include glass fibre, mineral wool and ceramic fibre products.

Discussion

Although glass fibre is classified as an irritant, levels of airborne fibreglass during routine occupation of the premises would be insignificant. During any large-scale installation or removal of fibreglass insulation, providing SMF fibre suppression measures as defined below are employed, exposure standards for SMF fibre would not normally be exceeded.

The following Risk Assessment is based on the requirements of the document:

- Worksafe Australia, Worksafe Australia, Sydney 1990, *Synthetic Mineral Fibres: National Standard and National Code of Practice.*

SMF Risk Assessment

According to Worksafe Australia 1990 (p 9) health risks associated with SMF are "significantly less potent … than white asbestos (Chrysotile) fibres" and that "...the possibility of lung cancer is eliminated at an exposure standard (time weighted average) of 0.5 respirable fibres per millilitre of air for all types of synthetic mineral fibres...." (p V).

To reduce the possibility of skin, eye and upper respiratory tract irritation a maximum exposure standard of 2 milligrams per cubic metre of inspirable dust is recommended. These two standards are designed principally for the manufacture and end user industries in which significant dust clouds would be generated.

The same document also states: "The overall conclusion based on available animal experiments and epidemiology is that provided work is carried out in accordance with (NOHSC 1990), and compliance is maintained with the exposure standards, then there is a negligible health risk associated with exposure to SMF under present-day manufacturing and usage patterns."

Recommendations

Although of negligible health risk if undisturbed, it is strongly recommended that if fibreglass is to be removed or otherwise disturbed the following procedures and safety measures should be adopted.

- Workers wear personal protective equipment to minimise dust inhalation and irritation to eyes and skin. The correct use of filter masks, goggles, gloves and disposable coveralls should prevent significant irritation;
- Care should be taken to ensure minimal SMF or nuisance dust enters the occupied areas below the work area;
- If significant contamination of the occupied areas is likely, dust control measures such as the use of plastic screens and an effective extraction fan should be positioned to prevent such an occurrence; and
- Disposable suits and any removed insulation are to be appropriately bagged and disposed of as general waste.

PCBs

PCB is the common name for Polychlorinated Biphenyls. PCBs range in appearance from colourless, oily liquids to more viscous and increasingly darker liquids, to yellow then black resins, depending on chlorine content of the PCB.

Discussion

The major use of PCBs in the electrical industry has been as an insulating fluid inside transformers and capacitors. These transformers and capacitors have ranged in size from the very large transformers typically used by electrical supply companies, to the small capacitors used in commercial products. Capacitors containing PCBs were installed in various types of equipment including fluorescent light fittings during the 1950's, 60's and 70's.

Risk Assessment

Small quantities of PCBs are usually found in sealed containers known as capacitors. PCB-containing capacitors are unlikely to pose a health risk, unless they become damaged and leak.

PCBs can enter the body in three ways:

- absorption through the skin
- inhalation of PCB vapour
- ingestion, e.g. by contamination of food or drink

The most commonly observed symptom in people exposed to high levels of PCBs is a condition known as chloracne. This is a severe, persistent acne-like rash due to repeated and prolonged contact of PCBs with skin. This condition has also occurred in people who have accidentally ingested PCBs orally.

Very high exposure to PCBs may also cause liver damage and damage to the nervous system.

There is the possibility that PCBs may cause cancers.

The likelihood of becoming sick from PCB exposure increases with the length of time and the amount of material that a person might come in contact with.

