Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Asbestos Management Plan

Proposed University Redevelopment
Building J03, Electrical Engineering, Darlington

Prepared for
Laing O'Rourke Australia Construction Pty Ltd

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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.

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Appendix A: Drawings and About This Report

Report on Asbestos Management Plan
Proposed University Redevelopment
Building J03, Electrical Engineering, Darlington

1. Introduction

Douglas Partners Pty Ltd (DP) was commissioned by Laing O'Rourke to prepare this Asbestos Management Plan (AMP) for the proposed university redevelopment at Building J03 – Electrical Engineering, Darlington (herein referred to as 'the larger development site') (refer to Drawing 1, Appendix A). The area to which this AMP relates is located in the north west of the larger development site ('the site') as shown on Drawing 1.

Investigations and observations made during previous investigations by DP have identified a fragment of bonded asbestos-containing material (ACM) in the filling around TP205 (see Drawing 1, Appendix A) and that there is an unacceptable risk of additional asbestos contamination present in fill at the site that needs to be managed. Accordingly, remediation of the asbestos impacted material was proposed. Various remediation approaches are outlined in the Remediation Action Plan (RAP) for the site as documented in DP's report titled '*Revised Remediation Action Plan, Proposed University Facility Redevelopment, Building J03, Electrical Engineering, Darlington'*, dated November 2018, DP reference 85658.04.R.002.Rev2 (the RAP).

The AMP is required to assist in the operation of the site during the early stages of construction and specifically the management of asbestos impacted soils during the remediation process and must be read in conjunction with the RAP.

The purpose of the AMP is to describe the works required to safely control, excavate, stockpile and manage the asbestos impacted soils identified at the site in accordance with the RAP and applicable legislation. It has been drafted to reflect known information on the site with respect to asbestos contamination previously identified.

This AMP has been prepared in accordance with the requirements of SafeWork NSW and Condition B24 of State Significant Development (SSD) 8636 Development Consent.

1.1 Objective

The objective of this AMP is to assist with the management of the site, so the identified asbestos impacted soils are handled and managed in an acceptable manner. That is, with minimal human health and environmental impact and to a condition suitable for the proposed development. The plan therefore aims to:

- Include stringent requirements for controlling dust emissions in the development site so as not to affect the adjoining land;
- Mitigate impacts from the site on the environment and on public health and safety during asbestos related remediation works;
- Enhance the protection of workers involved with asbestos related remediation works, and other workers who may be present at the site during asbestos remediation works; and

- Render the site suitable for the proposed land use, in terms of asbestos impact.

1.2 Risks Associated with Asbestos

Asbestos has been linked to a number of adverse health conditions as discussed below. Health risks from asbestos are associated with inhalation of asbestos fibres. Management of emissions and / or inhalation of asbestos fibres is therefore the most appropriate method to mitigate health impacts from asbestos.

The following information is sourced from the Safe Work Australia document: *Asbestos-Related Disease Indicators*, May 2014 (pp.2):

"*Asbestosis and other asbestos-related diseases usually only occur following lengthy periods of exposure to high levels of asbestos fibres. Mesothelioma, on the other hand, can develop from short or lengthy periods of low or high concentrations of asbestos, although exposure to asbestos fibres does not make the development of the disease inevitable*."

"*It can take up to 40 years or more after initial asbestos exposure for disease caused by asbestos to become evident. Each asbestos-related disease differs in the extent of exposure to asbestos fibres and time between exposure and the onset of disease*.

