HAZARDOUS BUILDING MATERIALS

SURVEY REPORT

Pymble Ladies College
Avon Road
Pymble 2073

Prepared for:
Pymble Ladies College
Avon Road
Pymble NSW 2073

SLR Ref No: 610.12769.00040
Version No: -v0.1
July 2018

PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
Tenancy 202, Submarine School
Sub-Base Platypus, 120 High Street
North Sydney NSW 2060
+61 2 9427 8100
sydney@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Pymble Ladies College. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.12769.00040-R01-v1	21 June 2021	Andrew Parker	Jordan Harley	Jordan Harley

DOCUMENT REFERENCES

TABLES

FIGURES

APPENDICES

1 Executive Summary

SLR Consulting Australia Pty Ltd (SLR) was engaged by Kate Bimson of Pymble Ladies College to undertake an inspection of an area (outlined in **Figure** 1) of Pymble Ladies College, Avon Road, Pymble 2073 (herein referred to as the Site). The survey was conducted by Andrew Parker from SLR on 07 June 2021.

The following hazardous building materials were identified.

Asbestos Containing Materials (ACM)
No Asbestos Containing Materials Found

Lead in Paint
No lead in paint found

Lead in Dust
No lead in dust sampled

Polychlorinated Biphenyls (PCBs) in older style florescent light fittings
No PCBs observed

Synthetic Mineral Fibres (SMF)
No synthetic mineral fibres found

The recommendations arising out of this Hazardous Demolition Survey are:

1. As required by the *Work Health and Safety Regulations 2017,* the building owner is obliged to comply with the requirements outlined in the Regulation
    a. All ACM at the workplace is identified and maintained in a register of asbestos containing materials;
    b. All in situ ACM is clearly indicated and labelled;
    c. Implementation of an Asbestos Management Plan; and
    d. Ongoing review of the Asbestos Containing Materials Register and Asbestos Management Plan.

As the buildings are to be refurbished the following recommendations arising out of this survey are:

- No Hazardous Materials were identified within the scope of this survey. Any planned below ground works should include an Unexpected Finds Protocol.

The list above is a summary/overview only and should not be relied on to accurately identify hazardous materials. The locations and details of all items of known hazardous materials at the property are documented in the Hazardous Materials Registers in **Section 6** of this report.

In order to comply with the *Work Health and Safety Regulations 2017* any action taken to control ACM in the place of work, or in plant at the place of work, is to be recorded in the Asbestos Control Log attached in **Appendix A**.

Copies of NATA Laboratory Certificates for asbestos identification analysis are provided in **Appendix B**. Refer to Appendix C for Limitations of this survey. Refer to the General Information provided in **Appendix D** of this report for further information pertaining to hazardous materials.

The information provided in this report should not be relied on to accurately identify all hazardous materials at the Site. Hazardous materials may have been concealed i.e. behind new walls, flooring, ceilings, etc. that may have been inaccessible at the time of the inspection. If any hazardous materials are reasonably suspected at the Site, which are not identified within this report, further investigation is recommended by a competent person/s to undertake additional confirmatory inspections and/or sampling and analysis as required.

This report should be read in full including all attachments.

2 Background and Scope

The Scope of Work is to undertake a Hazardous Demolition Survey survey for the identification of all in situ hazardous materials at the Site. The extent of the inspection and samples collected for subsequent analysis (where applicable) was completed in order to confirm, as far as reasonably practicable, the location, condition and risk presented by in situ hazardous materials (based on the level of access available at the time of the assessment).

2.1 Site Description

The site is located within Pymble Ladies College, which is situated on the South side of Avon Road. A Locality Map is presented in **Figure 1**. For the purpose of this report, Avon Road is taken to run in an East-West direction, directly adjacent to the site.

The following information is known about the site:

- The site was a section of the school, outlined in **Figure 1**.
- The site's use was for playground and courtyard areas.
- The site was occupied at the time of inspection.
- Demountable buildings within the footprint in **Figure 1** were not inspected at the time of inspection.

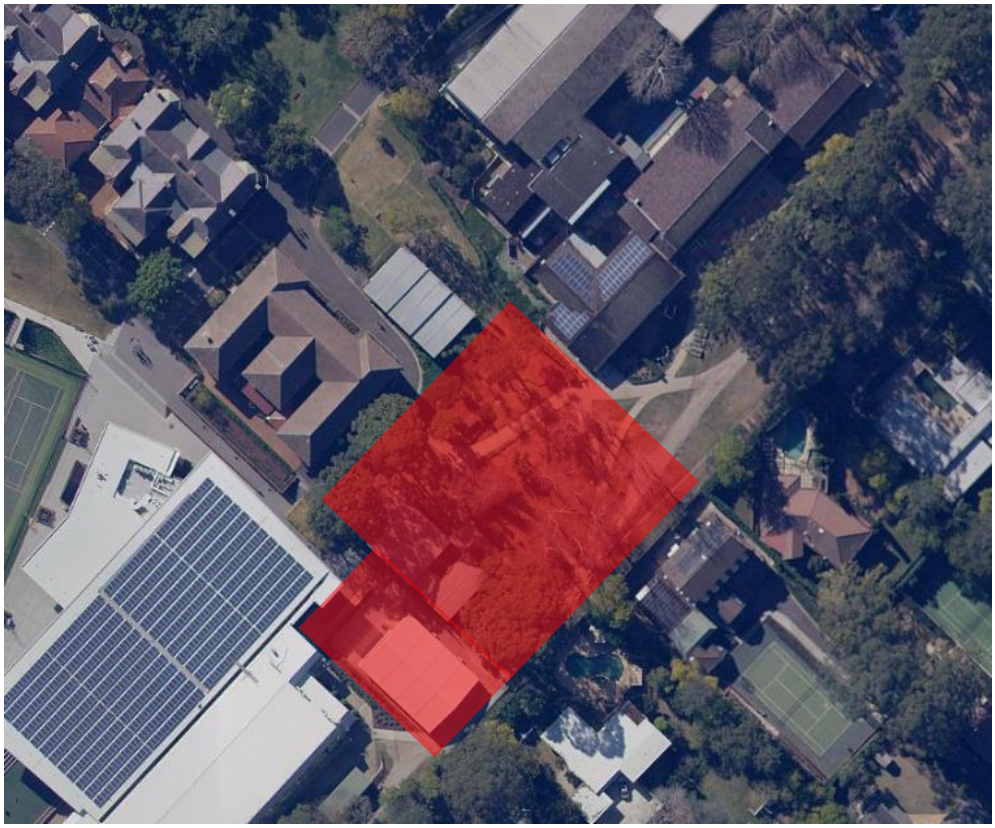

Figure 1 Site Location

2.2 Survey Strategy

The purpose of this survey is to locate, as far as reasonably practicable, the presence and extent of any suspect hazardous materials in the area where the refurbishment/demolition work will take. The survey involved a destructive investigation as far as reasonably practicable and as necessary to gain access to all locations to facilitate the proposed works by the Client.

This survey is designed to identify hazardous materials so that they can be included within a site specific hazardous materials removal scope of works/specification and subsequently removed in preparation for the refurbishment/demolition of the site. Should there be a delay in the proposed removal in excess of 3 months, then the client should be aware that the materials may have to be reassessed in order to comply with the management of ACMs.

3 Methodologies

Hazardous material surveys are undertaken considering a risk management approach, in accordance with best practice, State Legislation and Safe Work Australia NOHSC Guidance. The survey was conducted in a manner which conforms with the *Work Health and Safety Regulations 2017.*

3.1 Asbestos Containing Materials (ACM)

Asbestos containing materials presumed or identified through visual and/or analytical characterisation were performed and reported in this report and documented in the Asbestos Containing Materials Register (ACMR) in accordance with the Code of Practice How to Manage and Control Asbestos in the Workplace (2019).

