Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Hazardous Building Materials Assessment –
Early Works

Dubbo Base Hospital
Myall Street, Dubbo

Prepared for
Health Infrastructure

Project 72811.01
June 2012

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		25 June 2012

NCS INTERNATIONAL CERTIFIED QUALITY MANAGEMENT SYSTEM

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Table of Contents

Page

Report on Hazardous Building Materials Assessment – Early Works
Dubbo Base Hospital
Myall Street, Dubbo

1. Introduction

This report presents the results of a Hazardous Building Materials Assessment associated with the proposed redevelopment works at Dubbo Base Hospital, Myall Street, Dubbo. The work was commissioned by Health Infrastructure, in consultation with TSA Management Pty Ltd.

The redevelopment project involves the demolition of several existing buildings on the hospital campus to enable new buildings to be constructed. The buildings to be demolished as part of the early stage redevelopment works on the site include:

- Building 9: Electrician's Store which is adjacent to the Mortuary;
- Building 10: Main Switchroom and Generator;
- Building 11: Old Boiler House and Medical Records (including external chimney);
- Building 12: New Boiler House;
- Building 13: Laundry; and
- Building 14: Nurses Accommodation.

The numbering scheme is a hospital-wide scheme to identify each building on the campus. The locations of the buildings are shown on Drawing EWH1 in Appendix A.

The Hazardous Building Materials Assessment was undertaken to provide information on issues associated with demolition of the buildings and included a review of existing information provided by the Western NSW Local Health District (formerly the Greater Western Area Health Service), site inspections/sampling by an experienced engineer, laboratory testing of a limited number of samples and the preparation of this report.

For the purposes of this report, hazardous building materials can be described as asbestos-containing materials in both bonded and friable form, lead-based paints, phenols associated with electrical fittings, and polychlorinated biphenyls (PCBs) within the capacitors of fluorescent light fittings.

Douglas Partners Pty Ltd has recently been involved in a geotechnical investigation, contamination assessment, groundwater impact assessment, preliminary hazard analysis and hazardous building materials assessment for the main-stage demolition works. Each of these elements are reported separately.

2. Site Description

2.1 General Site

Dubbo Base Hospital is located to the north-east of the city centre and is bounded by Myall Street to the south, the Coonamble-Dubbo Railway line to the west, residential dwellings to the east, and vacant land to the north. The natural ground surface levels at the site appear to fall gently to the south and west.

At the time of the current investigation, the main hospital buildings were located in the southern and central portions of the site. A car park was located in the eastern portion, and the western and northern sections of the site were generally vacant. The buildings to be demolished during the early works stage of the redevelopment are located in the northern area of the main hospital campus as shown on Drawing EWH1 in Appendix A.

The portion of the site on which the development works are proposed consists of Lot 12 in DP 1159243 in the Parish of Dubbo, County of Lincoln.

2.2 Buildings Proposed for Demolition

Descriptions of the buildings proposed for demolition during the early works stage of the redevelopment are provided in Table 1.

Table 1: Descriptions of Buildings to be Demolished During Early Works

Building No.	Building Name	Description
9	Electrician's Store	Small brick building
10	Main Switchroom/Generator	2-storey brick, attached to Building 11
11	Old Boiler/Medical Records	2-storey brick, attached to Buildings 10 & 12, old chimney
12	New Boiler House	2-storey brick & metal clad, attached to Buildings 11 & 13
13	Laundry	Single storey brick, attached to Building 12
14	Nurse's Accommodation	3-storey brick, tile roof, free-standing

3. Potential Hazardous Building Materials

3.1 Asbestos

Asbestos is a naturally occurring mineral rock that was mined in Australia from the 1940s to late 1980s and used in a variety of materials and products. Unlike other rocks made up of small particles, asbestos is made up of fibres so thin that they can be invisible to the unaided eye. If asbestos materials or products are disturbed, these fibres can be released into the air and remain for extended periods of time where they can be inhaled into the lungs.

Asbestos was considered a valuable product due to its resistance to fire, moisture, chemicals and heat and also its suitability as an insulation material. Due to asbestos being constructed of fibres, woven asbestos materials and products such as blankets, rope and even clothing were widely used. However, due to the physical properties of the fibres, and the potentially harmful impact on human health, a national ban on asbestos came into effect on 31 December 2003.