Recommendations

Care must be taken when handling damaged capacitors to ensure that spillage does not occur. The person handling the damaged capacitor should take the following precautions:

- put on personal protective equipment and clothing before removing damaged or leaking components
- wear gloves that are made of materials that are resistant to PCBs, such as Viton, polyethylene, polyvinyl alcohol (PVA), polytetrafluoroethylene (PTFE), butyl rubber, nitrile rubber, or neoprene
- **do not** use gloves made of polyvinyl chloride (PVC) or natural rubber (latex)
- use disposable gloves
- wear disposable overalls made of Tyvek or made of materials with similar chemical resistant properties
- when working with overhead equipment (e.g. Fluorescent light fixtures), wear a full face shield and appropriate hair protection
- wash any non-disposable contaminated equipment with kerosene and collect the kerosene for disposal as a PCB contaminated solvent
- if PCB vapours are suspected (e.g. PCB leaks onto a hot surface in a confined space), wear a twin cartridge type respirator suitable for chlorinated vapours
- always ensure adequate ventilation
- Note: PCBs do not vapourise readily at room temperature
- do not smoke
- after handling PCBs, employ good personal hygiene practices, including washing hands in warm, soapy water before eating, drinking, smoking, handling food, or using the toilet

Disposal

It is advisable to check the current regulations in effect with the authority responsible for environmental protection authority in your State or Territory. In the ACT this is WorkCover ACT and Environment Protection and Heritage.

Note: The absence of a capacitor from the ANZECC information booklet is not a guarantee that the capacitor does not contain PCBs: If there is any doubt as to whether a capacitor or any electrical equipment contains PCBs, treat the equipment as if it does contain PCBs

OZONE DEPLETING SUBSTANCES

Introduction

Ozone depleting substances (ODS) are compounds that contribute to stratospheric ozone depletion. They are widely used in refrigerators, air-conditioners, fire extinguishers, in dry cleaning, as solvents for cleaning, electronic equipment and as agricultural fumigants.

Ozone depleting substances (ODS) include:

- Bromochloromethane (BCM)
- Carbontetrachloride (CCl_4)
- Chlorofluorocarbons (CFCs)
- Halons
- Hydrobromofluorocarbons (HBFCs),
- Hydrochlorofluorocarbons (HCFCs),
- Methylbromide (CH_3Br)
- Methylchloroform (CH_3CCl_3)

ODS are generally very stable in the troposphere and only degrade under intense ultraviolet light in the stratosphere. When they break down, they release chlorine or bromine atoms, which then deplete the ozone.

Ozone Protection Strategy

The Australian Strategy for Ozone Protection calls for personnel who handle, install, service, commission and decommission and maintain commercial and industrial refrigeration and air-conditioning equipment to be accredited, licensed, registered to work with ozone depleting substances.

Best Management Practices

In Australia a 'Code of Good Practice' has been drawn up with the objective of assisting the reduction of emissions into the atmosphere of substances that deplete the ozone layer and contribute to global warming.

The Australian Refrigeration and Air-conditioning Code of Good Practice (HB 40.1 – 2001) recommends best practice for the maintenance, design, servicing, labelling and manufacture of refrigeration and air conditioning systems towards this objective.

Legislation

Under the Federal Government's *Ozone Protection and Synthetic Gas Management Act 1989* and its *Ozone Protection and Synthetic Gas Legislation Amendment Bill 2003* it is illegal to vent an ODS (Scheduled Substances) to the atmosphere.

General Maintenance

- All refrigeration and air-conditioning plant should be regularly inspected for traces of leaking refrigerant and/or oil, and for signs of leak-indicating dye.

- Whenever a system is charged with refrigerant and/or lubricant, the service person must clearly label the system with the refrigerant/lubrication type; name of service organization; and date of service. In addition, the ASHRAE/ARI refrigerant designated R number shall be clearly displayed.

- A service person should be aware of the possibility that a refrigeration or air-conditioning system may have been incorrectly charged or incorrectly labelled. The type of refrigerant contained in the system must therefore be first established by checking the temperature/pressure relationship or by using other tests to verify that the labelling is correct.

Advice to Equipment Users

- Users are advised that persons who service refrigeration and air-conditioning equipment are required by legislation to observe the Code of Good Practice and not to ‘top-up’ or ‘charge’ systems known to be leaking refrigerant, or to service equipment unless it can be returned into service in a leak-free condition.

- If a user does not have trained staff to undertake service or maintenance work, then it is recommended that a routine maintenance agreement for their plant be undertaken with a reputable service organization.