The assessment was conducted on the basis of the condition, type and location of the materials at the time of inspection. The scope of this investigation did not allow intrusive sampling techniques to be undertaken, and consequently the register may have limitations as a reference document for the purposes of renovation or demolition.

Sample collection was performed in a non-destructive and non-invasive manner by competent persons. Presumptions, based on knowledge and experience, that inaccessible areas may contain asbestos materials may also be made and stated within the register.

The survey consisted of a visual inspection with limited sampling/analysis of materials undertaken by a trained and experienced surveyor. Materials are assumed to contain asbestos where:

- Laboratory analysis has confirmed the presence of asbestos in a visually similar material; or
- Materials visually appear to be asbestos containing but no sample was collected, for example due to access restraints.

Samples are typically collected using a hand tool or core borer. Hand drills and other tools are used where required. Power tools were not used during the survey.

Small representative samples were collected from materials assumed to contain asbestos (where not previously identified). Samples collected are representative of the material sampled, individually identified, transported, analysed and reported in accordance with Guidelines, relevant Statutory Regulations, Codes of Practice and SLR in-house Work Instructions and procedures. Samples were submitted to a NATA certified laboratory for confirmation analysis by stereo microscope and polarised light microscopy (PLM) with dispersion staining techniques.

Notably, with some asbestos containing bulk material it can be very difficult, or impossible, to detect the presence of asbestos using the polarised light microscopy analytical method, even after ashing or disintegration of samples. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or attributed to the fact that, very fine fibres have been distributed individually throughout the materials. Some materials, such as vinyl tiles, may require further analysis via X-ray diffraction or Scanning Electron Microscopy.

The ACMR consists of relevant information gathered on site, assessment of risk and recommendations for ongoing management of in situ asbestos materials. Reference to photographs, where available, is made in the register along with sample identification and analysis results, where applicable. Sample analysis results from preceding assessments may be referenced in the ACMR (refer to previous survey reports for analytical test results where reference is made to previous sample data).

3.2 Lead

3.2.1 Lead in Paint

Lead paint was identified through analytical characterisation. Small representative samples were collected from paint presumed to contain lead. Samples collected are representative of the material sampled, individually identified, transported, analysed and reported in accordance with the Australian Standard AS 4361.2: *Guide to lead paint management Part 2: Residential, Public and Commercial Buildings* (2017) and SLR in-house Work Instructions and procedures.

Paint samples were submitted to a NATA certified laboratory for confirmation analysis by Inductively Coupled Plasma Emission Spectroscopy (ICP-OES). A paint film that contains greater than 0.1% lead by mass in the dry film is considered lead paint and is sometimes referred to as lead-based paint, lead-containing paint leaded paint and/or paint containing lead.

Paint samples were collected for laboratory analysis for lead content. Flakes of paint were removed from non-intrusive areas to minimise disturbance. Paint flake samples included all layers of paint on a particular surface and are considered representative of paints in the location sampled. Samples were analysed in a laboratory for lead content by ICP - AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy).

3.2.2 Lead in Settled Dust

Settled dust was not sampled and analysed for lead. Sampling and analysis was conducted in accordance with AS 4361.2. Briefly, this involved the collection of settled dust from a known surface area by wet wipe methods. The collected dust is then submitted to a NATA certified laboratory for confirmation analysis by ICP-AES for total lead content. The total lead content and area sampled is then used to calculate a lead in dust loading value in mg/m^2.

3.3 Polychlorinated Biphenyls (PCBs)

Capacitors in older style fluorescent light fittings are assumed to contain PCBs unless a more detailed inspection and/or laboratory analysis confirms otherwise. A more detailed inspection and/or laboratory analysis would require a qualified electrician to isolate and de-energise the light fittings to enable inspection and sampling.

3.4 Synthetic Mineral Fibre (SMF)

Synthetic Mineral Fibre (SMF) materials were identified through visual inspection only.

4 Exclusion

Certain areas of the building(s) were inaccessible at the time of the inspection. This includes areas/materials that were inaccessible due to being "live electrical" or "moving parts" equipment. **Table 1** lists those areas/materials that were inaccessible.

Table 1 Inaccessible Areas and/or Materials

Location	Explanation
Demountable Buildings	Outside Scope of Survey

Additionally, and unless specifically noted, the survey did not cover:

- Wall/ceiling panelling behind laminations/coverings.
- Concealed floor coverings beneath carpet or superficial floor coverings.
- Fuses within "live" electrical panelling. Fuses of a certain age may contain asbestos containing flashguards.
- Hidden and/or inaccessible locations such as in or under concrete slabs, in or under vinyl/linoleum/carpet, wall cavities, hidden storage areas and the like. If the vinyl or linoleum is tested, this does not necessarily mean that the resin/glue is included in the analysis.
- Lift wells and inaccessible/unidentified shafts, cavities and the like.
- Air conditioning, heating, mechanical, electrical or other equipment.
- General exterior ground surfaces and subsurface areas eg asbestos in fill/soil.
- Materials dumped, hidden, or otherwise placed in locations which one could not reasonably anticipate.
- Materials other than normal building fabric, materials in laboratories or special purpose facilities and building materials that cannot be reasonably and safely assessed without assistance.

Materials other than asbestos, lead and PCBs are generally outside the scope of this investigation as identification can require specialised analysis/inspection techniques.

Settled dust is generally not sampled or commented on unless specified. Settled dust may contain hazardous materials, particularly if it is/was once in the vicinity of hazardous materials (such as asbestos containing materials or lead paint). It may also contain hazards originating from outside the building (such as lead from petrol combustion).

5 Survey Results

The results of the asbestos survey are presented in a tabular format. **Section 6.1** details all of the ACM identified. **Section 6.4** shows all of the non-asbestos containing materials as determined during laboratory analysis.

To assist with the interpretation of the results the following legend provides detailed meaning of abbreviations and terms that may appear in the tables.

Legend

Internal/ External	Refers to the location of the material in relation to the structure. Eg Eaves would be External of the building; Kitchen would be internal of the building.
Floor	Refers to the floor level on which the material is located.
Specific location	Refers to the precise location of the material within a room eg Room 1 - infill panel below window on southern wall.
Material	Refers to the type of material identified e.g. vinyl tile, fibre cement sheeting, fibrous insulation, etc. Material does not refer to the use or application of the material. This is covered in 'Application'.
Application	Refers to the use or application of the material e.g. floor covering, soffit lining, pipe lagging, etc.
Photograph	Refers to the photograph reference number located in the appendices.
Approximate Extent	Usually refers to the surface area or length of the material expressed as either square metres (m^2) or linear metres (Lin m). The dimension is an estimate only and should not be relied upon as an exact measure.
Results of Analysis	Refers to the type of asbestos identified during laboratory analysis. There are three main commercial asbestos types: chrysotile (CH-white), amosite (A-brown or grey), and crocidolite (C-blue). The term NAD which appears only in the non-asbestos register; means no asbestos was detected during laboratory analysis. Materials shown as 'Similar to……' have not been sampled but appear the same as other materials previously sampled. 'Suspect' refers to those materials not sampled (perhaps for safety reasons) and which are not similar to previously sampled materials. 'Assumed' refers to those materials not sampled (perhaps for safety/access reasons) and which exhibit similar properties to other materials identified/sampled.
Risk of Disturbance	Refers to frequency of disturbance ***High:*** *The material is located in frequently accessible areas with potential for disturbance* ***Medium:*** *The material is prone to mechanical disturbance due to routine building activity and/or maintenance* ***Low:*** *Routine accessibility is unlikely to cause significant deterioration, the material is located in areas with minimal or no disturbance potential or the material is adequately sealed* ***NA:*** *Not Applicable where Analysis indicates No Asbestos Detected*
Overall Condition / Deterioration	Refers to the physical state or condition of the material. Good - material shows no, or very minor, sign of damage and/or deterioration Fair - material shows signs of minor damage and/or deterioration Poor - material shows sign of significant damaged and/or deterioration or the material is partly or wholly unserviceable for its intended use.
Friability of Asbestos	Friable or Non Friable
Sealed / Surface Treatments	Refers to whether or not the material is encapsulated with a sealant such as paint, wall paper, etc. concealing its exposed surfaces.