The common forms of asbestos include:

- Chrysotile (white asbestos);
- Amosite (brown or grey asbestos); and
- Crocidolite (blue asbestos).

Asbestos has been found in thousands of materials and products throughout Australia. Within a house or a building, asbestos is most commonly found in asbestos cement sheeting, also known as 'fibro'. Asbestos cement sheeting can be found in a flat form in internal and external walls and ceilings. A corrugated form of asbestos cement sheeting, also known as 'super six' or ''super eight', is commonly found on roofs, as fences and sometimes as external wall cladding.

Asbestos is commonly found in other places within buildings including:

- External guttering, downpipes and vent pipes;
- Backing to electrical switchboards in a black product known as Zelemite;
- Bakelite products such as light fittings, switches etc.;
- Vinyl sheeting and vinyl tiles used as floor coverings;
- Insulations to heater banks, air conditioning ducting and pipes;
- Gaskets to pipes and pipe joints;
- Certain paints such as Galbestos;
- Mastics and glues behind wall tiles and vinyl;
- Waterproofing in windows;
- Roof tiles; and
- Woven textile seals to old ovens, grillers and kitchen appliances.

Materials containing asbestos can be referred to as asbestos-containing materials (ACM). Bonded ACM refers to materials in which the asbestos fibres are within a solid matrix and therefore not able to be ingested unless the matrix is broken and the fibres released. Examples of bonded ACM include asbestos cement sheeting, moulded pipes etc.

Friable ACM refers to materials in which the fibres are not bonded within a strong solid matrix and disturbance of the material may readily result in the release of fibres. An example of friable ACM is lagging (insulation) around pipes.

Specific precautions need to be followed when working with ACM and demolition contractors are generally required to be licensed by WorkCover NSW.

3.2 Lead-Based Paints

Paints used in houses and other buildings constructed before 1970 are likely to contain high lead concentrations (typically above 1% w/w). Before 1950, certain paints contained as much as 50% lead. The National Health and Medical Research Council (NHMRC) recommends a maximum lead concentration of 0.1% in domestic paints.

Exposure to lead-based paint only becomes a risk if it is flaking or chalking, or when the paint is disturbed (e.g. removed by sanding). Materials that contain lead-based paints should be, as far as possible, removed or disposed of intact with minimal disturbance of the painted surfaces. Appropriate precautions are required to reduce the risk of ingestion during demolition activities.

3.3 Phenols

The main source of Phenols within buildings is Bakelite products such as light fittings and electrical switches. Bakelite is an early form of plastic formed by a reaction between Phenol and Formaldehyde, and incorporates some form of fibrous product such as paper, cotton, glass and even asbestos. Bakelite should be handled in a similar way to bonded asbestos.

3.4 Polychlorinated Biphenyls (PCBs)

PCBs can range in appearance from colourless oily liquids to yellow and black resins, depending on the chlorine content. PCBs have very high chemical, thermal and biological stability, a very low vapour pressure and high dielectric constants. As a result of these properties PCBs were used during the 1950s, 1960s and 1970s for a variety of purposes including:

- Coolant-insulation fluids in transformers and capacitors;
- Impregnation of cotton and asbestos;
- Plasticisers; and
- Additives for epoxy paints.

The main source of PCBs within buildings are electrical transformers and capacitors in switchboards, generators and fluorescent light fittings.

4. Existing Asbestos Register

An asbestos audit of all buildings on the Dubbo Base Hospital campus was undertaken by the former Greater Western Area Health Service in 2008. The audit report, including the asbestos register prepared during the audit, was provided to Douglas Partners during the current assessment. Visual inspection of the ACM in each building subject to the current assessment was undertaken. However, additional sampling and analysis was considered unwarranted, particularly in the sensitive buildings such as the Nurses Accommodation and Laundry.

5. Current Field Work

The current assessment was undertaken by an experienced engineer on 22 May 2012. The assessment initially involved a discussion with hospital maintenance staff in relation to the existing buildings and possible hazardous materials within. The asbestos register was also reviewed at this time.