- All users should monitor the operation of their installation weekly and call the service person immediately if any abnormal condition is found.

- When a refrigeration system contains in excess of 50 kg of refrigerant, that system should be leak tested on a quarterly basis.

Leak Testing

- Various methods may be used for leak-testing, e.g. electronic leak detectors, halide lamp and or ultraviolet lamp.

- Only a non-controlled refrigerant mixed with a pressurising substance such as dry nitrogen should be used to leak test refrigeration and air-conditioning systems.

- Where an air-conditioning or refrigeration system is found to be leaking and needs to be repaired, the vapour and/or liquid must first be recovered from the leaking system.

- Where pressurisation testing has determined that an air-conditioning or refrigeration system is not leaking, moisture and non-condensables must be evacuated from the system using dry nitrogen as the moisture absorber and either the deep or triple evacuation methods.

- All refrigerants shall be recovered and either recycled, reclaimed or held for disposal in an approved manner.

- It is highly recommended that a refrigerant charge monitor or leak detector be installed to alert equipment owners/operators of a refrigerant leak.

Recovery, Recycling and Disposal of Refrigerants

- It is highly recommended, and in some cases mandatory, for recovery and/or recycling equipment to be used for the removal and recovery of refrigerant during service.

- To avoid the danger of mixing different refrigerant types, the receiving containers shall be identified by the correct colour coding and labelling and shall only be used for the refrigerant type that is being transferred. The recovery containers shall conform to AS 4484-2004, '*Gas Cylinders for Industrial, Scientific and Refrigerant use – labelling and colour coding'.*

- As chillers have large internal volume, it is important that all refrigerant vapour be recovered. A chiller at atmospheric pressure can still hold many kilograms of refrigerant vapour after the liquid has been removed.

- When recovering refrigerant from a chiller the refrigerant should be recovered until the internal system pressure is reduced to 3 kPa absolute for low-pressure systems (e.g., R-11) and 70 kPa absolute for positive pressure systems (e.g., R-12 and R-22). The internal pressure should then be taken up to atmospheric pressure with dry nitrogen if the chiller is to be opened. This will prevent moisture–laden air entering the system, which could lead to contamination and corrosion.

Disposal of Refrigerants

- Unusable or surplus fluorocarbon refrigerant shall not be discharged to the atmosphere, but shall be returned to a supplier.

- Empty residual refrigerant in a disposable container shall be recovered and the container disposed of at a recycling centre.

- The utmost care must be taken to avoid mixing different types of refrigerants, as separation may be impossible and large quantities of refrigerant may be rendered unusable.

Handling and Storage

Losses of refrigerant to the atmosphere can occur during the handling and storage of refrigerant containers. Service persons have a duty of care to avoid such losses.

- There are numerous hazards associated with the storage of refrigerant. These include asphyxiation in confined space due to leakage from refrigerant containers; and fire, which may overheat and explode refrigerant containers or decompose refrigerant into toxic substances.

Alternative Refrigerants and Lubricants

- With the introduction of HFC alternative refrigerants, alternative lubricants need to be considered to ensure system reliability. Some of these alternative lubricants tend to exhibit greater hygroscopicity than mineral oils, so care must be taken to ensure they are kept in sealed containers at all times.

- Care must be taken to ensure that all components used in the refrigeration/air-conditioning system are compatible with the new refrigerant and lubricant.

Recovery of Fluorocarbons Mixed with other Refrigerants

A number of different refrigerants and refrigeration mixtures have been used to replace or to ‘top up’ fluorocarbon based refrigerants in refrigeration and air-conditioning systems.

In many cases the equipment in question may not be labelled to indicate that hydrocarbon or hydrocarbon mixtures have been used and as the operating pressures of these replacement refrigerants are usually similar to those of the original refrigerant, their identification in the field is extremely difficult.

- It is not safe therefore to recover flammable refrigerant (hydrocarbon) using equipment designed only for non-flammable refrigerants such as R-12 and R-134a.