<table>
<tr><td>Outcome of Risk or exposure risk assessment</td><td>Below is the general risk matrix that is followed however the consultant will take into account the specifics with each individual situation which may vary the outcome from risk assessment, such variations would be explained in the comments.
Refers to the level of risk posed by the material based on its condition, friability, accessibility and other factors such as exposure to disturbance.
The Material Assessment score is calculated by adding the parameters above. The potential for releasing fibres is detailed below.
<table><tr><th>Material Assessment Score</th><th>Fibre Release Potential</th></tr><tr><td>10 or higher</td><td>High</td></tr><tr><td>7 – 9</td><td>Medium</td></tr><tr><td>5 – 6</td><td>Low</td></tr><tr><td>4 or lower</td><td>Very Low</td></tr></table>The material assessment looks at the type and condition of the ACM and the ease with which it will release fibres if disturbed. It does not take into account occupancy or activities within the area, including periodic maintenance works.
Removal Recommended: Engage appropriately qualified persons (i.e. licensed asbestos removal contractor) to remove and dispose of the ACM under controlled conditions in accordance with relevant state specific Removal Code of Practice.
Repair / encapsulation Recommended: Repair or encapsulate (e.g. paint) or enclose the ACM to minimise deterioration until such time that the ACM is removed
Suitable for Continual Use: ACM may remain in situ provided appropriate management controls are adopted, the material is appropriately labelled and re-assessed every 5 years or earlier, where a risk assessment indicates the need for reassessment or the ACM has been disturbed or removed.
NA: Not Applicable where Analysis indicates No Asbestos Detected</td></tr>
<tr><td>Recommended control Actions</td><td>Refers to the recommended controls / actions required to ensure the identified asbestos materials are managed as per the legislative requirements.</td></tr>
<tr><td>Labels Affixed</td><td>Yes/No or NA - Not Applicable where Analysis indicates No Asbestos Detected</td></tr>
<tr><td>Additional Comments</td><td>Refers to any other relevant comments that may assist with the future management of the material.</td></tr>
<tr><td>Next Inspection Date</td><td>Not Applicable where Analysis indicates No Asbestos Detected.</td></tr>
</table>

6 Hazardous Materials Registers

The following tables are a register of all identified hazardous materials at the Site, confirmed through analysis or assumed materials deemed to be homogenous or consistent in appearance and manufacture to similar samples collected/analysed. This Summary of hazardous materials should be read in conjunction with all sections of this report.

6.1 Asbestos Containing Materials Register

Within the Scope and Limitations of this report, no Asbestos Containing Materials were identified at the Site at the time of inspection.

6.2 Lead in Paint / Lead in Settled Dust and Polychlorinated Biphenyls Register

Within the Scope and Limitations of this report, no lead was identified at the Site at the time of inspection.

Within the Scope and Limitations of this report, no PCB's were identified at the Site at the time of inspection.

6.3 Synthetic Mineral Fibre (SMF) Register

Within the Scope and Limitations of this report, no SMF's were identified at the Site at the time of inspection.

The following table is a register of all other materials either visually or analytically confirmed as non-hazardous materials at the Site.

6.4 Non Asbestos Containing Materials Register

Sample No./ Visual Observation	Photo	Location	Interior / Exterior Floor Specific Location	Material Application	Analysis Result	Additional Comments
AS01		Pymble Ladies College	External Courtyard adjacent Jeanette Buckham Gymnasium (Northern entrance) - Brickwork to Fence line	Expansion Joints, No Asbestos Identified	NAD, Organic	No action required
AS02		Pymble Ladies College	External Courtyard adjacent Jeanette Buckham Gymnasium (Northern entrance) - Lower brickwork to Garden	Expansion Joints, No Asbestos Identified	NAD, Organic	No action required
AS04		Pymble Ladies College	External Footpaths throughout area between Health Centre Demountables and Junior School	Expansion Joints, No Asbestos Identified	NAD, Organic	No action required

Sample No./ Visual Observation	Photo	Location	Interior / Exterior Floor Specific Location	Material Application	Analysis Result	Additional Comments
AS05		Pymble Ladies College	External Ramp to Jeanette Buckham Gymnasium	Expansion Joint, No Asbestos Identified	NAD, Organic	No action required
AS03		Pymble Ladies College	External Walkway adjacent Demountables	Expansion Joint, No Asbestos Identified	NAD, Organic	No action required

6.5 Non Lead in Paint / Lead in Settled Dust Register

Sample No./ Assumed	Photo	Material Type and Location	Paint Colour if applicable	Material Status	Approx. Extent	Condition	Comments
FA01		Pymble Ladies College External Courtyard adjacent Jeanette Buckham Gymnasium (Northern entrance) - Timber Fence to Garden	Green	Contains <0.01% Lead	20 m²	Average	No action required
FA03		Pymble Ladies College External Courtyard adjacent Jeanette Buckham Gymnasium (Northern entrance) - Lower guttering to fence line	White	Contains <0.01% Lead	8 m²	Poor	No action required
FA02		Pymble Ladies College External Courtyard adjacent Jeanette Buckham Gymnasium (Northern entrance) - Floor Lining	Grey	Contains <0.01% Lead	60 m²	Flaking	No action required
FA04		Pymble Ladies College External Southern Footpath adjacent Junior School - Brick wall	Cream	Contains <0.01% Lead	30 m²	Average	No action required

Notes:

- AC = Asbestos Cement; FCS = Fibre Cement Sheeting; BEBB Black Electrical Backing Board; NAD = No Asbestos Detected; PCBs = Polychlorinated Biphenyls; LM = Linear Metres; N/A = Not Applicable.
- This Summary of Hazardous Materials should be read in conjunction with all sections of this report.
- All other similar occurrences of the ACM identified in the summary table above should be assumed to contain asbestos, and treated accordingly, unless sampling and analysis confirms otherwise.
- All other similar occurrences of the lead listed in the above summary table should be assumed to contain corresponding levels of lead.
- All other similar occurrences of lead in dust or lead paint listed in the above summary table should be assumed to contain corresponding levels of lead.

7 Discussion and Recommendations

SLR was appointed to complete a survey and assessment of the Site with regards to the identification of hazardous materials as detailed in **Section 2**, Background and Scope. The extent of the inspection and samples collected for subsequent analysis was completed in order to confirm, as far as reasonably practicable, the location, condition and risk presented by hazardous materials remaining in-situ (and was based on the level of access available).

Further to the completion of the on-site investigation and collection/analysis of samples, there are detailed site/work-specific requirements and precautions that must be taken in the management, control and removal of hazardous materials. In addition to those listed on the Hazardous Materials Registers, the following are some general recommendations and precautions that should be considered. Detailed documents, which may include Scope of Works, Safe Work Method Statements and Risk Assessments, should be prepared to appropriately address health and safety issues associated with specific work and site conditions.