Each building was inspected and photographed by the engineer. The asbestos register was used to assess the locations of ACM to confirm that the register was still representative of site conditions. Samples of paint were obtained from three locations in which the paint was in poor condition and peeling. The sample locations are described in Table 2.

Table 2: Descriptions of Paint Sample Locations

Sample Identification	Location
P1	Common room on top level of Nurses Accommodation
P2	A bedroom on top level of Nurses Accommodation
P3	Door of Old Boiler Room

It was confirmed with maintenance staff that all PCB capacitors in the fluorescent light fittings have been replaced as part of a maintenance programme. As such, all fluorescent light fittings are not expected to contain PCBs.

6. Laboratory Testing

The three paint samples collected from the site were sent to a NATA accredited laboratory and were tested for lead content. The results of the analysis are summarised in Table 3.

Table 3: Summary of Laboratory Test Results

Sample Identification	Lead Concentration (%w/w)
P1	<0.05
P2	<0.05
P3	2.3

The detailed results are included in Appendix C.

7. Results of Assessment

7.1 Asbestos

Areas in which ACM has been identified in the buildings proposed for demolition, as per the current asbestos register for the site, are listed in Tables 4 to 9.

Table 4: Asbestos Register – Building 9 – Electrician's Store

Location of ACM	Description	Bonded or Friable
Internal ceiling lining	Flat asbestos-cement sheeting	Bonded

Table 5: Asbestos Register – Building 10 – Main Switchroom/Generator

Location of ACM	Description	Bonded or Friable
None identified	N/A	N/A

Table 6: Asbestos Register – Building 11 – Old Boiler House/Medical Records

Location of ACM	Description	Bonded or Friable
Chimney	Moulded inlet pipe	Bonded
None identified within building	N/A	N/A

Table 7: Asbestos Register – Building 12 – New Boiler House

Location of ACM	Description	Bonded or Friable
Storage cupboard	Bakelite switches	Bonded

Table 8: Asbestos Register – Building 13 – Laundry

Location of ACM	Description	Bonded or Friable
External eve lining	Flat asbestos-cement sheeting	Bonded
Central floor	Asbestos vinyl floor tiles	Bonded

Table 9: Asbestos Register – Building 14 – Nurses Accommodation

Location of ACM	Description	Bonded or Friable
External eve lining	Flat asbestos-cement sheeting	Bonded
Ceiling space	Pipe insulation	Friable
Ceiling lining rooms 48, 48A	Flat asbestos-cement sheeting	Bonded
Level 3 switchboard	Bakelite switches	Bonded
Ceiling lining rooms 47, 47A	Flat asbestos-cement sheeting	Bonded
Ground floor laundry	Flat asbestos-cement sheeting	Bonded
Ground floor bathroom	Asbestos-cement partitions	Bonded
Main service riser room	Pipe insulation	Friable
Toilets – hot water riser	Pipe insulation	Friable
Corridor heaters – riser	Pipe insulation	Friable
Corridor heaters – lining to riser	Flat asbestos-cement sheeting	Bonded
Western end heater	Pipe insulation	Friable
Ground floor plant room – heater	Pipe and unit insulation	Friable
Sub-floor space	Pipe insulation	Friable

The inspections undertaken as part of the current assessment generally confirmed that the ACM listed in the register remain on site. The presence of ACM within the products listed in the register was assumed to be correct; additional laboratory analysis was considered unwarranted.

7.2 Lead-Based Paints

One of the three paint samples (P3) had a significant concentration of lead. The other two samples had low concentrations. It is therefore likely that sample P3 was taken from older paint whereas the other samples were collected from areas in which either lead-based paint had been covered with a more modern variety or the paint application may have occurred following the cessation of lead-based paint use.

Due to the age of the hospital buildings it is recommended that all paint be assumed to be lead-based and appropriate safety precautions (e.g. coveralls, face mask, eye protection etc.) be adopted by the demolition contractor during the removal of painted materials. Even if the upper layers of paint are not lead-based it is possible that lead-based paint was used originally and still remains. Disposal of lead-based painted items should be undertaken at a licensed landfill in a manner that minimises dust generation.