- Should it be suspected that refrigeration or air-conditioning system contains an unidentified mixture or, if on asking the owner, examining the labels, and/or detecting instruments indicate that a hydrocarbon/fluorocarbon mixture or any other non-standard mixture of refrigerant may be present; the following procedure should be followed:

- If a hydrocarbon or flammable mixture that contains hydrocarbon is suspected, use only equipment designed for the recovery of flammable gasses and recover the refrigerant into a specially marked container.

- In the case of refrigerant mixtures, it is not advisable to use recovery equipment as many mixtures have very high condensing pressures, which could result in equipment failure and/or injury to persons operating, or near the equipment.

- The safest method of recovery is to use an evacuated and preferably chilled container to depressurise the system.

- Label the container to show that it contains a mixture or the suspected composition, if known, and deliver it to a supplier for recycling.

- Purge the residual gas from the system with dry nitrogen before proceeding with any repairs

Health Effects

In addition to causing environmental degradation certain ozone depleting substances may present a risk to human health when they are improperly handled or released in to a poorly ventilated area.

Inhalation
The most significant exposure route for humans is through inhalation. Refrigerant gases displace oxygen in the air making breathing difficult.

Overexposure can cause central nervous system depression and oxygen deficiency. Effects of overexposure may include light-headedness, giddiness, shortness-of-breath, headaches, and in extreme cases, irregular heartbeats, cardiac arrest, asphyxiation and death.

Symptoms of overexposure at lower concentrations may include transient eye, nose and throat irritation.

Skin Contact
Contact with rapidly released refrigerant gas may cause frostbite. Symptoms of frostbite may include changes in skin colour to white or greyish yellow.

Other direct dermal contact may result in skin de-fatting, dryness, irritation or contact dermatitis.

Standard work clothes provide adequate protection of the skin but it is recommended that lined butyl gloves and goggles be used whenever handling liquid refrigerants.

Eye Contact
Eye contact with rapidly released refrigerant or air-conditioning gas may cause severe frostbite damage to eyes and eyelids. Eye irritation may occur if exposure occurs at lower concentrations.

FUEL STORAGE FACILITIES

In the ACT the management of fuel storage tanks is regulated by ACT WorkCover who administers the *Dangerous Substances Act 2004* and the *Dangerous Substances (General) Regulation 2004.*

Heating oil and other petroleum products are classified as a Dangerous Substance under the ACT Dangerous Substances Act 2004.

The Dangerous Substances (General) Regulation 2004 – Division 2.4.2-233 *Decommissioning* (applies to a container used to store a dangerous substance) states the following:

'The container is thoroughly cleaned so that the container is in the condition it would be in if it had never contained the substance';

This would be difficult to achieve therefore it is advantageous to remove the tank.

In the ACT, Environment Protection and Heritage prefers underground fuel storage tanks be removed once they are no longer in use, unless there are extenuating circumstances i.e. their removal undermines permanent infrastructure. This is also emphasized in the Code of Practice for *The Removal and Disposal of Underground Petroleum Storage Tanks* (Australian Institute of Petroleum CP22 –1994).

Further, the ACT Environment Protection Authority (Environment Protection and Heritage) which administers the Environment Protection Act 1997 which contains contaminated land provisions responsible for the development of policy and guidelines to facilitate best practice when it comes to the management of contaminated land.

Environment Protection and Heritage deems all sites known to have had fuel storage facilities as potentially contaminated until investigated and assessed and shown to be free of contamination.

Based on this information and for the long-term management of the sites with fuel storage tanks, Robson Environmental Pty Ltd recommends that the USTs be removed in accordance with the requirements of ACT WorkCover and Environment Protection and Heritage.

Removal of the UST does require approvals from relevant ACT Government agencies which include:

- ACT Planning and Land Authority (ACTPLA)
- ACT WorkCover - Dangerous Goods Unit.