Site Specific Recommendations

7.1 Asbestos

- Within the scope and limitations of this report, no ACM were identified at the site surveyed at the time of inspection.
- This document should be held as an Asbestos Register for the area inspected at the Site and updated where a risk assessment indicates the need for re-assessment. All occupiers of the workplace are to be provided with a copy of this register and all updates to it.
- In order to comply with the Work Health and Safety Regulations 2017, any action taken to control asbestos and ACM in the place of work, or in plant at the place of work, is to be recorded in this register. These details are to be recorded in the Asbestos Control Log.

- This document should be held as an Asbestos Register of the areas inspected.
- If any material that may contain asbestos is found on site that is not included within the register, the material should be sent for identification and expert advice sought. The material should be assumed to contain asbestos in the interim.
- As a precautionary measure, all materials, which may contain asbestos, should be assumed to contain asbestos and treated appropriately until sampling and analysis confirms otherwise.

7.2 Lead

7.2.1 Lead in Paint

Within the scope and limitations of the investigation undertaken, no paint applications containing greater than 0.1% lead by weight (w/w) were identified during the survey.

7.2.2 Lead in Settled Dust

Within the scope and limitations of the investigation undertaken, no dust containing greater than (>) 8 mg/m² lead was identified during the survey.

7.2.3 Contractor Competency

Contractor workers should be competent in relation to the scope of work involved in a lead project. Where a project involves lead paint disturbance, a competent lead abatement contractor, employing a Responsible Person and competent hazardous coating workers should be engaged. In addition, all lead work should be supervised by a suitably experienced and competent consultant, such as SLR, who can provide supervision, advice, sampling, testing and documentation for the project.

Airborne lead monitoring is recommended during all lead paint disturbance work.

7.3 Polychlorinated Biphenyls (PCBs)

Within the scope and limitations of the investigation undertaken, no old fluorescent light fittings were identified during the survey.

PCBs are assumed to be present in older fluorescent light fittings unless a more detailed inspection and/or sample analysis indicates otherwise. Sampling or a more detailed inspection would require the presence of a qualified electrician to electrically isolate and de-energise the light fittings.

PCBs are a scheduled waste with strict guidelines regarding transport and handling. PCB work is to be conducted in accordance with the *Environmental Protection & Heritage Council's Polychlorinated Biphenyls Management Plan, Revised Edition April 2003*. This includes:

- Prior to demolition when the power is disconnected, inspect the light fittings;
- Metal PCB containing capacitors are to be removed, placed in plastic lined 200 litre drums and disposed of as PCB Scheduled Waste. Any light fittings that show signs of oil staining from capacitors are to be disposed of as PCB contaminated;
- Protective clothing including eye protection, PCB resistant gloves and overalls are to be worn;
- Contaminated gloves and disposable coveralls are to be disposed of as PCB contaminated waste; and
- Contractors licensed to transport and handle PCBs must be used for transport and disposal. PCB is a scheduled waste with strict guidelines regarding transport and handling.

7.4 Synthetic Mineral Fibres (SMF)

Within the scope and limitations of the investigation undertaken, no SMF materials were identified during the survey.

8 Legislation, Guidelines and Regulations

- Work Health and Safety Act 2011
- Work Health and Safety Regulations 2018
- Code of Practice How to Safely Remove Asbestos (2019)
- Code of Practice How to Manage and Control Asbestos in the Workplace (2019)

- Code of Practice Demolition Work (2019)

- Australia and New Zealand Environment and Conservation Council (ANZECC), Polychlorinated Biphenyls Management Plan - 1999
- Australia and New Zealand Environment and Conservation Council (ANZECC), Identification of PCB – Containing Capacitors - 1997
- Australian Standards AS 4361.1: Guide to hazardous paint management Part 1: Lead and other hazardous metallic pigments in industrial applications -2017
- Australian Standard AS4361.2: Guide to lead paint management Part 2: Residential, Public and Commercial Buildings -2017
- Australian Standard AS4874: Guide to the investigation of potentially contaminated soil and deposited dust as a source of lead available to humans - 2000
- Department of Commerce Safe Handling of PCB in Fluorescent Light Capacitors - 1993
- Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [National Occupational Health and Safety Commission: 3003 (2005)]
- AS/NZS 1716-2012 - Respiratory Protective Devices
- AS/NZS 1715-2009 - Selection, Use and Maintenance of Respiratory Protective Devices
- AS 2601-2001 - The Demolition of Structures
- AS 1319-1994 Safety Signs for the Occupational Environment

APPENDIX A

ASBESTOS CONTROL LOG

To comply with the Code of Practice How to Manage and Control Asbestos in the Workplace (2019) all actions taken to control asbestos and ACM are to be recorded in the table below. It is recommended that similar details also be recorded for any other asbestos materials identified.

NAME	COMPANY	DATE	ASBESTOS MATERIAL RELATED WORK UNDERTAKEN (Include any assessment concerning asbestos that took place before the work was carried out)	REFERENCE NUMBER (Include sample numbers, report numbers, quote number and/or purchase order number etc)
Andrew Parker	SLR Consulting Australia Pty Ltd	7/06/2021	Hazardous Building Materials Survey	Report No 610.12769.00040-R01-v1\HMR

APPENDIX B

Certificate of Analysis

ASBESTOS ANALYTICAL REPORT

Report Number 610.12769.00040-v1.0-ANA

Client:	Pymble Ladies College
Client Contact:	Malcolm Boyes
Client Address:	Avon Road, Pymble NSW 2073
Sampled By	Andrew Parker
Date Sampled:	07 June 2021
Report Date:	21 June 2021
Site Address/ Location:	Pymble Ladies College, Avon Road, Pymble 2073
Test Methods:	Sample(s) examined under a stereo Microscope and selected fibres under a Polarised Light Microscope with dispersion staining techniques, in accordance with AS4964 and method AIP.01.03.
Laboratory Address	Tenancy 202 Submarine School, Sub Base Platypus, 120 High Street, North Sydney NSW 2060 Australia (NATA Accreditation No. 3130)

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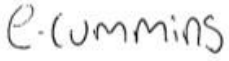
Results

Sample No.	Sample Location	Sample Description (including Weight/Size)	Analysis Results
AS01	External, Courtyard adjacent Jeanette Buckham Gymnasium (Northern entrance) - Brickwork to Fence line, Expansion Joints	Bituminous Product 15 x 10 x 3mm	No Asbestos Detected Organic Fibres Detected
AS02	External, Courtyard adjacent Jeanette Buckham Gymnasium (Northern entrance) - Lower brickwork to Garden, Expansion Joints	Bituminous Product 20 x 15 x 3mm	No Asbestos Detected Organic Fibres Detected
AS03	External, Walkway adjacent Demountables, Expansion Joint	Bituminous Product 10 x 8 x 3mm	No Asbestos Detected Organic Fibres Detected
AS04	External, Footpaths throughout area between Health Centre Demountables and Junior School , Expansion Joints	Bituminous Product 20 x 15 x 3mm	No Asbestos Detected Organic Fibres Detected
AS05	External, Ramp to Jeanette Buckham Gymnasium, Expansion Joint	Bituminous Product 15 x 10 x 3mm	No Asbestos Detected Organic Fibres Detected

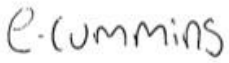
Notes:

- The results contained within this report relate only to the samples submitted for testing.
- The report(s) and/or information produced by SLR Consulting Australia Pty Ltd should not be reproduced and/or presented/reviewed except in full.
- Even after disintegration of some bulk samples (eg bituminous materials and vinyl tiles/sheeting) detection of fibres may be difficult when using polarized light microscopy and dispersion staining techniques. This may be due to the matrix of the samples (uneven distribution) or fine fibres that are difficult to detect and positively identify.
- Asbestos in non-homogenous samples is reported to the detection limit unless otherwise stated - 0.1 g/kg (AS 4964).
- An Independent Analytical Technique is Recommended for Vinyl Samples (i.e. Vinyl Floor Tiles).
- Laboratory is not accredited to perform sampling

Approved Identifier: Ewan Cummins



Approved Signatory: Ewan Cummins



LIMITATIONS

Thus, while we carry out the work to the best of our ability, we totally exclude any loss or damages which may arise from services we have provided to Pymble Ladies College and/or associated parties.