7.3 Phenols

Several Bakelite light fittings were observed within the Nurses Accommodation building. Numerous Bakelite electrical switches and components were observed in the New Boiler Room and Nurses Accommodation building. These switches contain phenolic compounds and also may potentially contain asbestos fibres. These products should remain intact and be disposed of at an appropriate landfill facility. The products should not be broken, cut or damaged as the release of fibres is a potential health hazard.

7.4 Polychlorinated Biphenyls (PCBs)

Hospital maintenance staff have confirmed that all PCB-containing capacitors have been removed from light fittings throughout the entire hospital. As such, specific storage and disposal practices should not be required for the light fittings. Confirmation of this status should be made during light fitting removal (i.e. the capacitors within the fittings should be checked unless marked as PCB-free).

It is possible that electrical infrastructure within the buildings and within the generator will contain PCBs. An assessment of this infrastructure was not possible during the field work due to safety restrictions associated with handling such infrastructure. The electrician engaged to disconnect and remove the electrical items should make an assessment of the presence of PCBs and ensure appropriate storage and handling procedures are employed for the removal works.

8. Recommendations

The removal of ACM from the impacted buildings should be carried out prior to the commencement of large-scale demolition activities and in accordance with the requirements of the WorkCover NSW and the National Occupational Health and Safety Commission (NOHSC) *Code of Practice for the Safe Removal of Asbestos 2nd Edition* [NOHSC:2002(2005)]. This work will need to be undertaken by a contractor with an appropriate asbestos-removal licence.

At the completion of ACM removal, a visual clearance inspection must be carried out prior to each building being re-opened for demolition. Written certification detailing the results of the visual clearance inspection will need to be provided by an Occupational Hygienist or other experienced consultant.

All fluorescent light capacitors are understood to be PCB-free as confirmed with hospital maintenance staff. Specific procedures for the removal of PCB capacitors from the light fittings are therefore likely to be unnecessary. Any PCBs encountered in other electrical infrastructure should be stored in a sealed metal drum for transport to a facility specialising in Base Catalysed Destruction (BCD) technology to destroy the PCB compounds.

Lead-based paint was identified in one location and is likely to be present elsewhere in the buildings. As previously mentioned, all paint should be conservatively assumed to contain lead and appropriate precautions taken during handling to reduce the risk of dust generation and ingestion. Painted building elements should be disposed of at a licensed landfill.

9. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for a project at Dubbo Base Hospital in accordance with DP's proposal dated 2 May 2012 and acceptance received from Health Infrastructure. The report is provided for the use of Health Infrastructure for this project only and for the purpose(s) described in the report. It should not be used for other projects or by a third party.

The results provided in the report are indicative of the conditions observed at the time of the assessment and only in accessible areas. Conditions may change subsequent to the assessment and therefore the demolition contractor should make its own assessment of hazardous materials on the site. In preparing this report DP has necessarily relied upon information, both verbal and written, provided by the client and/or their agents.