16 GLOSSARY

ACM	*See asbestos containing material*
Air monitoring[1]	Air Monitoring means airborne asbestos fibre sampling to assist in assessing exposures and the effectiveness of control measures. Air monitoring includes exposure monitoring, control monitoring and clearance monitoring. *Note: Air monitoring should be undertaken in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC:3003 (2005)]*
Airborne asbestos fibres[2]	Any fibres of asbestos small enough to be made airborne. For the purposes of monitoring airborne asbestos fibres, only respirable asbestos fibres (those less than 3µm wide, more than 5µm long and with a length to width ratio of more than 3 to 1) are counted.
Amosite	Grey or brown asbestos
AR	*See Asbestos Register*
Asbestos Containing Material	Any material, object, product or debris that contains asbestos.
Asbestos Register	Inventory of ACM by type, form, location, risk and required action.
Asbestos Removalist[2]	A competent person who performs asbestos removal work. *Note: an asbestos removal licence is required in all State and Territory jurisdictions for friable ACM.*
Asbestos Survey and Management Plan	Document covering the identification, risk evaluation, control and management of identified asbestos hazards, developed in accordance with NOHSC: 2018(2005).
Asbestos[2]	The fibrous form of mineral silicates belonging to the serpentine and amphibole groups of rock-forming minerals, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite or any mixture containing one or more of the mineral silicates belonging to the serpentine and amphibole groups.
Asbestos–cement (AC)[2]	Products consisting of sand aggregate and cement reinforced with asbestos fibres (e.g. asbestos cement pipes and flat or corrugated asbestos cement sheets).
ASCC	*See Safe Work Australia Council*
Bonded asbestos	ACM that is bonded into a stable matrix and cannot be reduced to a dust by hand pressure.
Chrysotile	White asbestos
Clearance inspection[2]	An inspection, carried out by a competent person, to verify that an asbestos work area is safe to be returned to normal use after work involving the disturbance of ACM has taken place. A clearance inspection must include a visual inspection, and may also include clearance monitoring and/or settled dust sampling.

Clearance monitoring[2]	Air monitoring using static or positional samples to measure the level of airborne asbestos fibres in an area following work on ACM. An area is 'cleared' when the level of airborne asbestos fibres is measured as being below 0.01 fibres/mL.
Competent person[2]	A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill, for the safe performance of the specific work.
Control monitoring[2]	Air monitoring, using static or positional to measure the level of airborne asbestos fibres in an area during work on ACM. Control monitoring is designed to assist in assessing the effectiveness of control measures. Its results are not representative of actual occupational exposures, and should not be used for that purpose.
Crocidolite	Blue asbestos
Exposure monitoring	Air monitoring in the breathing zone to determine a person's likely exposure to a hazardous substance. Exposure monitoring is designed to reliably estimate the person's exposure, so that it may be compared with the National Exposure Standard.
HMSMP	*See hazardous material survey and management plan*
In situ[2]	Fixed or installed in its original position, not having been removed.
Inaccessible areas	Areas which are difficult to access, such as wall cavities and the interiors of plant and equipment.
Licensed Class A Asbestos Assessor	Person who is qualified to undertake the identification and assessment of asbestos and provide recommendations on its safe management.
Licensed Class B Asbestos Assessor	Person who is qualified to undertake the identification of asbestos.
Membrane	A flexible or semi-flexible material, which functions as the waterproofing component in a roofing or waterproofing assembly.
NATA	National Association of Testing Authorities (NATA)
NOHSC *(now SWA)*	National Occupational Health and Safety Commission (*now known as Safe Work Australia)*
Safe Work Australia Council (SWAC)	A council that provides a national forum for State and Territory governments, employers and employees to consult and participate in the development of policies relating to OHS and workers' compensation matters, and promote national consistency in the OHS and workers' compensation regulatory framework.
SWMS	Safe Work Method Statement
UST	Underground Storage Tank (fuel)

1. Definition sourced from: NOHSC: 2018(2005).
2. Definition sourced from: NOHSC: 2002(2005).

17 REFERENCES

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