The analysis was undertaken by SLR Consulting, Tenancy 202 Submarine School, Sub Base Platypus, 120 High Street, North Sydney NSW 2060 Australia (NATA Accreditation No. 3130).

The performance limitation of the *AS 4964 (2004)* method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w).

All work conducted and reports produced by SLR Consulting Australia Pty Ltd (SLR) are prepared for a particular Client's objective and are based on a specific scope, conditions and limitations, as agreed upon between SLR and the Client. Information and/or report(s) prepared by SLR may therefore not be suitable for any use other than the intended objective. No parties other than the Client should use any information and/or report(s) without first conferring with SLR.

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The report(s) and/or information produced by SLR should not be reproduced and/or presented/reviewed except in full.

APPENDIX C

Limitations

Surveys are conducted in a conscientious and professional manner. The nature of the task and the likely disproportion between any damage or loss which might arise from the work or reports prepared, and the cost of our services, is such that SLR cannot guarantee that all asbestos building materials have been identified and/or addressed.

Due to the possibility of renovations and additions to the building(s) over time, ACMs may have been concealed (for example behind new walls, flooring, ceilings, within boxing, etc.); such areas may have been inaccessible during the inspection. If any materials reasonably suspected of containing asbestos are found during further renovation and/or demolition of the buildings, which are not identified within this report, the client's independent consultant, SLR, should be contacted to complete additional confirmatory sampling and analysis as required.

A change in building use/nature of activities could affect the control actions recommended within this report and a re-survey may be required.

Thus, while we carry out the work to the best of our ability, we totally exclude any loss or damages which may arise from services we have provided to Pymble Ladies College and/or associated parties.

Where potentially ACMs are identified these are normally reported on to the best of the consultant's ability. Analysis is not normally included and there is no guarantee that all such materials have been identified and/or addressed.

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Materials other than asbestos are generally outside the scope as identification can require specialised analysis/inspection techniques.

Settled dust is generally not sampled or commented on. Settled dust may contain asbestos, particularly if it is in the vicinity of ACM or areas where ACM have been removed.

APPENDIX D

Photographs

APPENDIX D

General Information

ASBESTOS

Asbestos: Description, Properties and Uses

Asbestos is the generic term given to a group of naturally occurring fibrous minerals, based on hydrated silicates, which are found in various rock formations. Differing ratios of oxygen, hydrogen, sodium, iron, magnesium and calcium elements account for several different types of asbestos minerals, the most common varieties being Amosite (brown asbestos), Chrysotile (white asbestos), Crocidolite (blue asbestos). Other types include Anthophyllite, Actinolite and Tremolite.

The immense popularity of asbestos as a building material is attributed to its near unique properties of fire resistance, high abrasion resistance and superb acoustical characteristics coupled with its relatively low cost. Prior to 1973, asbestos was the material of choice for fire proofing, thermal insulation, sound insulation and abrasion resistance. It was used as a spray-on insulation of ceilings and steel girders; as a thermal insulation of boilers, pipes, ducts, air conditioning units, etc; as an abrasion resistant filler in floor tiles, vinyl sheet floor coverings, roofing and siding shingles; as a flexible, though resistant joining compound and filler of textured paints and gaskets; as the bulking material with the best wear characteristics for automobile brake shoes and in countless domestic appliances such as toasters, grills, dishwashers, refrigerators, ovens, clothes dryers, electric blankets, hair dryers, etc.

Asbestos: Health Effects

Many asbestos bearing materials or products are of no significant health risk whatsoever when used in the normal course of events. A health risk exists when asbestos fibres are released into the air and when that air is inhaled into the lungs. Even then, it appears that most people exposed to relatively small amounts of asbestos do not develop any related health problems. There is however no “safe” level of asbestos exposure since the risk is dependent on numerous factors including the time since exposure, exposure duration and concentration, asbestos type, the attributes of the particular individual and environmental factors such as exposure to cigarette smoke and other airborne pollutants.

There are three main diseases associated with airborne asbestos fibres:

Asbestosis - A fibrosis (or scarring) of the lung associated with relatively massive exposure to asbestos.

Lung Cancer - Indistinguishable from that caused by smoking and a common cause of death. The risk of lung cancer is much higher when there is exposure to both cigarette smoking and to airborne asbestos.

Mesothelioma - A cancer of the chest and abdominal lining, it is specific to asbestos exposure.

A feature of these diseases is that symptoms take a long time to appear, generally 5 to 40 years. Once symptoms are evident the disease progresses rapidly.

There is some evidence that Chrysotile asbestos is less carcinogenic than Amosite, and that Amosite is less carcinogenic than Crocidolite in causing mesothelioma, but the evidence is less clear for lung cancer.

Measurement of Airborne Asbestos Fibres

The Work Health and Safety Regulations 2017 and the Safe Work Australia Asbestos Codes of Practice & Guidance Note set the maximum allowable time weighted average for all forms of asbestos at 0.1 fibre/mL of air.

Air monitoring is used to determine airborne fibre levels. SLR is NATA certified for Asbestos Fibre Counting and Volume Measurement to carry out such monitoring.

The Safe Work Australia Code of Practice How to Safely Remove Asbestos 2011 states that air monitoring should be performed whenever Asbestos Containing Materials (ACM) are being removed, to ensure the control measures are effective.

The onus to provide a safe environment rests with persons in control of a business or undertaking, persons with management or control and persons carrying out demolition or refurbishment work. To meet these obligations it is recommended that SLR be engaged by the site controller, or their representative, and not an asbestos removal contractor as there could be a conflict of interest in the latter arrangement.

Asbestos Survey

Asbestos surveys are undertaken to identify any asbestos materials/hazards and assess the risk associated with the material/hazard.

Surveys are conducted through visual inspection by experienced personnel. During the inspection material samples are taken as appropriate for analysis.

Limitations

Due to the nature of the task all asbestos surveys are limited. Since asbestos can occur in so many forms and in so many locations, and as there is no instrument to detect asbestos, it is never possible to guarantee all asbestos has been identified. Access is usually restricted, and there may be asbestos hidden behind walls or other structures. Building plans are of great assistance to consultants undertaking surveys.

Asbestos Register

An asbestos register is a record of the location, type and condition of all asbestos containing products identified in a building. Under the Safe Work Australia Codes of Practice and the legislation, any place of work constructed prior to 31 December 2003 must have an Asbestos Register. A SLR Asbestos Survey Report includes an asbestos register.

Registers must be maintained and changes in the condition or extent of any asbestos present should be recorded. Registers should also detail the next review date, at present annually since the condition of asbestos materials, legislation, guidelines and standards change.

Management Plan

An asbestos management plan is required where asbestos materials have been identified and are to remain on site. The plan would normally be a component in the overall Hazard Management Plan for the site.

Control Options

Asbestos judged to constitute a health risk should be removed, enclosed or encapsulated by an approved asbestos contractor.

Enclosure

This involves the installation of a permanent, solid, non-porous, impervious barrier between the asbestos material and the surrounding environment. Examples include building boxes around steam pipes etc. A suspended ceiling is not permanent and, since occasional access is necessary above a suspended ceiling, enclosure is negated. Furthermore, many suspended ceilings act as return air plenums so enclosure is impossible.

Encapsulation

Encapsulation involves coating the material with a sealant. Good sealants penetrate through the asbestos material to the substrate. The encapsulating substance then hardens and binds all the asbestos fibres into a solid matrix. This is usually a short to medium term management option.