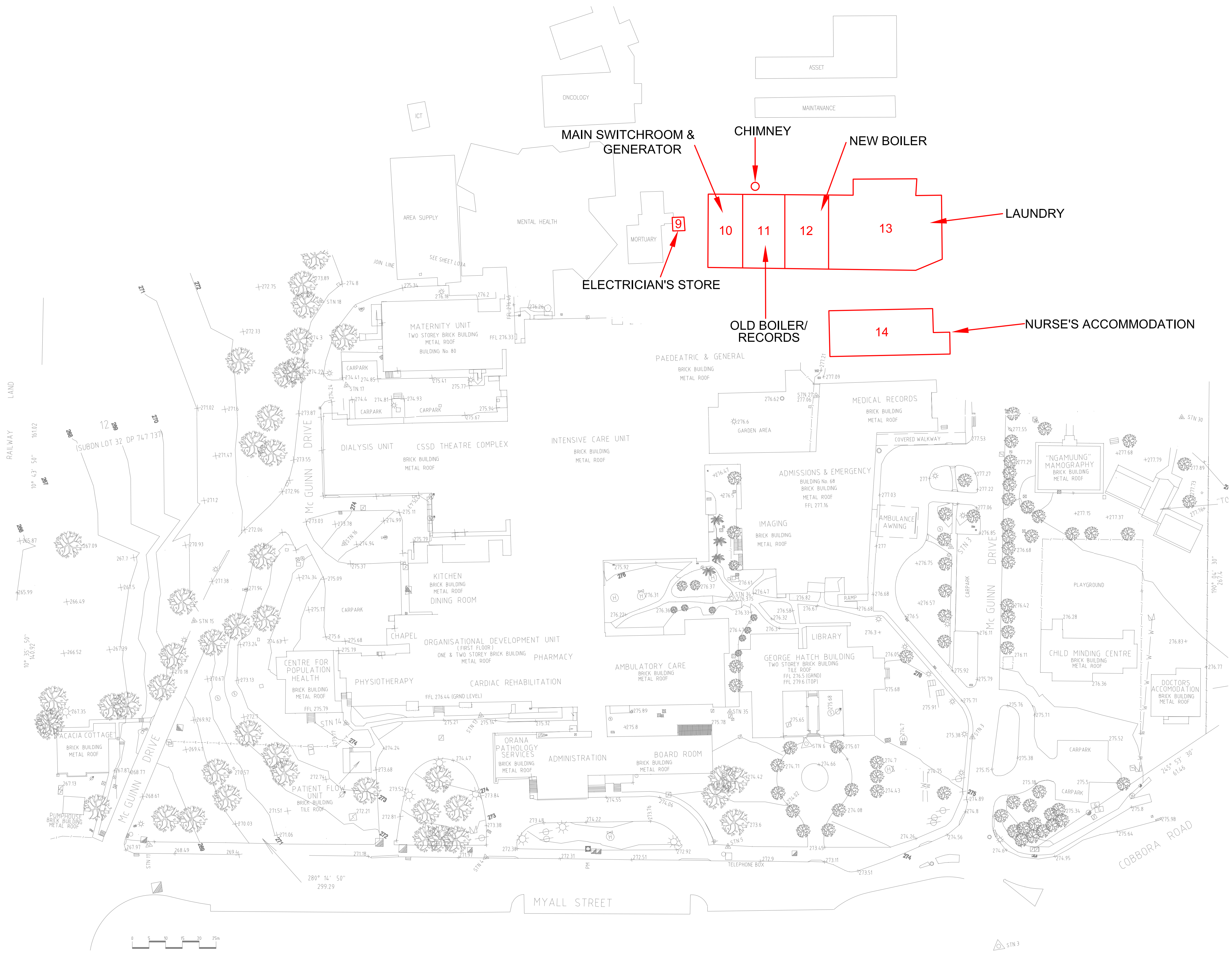
This report must be read in conjunction with all of the attached notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by a statement, interpretation, outcome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

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

Douglas Partners Pty Ltd

Appendix A

Drawing



Locality Plan

Douglas Partners — Geotechnics / Environment / Groundwater	CLIENT: Health Infrastructure		TITLE: **Hazardous Building Materials Assessment - Early Works** **Dubbo Base Hospital** **Myall Street, DUBBO**
	OFFICE: Sydney	DRAWN BY: PMO	
	SCALE: 1:1250@A3	DATE: 8.06.2012	