Removal

Removal is not without hazards to the occupants of the building. If not strictly controlled, the removal process can result in increased fibre counts in other areas. Technical competence, experience and integrity are of prime importance in evaluating asbestos removal plans.

We advise clients to work within the usual practised time frames of the experienced asbestos removal companies under strict supervision by a qualified person. Pressing for quicker turnaround times may result in low quality workmanship and unnecessary asbestos risk. Building owners may be in part responsible for risks created by the removal Contractor due to carelessness or negligence.

An independent consultant such as SLR, experienced in the supervision of asbestos removal, should be retained to act on the client's behalf.

Clearance Inspection

A clearance inspection must be conducted at the completion of asbestos removal works. The clearance inspection may include airborne asbestos monitoring and/or sampling/analysis of materials and should be completed by a suitably qualified and experienced consultant, such as SLR.

ASBESTOS CEMENT SHEETING

A large number of building products used in the building and construction industry have been made with asbestos and cement. Products include:

- Flat or corrugated, compressed sheeting
- Pipes for water, drainage, flues
- Roof shingles
- Building boards eg Villaboard, Hardiflex, Wundaboard, Flexiboard
- Cable trays for electrical wiring
- Numerous preformed items such as cisterns, protective housings, etc

Provided these products are maintained in good condition, they present no health risk, however precautions must be observed during demolition, refurbishment etc.

Licensing Requirements

Asbestos-containing products are classified as **non-friable** or **friable**. **Asbestos cement** (AC) is classified as **non-friable asbestos** however once it is significantly broken, crushed or otherwise damaged WorkCover NSW may consider it to be friable asbestos. The rules governing friable asbestos are far more stringent.

A WorkCover NSW asbestos licence is required to remove 10 square metres or more of non-friable asbestos and there must be WorkCover NSW notification.

Anyone wishing to carry out friable asbestos removal must obtain a friable asbestos removal licence from WorkCover NSW. A friable asbestos removal permit must be obtained for all friable asbestos jobs.

Removal Procedures

The following procedures are recommended for demolition work involving non-friable asbestos cement sheeting in order to reduce the potential health risk to workers and to building occupants.

All asbestos removal and/or decontamination should be undertaken by a competent person working in accordance with the requirements specified in the Safe Work Australia Asbestos Codes of Practice and the *Work Health and Safety Regulations 2017* A licensed, experienced asbestos removal contractor is required to remove friable asbestos and >10m² of non-friable asbestos.

1. Prior to commencement of asbestos removal works, suitable warning signs must be erected. All windows and doors etc in the occupied areas of these buildings should be closed so as to prevent the spread of contamination.
2. All asbestos removal operatives to wear half-face particulate filter (cartridge) respirators and approved disposable coveralls.

3. The bolts fixing the asbestos cement sheets to the main frame must be cut out and removed. Abrasive cutting or sanding discs shall not be used on asbestos cement products. Only approved power tools may be used.
4. The asbestos cement sheets should be wetted or PVA coated (polyvinyl acetate). **High water pressures should not be used**.
5. All asbestos cement sheets should be removed with minimal breakage and be **lowered** to ground level, not dropped.
6. All asbestos cement dust and residues should be cleaned from the work area using an approved vacuum cleaner.
7. All asbestos containing waste must be removed from the site as soon as possible. The bins should be plastic lined, covered and taped secure prior to removal.
8. The asbestos waste shall be disposed of in accordance with the existing regulations.
9. Prior to engagement in the work, all asbestos operatives must be trained in safe working practices. These training aspects include:
   - Health hazards of asbestos
   - Safe working procedures
   - Wearing and maintenance of protective clothing and equipment

ASBESTOS CONTAINING VINYL TILES

Vinyl tiles which contain asbestos are considered to be of minimal risk whilst undisturbed and in good condition. The asbestos contained within vinyl tiles is well bound in the parent matrix and fibre release is virtually impossible provided the tiles are not ground, drilled, or otherwise abraded. Normal floor cleaning operations will not release asbestos fibres.

If the tiles are intact and not abraded or drilled etc it is safe to leave them *in-situ*. However, prior to demolition and/or refurbishment all asbestos containing vinyl tiles in the work area must be removed in accordance with the *Work Health and Safety Regulations 2017* and the Safe Work Australia Asbestos Codes of Practice.

Removal Procedures

The following procedures are recommended for the removal of asbestos containing vinyl tiles in order to avoid potential asbestos health risks to workers and building occupants.

If 10 m² or more of vinyl tiles are to be removed the work should be completed by a licensed, experienced asbestos removal contractor with notification to Work Health and Safety Regulations 2017.

1. Prior to commencement of removal works, suitable warning signs must be erected. All windows, doors and vents etc in the occupied areas of the buildings should be closed to reduce the potential for cross-contamination/exposure.
2. All vinyl tile removal operatives are to wear appropriate personal protective equipment (PPE) including respiratory protection, safety glasses/goggles, disposable coveralls, hearing protection and gloves. Steel capped boots, hi-visibility vests and hard hats should also be worn as per the normal requirements for work on construction sites.
3. The tiles can be removed by heating the surface to loosen them or by use of a mechanical chisel to wedge them up. Care should be taken when heating tiles and the glues holding them in place to avoid the generation of toxic fumes. Do not grind, drill or otherwise abrade the tiles in any fashion that generates unnecessary dust/debris.
4. All waste is to be double bagged or placed in lined bins, sealed, and disposed of as asbestos waste in accordance with the Asbestos Codes of Practice and existing guidelines and regulations.
5. The removal area should be detailed clean using an approved vacuum cleaner fitted with a High Energy Particulate (HEPA) filter, and by wet wiping. A detergent should be used when wet wiping as this improves cleaning efficiency.

6. Obtain a clearance inspection and report from an independent, suitably qualified and experienced consultant such as SLR.
7. Upon satisfactory clearance inspection spray the area with a dilute PVA emulsion at low pressure. Multiple applications may be required to provide adequate coverage.
8. Prior to engagement in the work, all asbestos operatives must be trained in safe working practices. These training aspects include:
    - Health hazards of asbestos
    - Safe working procedures
    - Wearing and maintenance of protective clothing and equipment

Air Monitoring

The Safe Work Australia Code of Practice How to Safely Remove Asbestos 2011 states that air monitoring should be performed whenever Asbestos Containing Materials (ACM) are being removed, to ensure the control measures are effective.

All air monitoring must be completed by a NATA accredited organisation as specified in the *Work Health and Safety Regulations 2017.*

Asbestos fibres are generally well bound in the vinyl matrix and fibre release is unlikely provided the tiles are not ground, drilled or similarly disturbed.

Note:

These are general recommendations. In all cases the asbestos removalist should be familiar with, and comply with, the relevant Codes of Practice and the *Work Health and Safety Regulations 2017.* There may also be site specific requirements which should be complied with.

CORRUGATED ASBESTOS CEMENT (AC) ROOFING

Deterioration Mechanisms

Asbestos cement (AC) roofs deteriorate slowly over time. The upper surface exposed to the elements slowly loses cement binder and asbestos fibres become increasingly exposed. This may result in excessive fibre loss and a general weakening of the roof materials which will eventually become porous.

The process of natural weathering may be compounded by exposure to steam, acid fumes and other agents from industrial processes, resulting in accelerated deterioration of the roof.

Hail, heavy rain and other storm activity can cause also significant problems including:

- Cracks and/or penetrations in asbestos cement panels, and resultant generation of asbestos cement dust/debris.
- Shedding of asbestos fibres which may contaminate runoff and enter gutters and drains etc.
- Blocking of gutters with hail and other debris resulting in overflow and asbestos contamination of surrounding areas.