PROJECT No:	72811.01
DRAWING No:	EWH1
REVISION:	0

Appendix B

Site Photographs

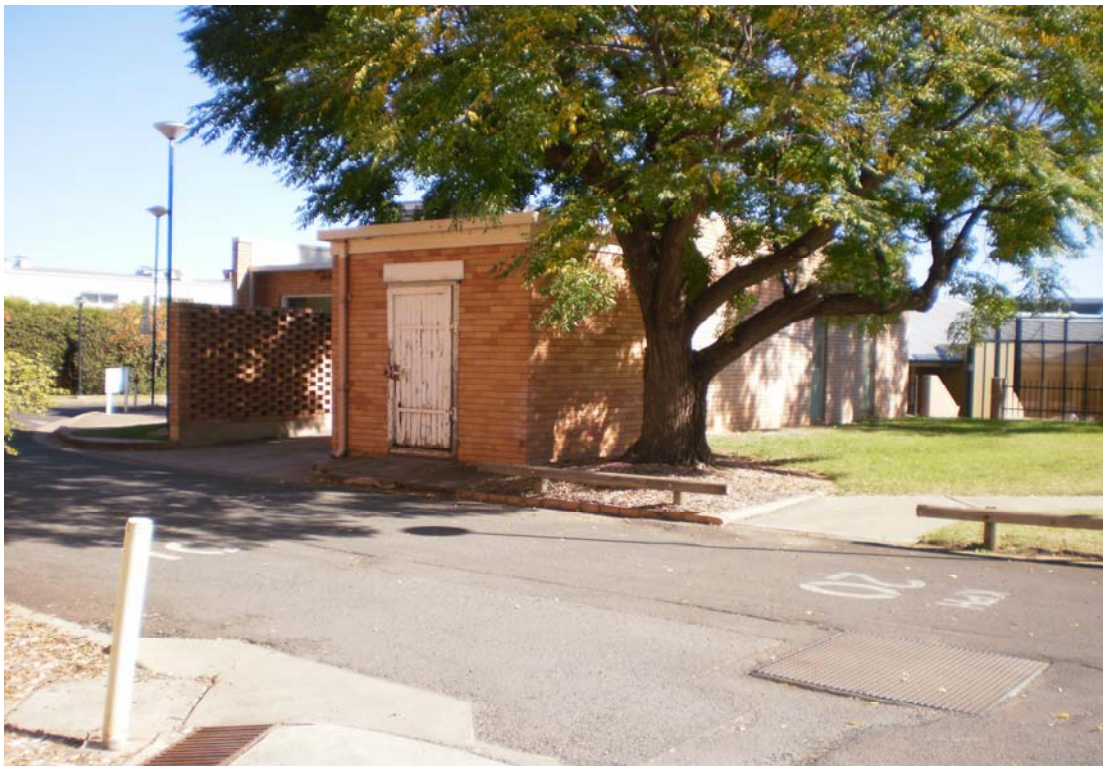


Photo 9/1 - External view of electrician's store

Photo 9/2 - Bonded asbestos ceiling inside electrician's store

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 9** **Electrician's Store** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 9/1 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 10/1 - Main switchroom and generator room through white doors

Photo 10/2 - Substations outside building

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 10** **Main Switchroom/Generator** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 10/1 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 10/3 - Pipe with exposed insulation


Photo 10/4 - Close up view of exposed insulation (assumed not to be ACM)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 10** **Main Switchroom/Generator** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 10/2 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 11/1 - Old boiler room adjacent to smoke stack (bonded asbestos pipes from building to stack)

Photo 11/2 - Internal view of smoke stack

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 11** **Old Boiler Room/Records** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 11/1 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 11/3 - Records section within building

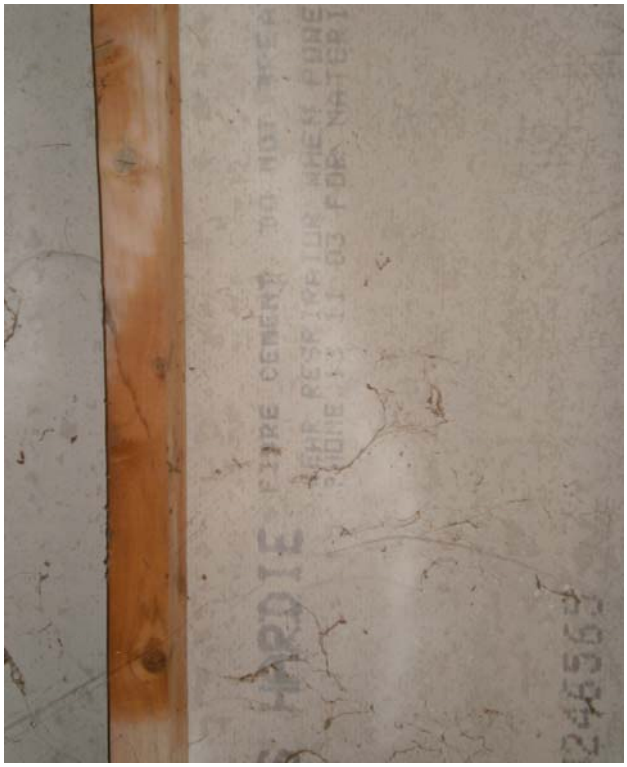


Photo 11/4 - Modern wall partitions (non-asbestos)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 11** **Old Boiler Room/Records** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 11/2 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 12/1 - New boiler room (steel panelling)

Photo 12/2 - Bakelite switches (potentially bonded asbestos + phenol)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 12** **New Boiler Room** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 12/1 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 12/3 - Electrical switchboard (internal access not available)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 12** **New Boiler Room** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 12/2 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 13/1 - Brick laundry building

Photo 13/2 - Bonded asbestos eve lining

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 13** **Laundry** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 13/1 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 13/3 - Asbestos vinyl floor tiles

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 13** **Laundry** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 13/2 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 14/1 - External view of building

Photo 14/2 - Typical corridor view

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 14** **Nurse's Accommodation** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 14/1 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 14/3 - Typical view of bedroom

Photo 14/4 - Bakelite light fitting (potentially bonded asbestos + phenol)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 14** **Nurse's Accommodation** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 14/2 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 14/5 - Typical corridor heater (friable asbestos lagging on concealed pipes)

Photo 14/6 - Manhole to ceiling space (friable asbestos lagging on pipes in ceiling)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 14** **Nurse's Accommodation** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 14/3 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 14/7 - Typical example of peeling paint (potentially lead-based)

Photo 14/8 - View of bonded asbestos eve lining

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 14** **Nurse's Accommodation** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 14/4 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 14/9 - Electrical switchboard (potentially bonded asbestos mounting board)

Photo 14/10 - Heat exchange unit (internal and external friable asbestos lagging)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 14** **Nurse's Accommodation** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 14/5 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 14/11 - Friable asbestos lagging in underfloor area

Photo 14/12 - Friable asbestos lagging in underfloor area

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 14** **Nurse's Accommodation** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 14/6 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 14/13 - Friable asbestos lagging in underfloor area (note lagging on ground)

Photo 14/14 - Electrical switch box

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 14** **Nurse's Accommodation** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 14/7 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 14/15 - Bonded asbestos partitions in bathroom

Photo 14/16 - Friable asbestos pipe lagging in bathroom

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 14** **Nurse's Accommodation** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 14/8 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Photo 14/17 - Bonded asbestos partitions in laundry

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs - Building 14** **Nurse's Accommodation** **Dubbo Base Hospital**	PROJECT: 72811.01 PLATE No: 14/9 REV: 0
	CLIENT: Health Infrastructure	DATE: 22-May-12

Appendix C

Laboratory Test Results

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 73806

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Peter Oitmaa

Sample log in details:

Your Reference:	**72811, Dubbo**		
No. of samples:	4 soils, 3 paints		
Date samples received / completed instructions received	23/05/12	/	23/05/12

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: / Issue Date:	30/05/12	/	28/05/12
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Rhian Morgan
Reporting Supervisor

Hinoko Miyazaki
Chemist

Alex MacLean
Chemist

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Lead in Paint				
Our Reference:	UNITS	73806-1	73806-2	73806-3
Your Reference	----------	P1	P2	P3
Depth	----------	-	-	-
Date Sampled		21/05/2012	21/05/2012	21/05/2012
Type of sample		Paint	Paint	Paint
Lead in paint	%w/w	<0.05	<0.05	2.3

PAHs in Soil					
Our Reference:	UNITS	73806-4	73806-5	73806-6	73806-7
Your Reference	----------	BH101	BH103	BH104	BH104
Depth	----------	0.2	0.2	0.2	0.5
Date Sampled		22/05/2012	22/05/2013	22/05/2014	22/05/2015
Type of sample		soil	soil	soil	soil
Date extracted	-	24/05/2012	24/05/2012	24/05/2012	24/05/2012
Date analysed	-	26/05/2012	26/05/2012	26/05/2012	26/05/2012
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	70	101	99	101