In most situations the underside of AC roofs exhibit very little deterioration however asbestos containing dust can accumulate on the roof support structure and other exposed locations below/around the roof.

If an asbestos cement roof becomes significantly damaged, weathered and or produces visible dust or significant debris it is likely that health and safety management works will be required. A suitably qualified and experienced consultant, such as SLR, can advise and assist in carrying out such works.

Life Expectancy and Maintenance

AC roofs in good condition may remain in place indefinitely providing certain precautions are taken.

- On no account may high pressure water be used to clean AC roofs. This is forbidden under the Safe Work Australia asbestos codes of practice as it can result in widespread contamination.

- AC roofs may not be drilled, ground, cut or otherwise damaged as this may result in the release of airborne asbestos fibres.
- In general, roofs are best left undisturbed if in good condition. There are however several sealing compounds which may be used on AC roofs. The underside of AC roofs may be encapsulated, shielded with sarking or enclosed with a fixed ceiling or other materials. Enclosures are fixed, permanent, non-porous barriers that prevent fibre penetration. All barriers need to be maintained.
- The roof including internal support structure should inspected regularly (eg at least once a year) by a suitably qualified and experienced consultant such as SLR to assess the condition and extent of the asbestos materials present.
- Gutters and down pipes should be kept clean and in good condition. Some gutters may accumulate a build up of debris which contains asbestos; this is best removed by an experienced licensed asbestos removal contractor.
- Down pipes etc should be protected from damage by forklifts and other vehicles via the installation of appropriate barriers.
- Damaged sections of asbestos containing material should be removed as soon as possible by an experienced licensed asbestos removal contractor. It is illegal to re-use asbestos containing materials.
- As a precautionary measure any exposed broken edges of asbestos material temporarily remaining in place should be sealed with an appropriate sealant such as Emerclad paint.

Demolition

Demolition of AC roofs should only be undertaken by an experienced licensed Asbestos Removal Contractor.

It is recommended that asbestos removal supervision, air-monitoring and clearance inspections be undertaken by an independent, suitably qualified and experienced asbestos consultant such as SLR.

ASBESTOS CONTAINING FIRE DOORS

The cores of older fire doors frequently contain asbestos materials. Such doors may remain in place provided certain precautions are taken. These include:

- Labelling the doors with appropriate warning signs that advise of the asbestos risk.
- Not drilling or otherwise disturbing the doors so as to release airborne asbestos fibres.
- Recording the location, extent and condition of the doors in the site Asbestos Register and addressing them in the site Asbestos Management Plan. A copy of the Asbestos Register and Management Plan should be held by the Building Manager who is to ensure that no work is carried out on the doors without their prior knowledge and the implementation of adequate health and safety precautions.
- Regular inspection and reporting of the condition of the doors.

If the fire doors are damaged then access to the area is to be appropriately restricted and advice sought from a suitably qualified and experienced consultant such as SLR.

Any asbestos removal and/or remediation/decontamination work should be undertaken by a licensed Asbestos Removal Contractor.

LEAD

Lead contamination comes from numerous different sources. Common sources include lead-containing paint, putties, leaded petrol and lead flashing.

Lead is absorbed by ingestion, inhalation and directly through the skin. The finer the particle size the more readily it is absorbed. As a result, some lead compounds are more readily absorbed than others. High lead exposure can cause death, however far lower exposures can also cause a number of adverse consequences, including a reduction in IQ, particularly in children.

Lead containing materials should be managed in accordance with the *Work Health and Safety Regulations 2017* the *National Standard for the Control of Inorganic Lead at Work* [NOHSC:1012(1994)], the *National Code of Practice for the Control and Safe Use of Inorganic Lead at Work* [NOHSC:2015(1994)] and other relevant standards and guidelines as outlined below.

Acceptable Levels

There are numerous standards but application to particular situations is not always clear.

Paint

In 1969 the National Health and Medical Research Council (NH&MRC) introduced the Uniform Paint Standard which banned the use of white lead for domestic buildings and placed a limit on other forms of lead (usually in the form of dryers) in such paints of 1% (by weight on the dry weight). In March 1992 this limit was lowered to 0.25% and has more recently been reduced even further in domestic paints as outlined in Appendix I (the letter not the number) of Standard for the Uniform Scheduling of Drugs and Poisons No 20, 2005 published by Australian Therapeutic Goods Administration under the Therapeutic Goods Act 1989. It is therefore common to find up to 1% lead in paint especially in glossy paints. There is no limit on the lead content of old paint finishes.

Moderate lead levels (less than 4%) are generally not considered an immediate health risk if the paint is in good condition and not likely to be damaged or accessible to children who might chew the paint etc. Removal of such paint however poses a health risk if it is not adequately controlled.

Paints of 1% or more lead content are generally considered to be lead containing; however the dry sanding of paints with even 0.25% lead can result in the release of unacceptable levels of lead containing dust.

Australian Standards AS 4361.1-1995 Guide to lead paint management Part 1: Industrial Applications and AS 4361.2-1998 Guide to lead paint management Part 2: Residential and Commercial Buildings provide guidance for the management of lead paint, information on lead paint testing and selection of an appropriate management strategy.

There is a duty of care to ensure that workers and building occupants are not exposed to excessive lead levels. Young children are particularly at risk.

Dust

Lead in dust is of particular concern because it is easily disturbed and frequently in the form of very fine particles which are more readily absorbed by the human body.

The NH&MRC (National Health & Medical Research Council) has not set guidance concentration levels for lead in dust. Australian Standard AS 4361.2-1998 Guide to lead paint management Part 2: Residential and Commercial Buildings, does not offer any general guidance on lead levels in dust but it does provide acceptable surface-dust lead concentrations after lead paint management activities. The acceptance levels for surface dust are:

- Interior floors 1 mg/m² (as lead)
- Interior window sills 5 mg/m² (as lead)
- Exterior surfaces 8 mg/m² (as lead)

The National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999 Guideline on the Investigation Levels for Soil and Groundwater sets a limit of 300 ppm lead in soils for "standard" residential land-use. This limit is based on both Human Health and Environmental considerations.

Air

The NOHSC (National Occupational Health & Safety Commission) maximum allowable TWA (Time Weighted Average) concentration for airborne lead (inorganic dusts and fumes) is 0.15 mg/m^3, however some lead compounds have lower levels. The ACGIH (American Conference of Governmental Industrial Hygienists have adopted a Threshold Limit Value (Time Weighted Average) of 0.05 mg/m^3 for lead and inorganic lead compounds as lead.

Control Measures

When high lead levels are encountered control measures should be put in place which are appropriate to the particular situation, in many cases this may consist of a few simple low cost precautions, in some cases removal by experienced contractors working to detailed procedures with air monitoring and independent supervision is required.

The disposal of lead contaminated material should be in accordance with current legislation and guidance.

SLR can provide expert advice, air monitoring, sampling and project management on lead related issues.

PCBs (POLYCHLORINATED BIPHENYLS)

Description, Properties and Uses

PCBs is an abbreviation for Polychlorinated Biphenyls, a group of synthetic chlorinated organic compounds commonly used as non-flammable oils in electrical equipment.

PCBs were commonly used as insulators in electrical capacitors and transformers but were also used in a wide range of other products that took advantage of their stability. Normally the PCBs are held in a metal container carrying no label signifying PCB content.

Small PCB filled capacitors were fitted to electric motors, welders, and fluorescent lights. Typically they are small metal containers holding about 50 millilitres of PCB. Large oil cooled transformers may contain many litres of PCBs.

Health Hazard of PCBs

PCBs are suspected human carcinogens and are a serious health problem due to their persistence in the environment, their potential for chronic or delayed toxicity and their accumulation in human and animal tissues. They can enter the body in three ways; by absorption through the skin, by inhalation of the vapour of heated PCBs (not a problem at room temperature), and by swallowing contaminated food or drink. Once PCBs are in the body they tend to lodge in the body fat and stay there for a considerable time.

Exposure to PCBs can cause a range of health problems whose effects increase with the duration of exposure and concentration levels.

PCBs are proven animal carcinogens and suspected human carcinogens. The results of exposure may include liver damage, respiratory disorders, chloracne (a severe skin rash), eczema and skin discolouration. PCBs have also been associated with thyroid gland disorders, muscle and joint pain, headaches, nausea, loss of appetite, abdominal pain, and are potentially related to reproductive problems in humans. Pregnant women should avoid PCB polluted areas.

PCB liquid and vapour is moderately irritating to the eyes.

Synthetic Mineral Fibres (SMF) - Description, Properties and Uses

Synthetic Mineral Fibre is a general term used to describe amorphous (non-crystalline) silicate fibres which are manufactured from minerals such as glass, rock, alumina and silica. The manufacturing methods determine the fibre diameters. SMF do not break lengthwise into finer fibres (an important characteristic of asbestos), but break transversely into shorter fibres. Fibre diameter affects both the performance characteristics and the health effects.

The two basic forms of SMF insulation are bonded and unbonded. The bonded form is where adhesives or cements have been applied to the SMF and the product has a specific shape. The unbonded form has no adhesive or cements and the SMF is loose material. The unbonded form can be packed loose or mixed with adhesives or cements before, or during, installation.

Continuous Glass Filaments are used in textiles and in reinforced plastics and concretes. Typical applications are swimming pools, boats, surfboards and plumbing materials. Very few respirable SMF are present in such materials which have a diameter range of 10-30 microns.

Glasswool is generally manufactured to a nominal fibre diameter of between 5-8mm (micrometres), but a percentage of respirable size fibres (less than 3 micron diameter) is present in such materials. Glasswool is mainly used as bonded materials which include preformed insulation batts in ceiling and wall applications, insulation blankets or batts around air conditioning ducts and preformed sectional pipe insulation around hot or chilled water pipes.

Rockwool fibre diameter range is similar to glassfibre but with a higher percentage of respirable fibres present. Rockwool is manufactured in both bonded and unbonded materials as preformed insulation batts in ceilings and cavity walls, insulation blankets or batts around air conditioning ducts, lagging around pipes in preformed pipe sections (bonded materials), mixed with cement as sprayed fire production in multi-storey buildings and as loose-fill material or sprayed into ceiling and cavity spaces of buildings (unbonded materials).

Ceramic Fibres typical diameter range is 0.2-8.0mm with a large proportion of respirable fibres. Ceramic fibres are often used in a variety of high temperature applications as the refractory lining of furnaces, kilns and other industrial heaters and in some specialised applications as blankets, woven textiles rope, braid, boards, mastics, preformed shapes and other specialised materials.

Common trade names are Kaowool and Fibrefrax.

Health Effects of SMF

Irritation: Synthetic Mineral Fibres cause irritation to the skin and upper respiratory tract. This effect is mainly associated with the larger diameter fibres (greater than 4 microns). Eye irritation may also occur.

Long Term Effects: Glassfibre, Rockwool, Slagwool and Ceramic Fibre are regarded as possible human carcinogens as classified by the International Agency for Research on Cancer (IARC), even though evidence is not conclusive. Continuous glass filaments are not included in this classification as no risk of lung cancer has been found in this sector of the industry.

In the present day, with the very low exposures in the usage of SMF, the health risk is minimal provided SMF work is carried out in accordance with the National Code of Practice and compliance is maintained with the exposure standards.

Fibre Characteristics: The important factors which determine whether SMF can cause lung cancer include the fibre diameter and the durability of the SMF in the body. Only fibres less than 3 microns in diameter are respirable and able to penetrate into the lungs where disease could be initiated.

Chemical composition and fibre size determine durability in the lungs: SMF are much less durable in lung fluids than asbestos. Finer fibres of the same material are less durable than larger fibres. Ceramic fibres are more durable than rockwool and glassfibre. SMF may dissolve in the lung fluid within 1 to 6 years compared with about 100 years for asbestos.

Exposure Standard SMF

The National Occupational Health and Safety Commission (NOHSC), National Standard and National Code of Practice for the Safe Use of Synthetic Mineral Fibres sets a time-weighted average (TWA) exposure standard of 0.5 respirable fibres per millimetre of air (f/mL) to all forms of Synthetic Mineral Fibres (Glasswool, Rockwool and Ceramic Fibres).

In addition, an exposure standard of 2mg/m³ (TWA) of inspirable dust shall be applied to minimise upper respiratory tract irritations from largely non-respirable fibre. This inspirable standard is not to take precedence over the respirable fibre standard.

SLR Consulting can carry out the air monitoring to determine the airborne concentration of respirable fibres in accordance with the NOHSC 'Guidance Note on the Membrane Filter Method for the Estimation of Airborne Synthetic Mineral Fibres'.

Personal Protection and Work Procedures for SMF

- Appropriate protective clothing and respiratory protection is required when working with SMF.
- Handling procedures should minimise airborne fibre levels. The procedures will vary somewhat depending on the application.

Sensitive Equipment: The dust and fibres from SMF lined air conditioning ducts may cause problems in areas when sensitive equipment is housed, for example, computer rooms. Dust and fibre levels should be checked regularly**.**

Collection, Transport and Disposal

PCBs must be handled with care. They are very penetrating and will pass through some types of plastic gloves. When collecting PCBs appropriate personal protective equipment (PPE) must be worn.

PCBs are assumed to be present in fluorescent light fittings unless inspection indicates otherwise. Removal requires the following:

- Prior to demolition when the power is disconnected inspect the light fittings.
- Metal PCB containing capacitors are to be removed, placed in plastic lined 200 Litre drums, sealed and disposed of as PCB Scheduled Waste. Any light fittings that show signs of oil staining from capacitors are to be disposed of as PCB contaminated waste.
- Protective clothing including PCB resistant gloves to be worn.
- Contaminated gloves and disposable coveralls to be disposed of as PCB contaminated waste.
- PCBs are covered by a Chemical Control Order under the Environmentally Hazardous Chemicals Act 1985. The labelling, storage, transport and disposal of PCBs is highly regulated, and professional advice should be sought on how to deal with these materials.
- Contractors licensed to transport and handle PCBs must be used for transport and disposal.

Register and Management Plan

The Environment Protection & Heritage Council's *Polychlorinated Biphenyls Management Plan, Revised Edition April 2003* requires that a risk-based strategy for equipment containing PCBs be adopted. The elements of this strategy are surveying, testing and removal of identified high risk equipment. **There is a timetable by which surveys are to be completed**.

Property owners and managers should have a PCB register. This could form part of their Hazardous Materials Register for the site. Where PCBs are identified a PCB Hazard Management Plan should be in place. This could be a part of the Hazardous Materials Management Plan for the site.

ASIA PACIFIC OFFICES

BRISBANE
Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

DARWIN
Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

GOLD COAST
Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

MELBOURNE
Suite 2, 2 Domville Avenue
Hawthorn VIC 3122
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

PERTH
Ground Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

SYDNEY
2 Lincoln Street
Lane Cove NSW 2066
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

TOWNSVILLE
Level 1, 514 Sturt Street
Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

TOWNSVILLE SOUTH
12 Cannan Street
Townsville South QLD 4810
Australia
T: +61 7 4772 6500

WOLLONGONG
Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 404 939 922

AUCKLAND
68 Beach Road
Auckland 1010
New Zealand
T: +64 27 441 7849

NELSON
6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628