Acid Extractable metals in soil					
Our Reference:	UNITS	73806-4	73806-5	73806-6	73806-7
Your Reference	----------	BH101	BH103	BH104	BH104
Depth	----------	0.2	0.2	0.2	0.5
Date Sampled		22/05/2012	22/05/2013	22/05/2014	22/05/2015
Type of sample		soil	soil	soil	soil
Date digested	-	24/05/2012	24/05/2012	24/05/2012	24/05/2012
Date analysed	-	24/05/2012	24/05/2012	24/05/2012	24/05/2012
Arsenic	mg/kg	<4	<4	<4	<4
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	8	7	11	10
Copper	mg/kg	4	6	6	5
Lead	mg/kg	5	5	6	4
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	7	8	5
Zinc	mg/kg	12	24	15	7

Moisture Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	73806-4 BH101 0.2 22/05/2012 soil	73806-5 BH103 0.2 22/05/2013 soil	73806-6 BH104 0.2 22/05/2014 soil	73806-7 BH104 0.5 22/05/2015 soil
Date prepared	-	24/05/2012	24/05/2012	24/05/2012	24/05/2012
Date analysed	-	25/05/2012	25/05/2012	25/05/2012	25/05/2012
Moisture	%	4.1	4.8	4.2	13

Method ID	Methodology Summary
Metals-004	Digestion of Paint chips/scrapings/liquids for Metals determination by ICP-AES/MS and or CV/AAS.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.

QUALITY CONTROL Lead in Paint	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Lead in paint	%w/w	0.05	Metals-004	<0.05	[NT]	[NT]	LCS-1	99%
QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/05/2012	[NT]	[NT]	LCS-1	24/05/2012
Date analysed	-			26/05/2012	[NT]	[NT]	LCS-1	26/05/2012
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	104%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	105%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	102%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	106%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	107%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	103%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	[NT]	[NT]	LCS-1	110%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012 subset	103	[NT]	[NT]	LCS-1	98%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date digested	-			24/05/2012	[NT]	[NT]	LCS-1	24/05/2012
Date analysed	-			24/05/2012	[NT]	[NT]	LCS-1	24/05/2012
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	LCS-1	99%
Cadmium	mg/kg	0.5	Metals-020 ICP-AES	<0.5	[NT]	[NT]	LCS-1	94%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	98%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	98%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	98%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	LCS-1	99%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	98%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	96%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			[NT]
Date analysed	-			[NT]
Moisture	%	0.1	Inorg-008	[NT]

Report Comments:

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

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

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

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the 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.

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

SAMPLE RECEIPT ADVICE

Client:

Douglas Partners
96 Hermitage Rd
West Ryde NSW 2114

ph: 02 9809 0666
Fax: 02 9809 4095

Attention: Peter Oitmaa

Sample log in details:

Your reference:	**72811, Dubbo**
Envirolab Reference:	**73806**
Date received:	23/05/12
Date results expected to be reported:	**30/05/12**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	4 soils, 3 paints
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice
Sampling Date Provided:	YES

Comments:

Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: DUBBO .....
Project No: 72811..... Sampler: ...CF .....
Project Mgr: PMO...Mob. Phone: 0409 242 497.....
Email: Peter.oitmaa@douglaspartners.com.au .....
Date Required: Standard..... Lab Quote No. .....

To:Envirolab Services
12 Ashley Street, Chatswood NSW 2068
Attn: Tania Notaras
Phone: 02 9910 6200 Fax: 02 9910 6201
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W – water	Container type	Analytes: Heavy Metals	lead	PAH								Notes
P1		1	21/5	–	P		X									} Paint samples.
P2		2		–	P		X									
P3		3	↓	–	P		X									
BH 101	0.2	4	22/5	S	G	X		X								
BH 103	0.2	5		S	G	X		X								
BH 104	0.2	6		S	G	X		X								
BH 104	0.5	7	↓	S	G	X		X								

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 73806
Date Received: 23.05.12
Time Received: 10.00
Received by: Jia Liu
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Lab Report No. .....
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114
Phone: (02) 9809 0666
Fax: (02) 9809 4095

Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time:
C Falla		23.5.12 1pm		

Appendix D

Notes About This Report

About this Report

Douglas Partners

Introduction

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

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

Copyright

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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