- *Benign pleural disease takes at least seven years to develop following exposure to asbestos fibres and is only evident on chest x-rays. It generally causes no symptoms and does not require any treatment other than cessation of smoking and regular check-ups with a health professional.*
- *Asbestosis usually takes around 10 years or more to develop following heavy and prolonged exposure to asbestos (NHMRC, 2013) before the disease advances to a stage where symptoms become apparent. Although it is a chronic rather than a fatal disease, it is a serious condition that can lead to death from other causes such as respiratory or cardiac failure. Ongoing medical treatment is necessary to maintain good quality of life and to reduce the burden it places on the body's vital organs. People with asbestosis have a greater risk of developing lung cancer or mesothelioma than other people who have been exposed to asbestos fibres.*
- *Lung cancer can take 20 years or more before the cancer develops and asbestos is only one of many agents linked to its development (WHC, 2011). It is reported to occur only following levels of exposure similar to those for asbestosis and is strongly associated with workplace exposure to asbestos fibres (Queensland Health, 2002). It is much more likely to occur in people who smoke and/or who have asbestosis (CCV, 2011).*
- *Mesothelioma has the longest latency of any asbestos-related disease, usually taking between 20 and 40 years or more to develop. Symptoms of the disease usually only become evident when the disease has progressed to an advanced stage when treatment is ineffective and necessarily focussed at maintaining good quality of life for as long as possible*."

This management plan outlines steps to minimise the risks of asbestos outlined above.

2. Site Description

2.1 Site Description

The AMP site comprises the proposed excavation area and covers an approximate area of 0.4 hectare (ha) within the local government area of The City of Sydney. Former buildings at the site have been demolished between May and July 2018 and the site is currently a development site. The AMP site is part of the larger Faculty of Engineering site which covers an approximate area of 0.75 hectares at the University of Sydney. The site is bound by Maze Crescent to the west, the Seymour Centre to the north and university buildings to the south and east. The site locality and a location plan showing the site boundary is shown on Drawing 1, Appendix A. The site identification details are provided in Table 1 below.

Table 1: Site Identification Details

Item	Details
Site Owner	The University of Sydney
Site Address	96-148 City Road, Darlington
Current land use	University Facilities
Lot and Deposited Plan	Part Lot 1 D.P. 790620
LEP Planning Zone	SP2: Infrastructure
Approximate Investigation Area	~ 4000 m^2
Proposed future land-use	University Facilities

2.2 Previous Reports

The RAP and the following reports were reviewed for the preparation of this AMP:

- Douglas Partners (2016) Report on *Preliminary In Situ Waste Classification, Building J03 Electrical Engineering, Engineering Faculty Darlington Campus,* prepared for The University of Sydney, Report 85658.00.R002.Rev0 dated 4 November 2016 (DP, 2016a);
- Douglas Partners (2016) Report on *Geotechnical Investigation, Proposed University Facility Redevelopment, Building J03, Electrical Engineering, Darlington* prepared for The University of Sydney, Report 85658.00.R001.Rev0 dated 6 November 2016 (DP, 2016b);
- Douglas Partners (2018) Report on *Preliminary Site Investigation, Proposed University Facility Redevelopment, Building J03, Electrical Engineering, Darlington* prepared for Laing O'Rourke Australia Construction Pty Ltd, Report 85658.01.R.001.Rev0 dated 7 February 2018 (DP, 2018a);
- Douglas Partners (2018b) Report on *Detailed Site Investigation, Proposed University Facility Redevelopment, Building J03, Electrical Engineering, Darlington* prepared for Laing O'Rourke Australia Construction Pty Ltd, Report 85658.02.R.001.Rev0 dated 26 March 2018 (DP, 2018b); and
- Douglas Partners (2018c) Factual Report on *Supplementary Contamination Investigation, Proposed University Redevelopment, Building J03, Electrical Engineering, Darlington* prepared

for Laing O'Rourke Australia Construction Pty Ltd, Report 85658.04.R.001.Rev0 dated 23 November 2018 (DP, 2018c).

In summary, these reports have identified, with respect to asbestos contamination at the site, the presence of a fragment of bonded ACM on the ground surface near TP205 (See Drawing 1, Appendix A).

DP considers there is an unacceptable risk of additional asbestos contamination being present in fill at the site that will need to be managed as:

- Asbestos in fill is typically located in random discrete locations that are difficult to encounter by an investigation that relies on sampling soils at a finite number of discrete locations. This meant that more than 99.9% of fill was not sampled; and
- Most of the boreholes and test pits encountered fill that contained demolition rubble, which is typically associated with asbestos contamination.

It is noted that the RAP outlines the remediation action to be taken in regard to the fill around TP205.

3. Subsurface Conditions

The subsurface conditions observed on site are broadly summarised as follows:

FILLING:	Dark brown gravelly sand filling with building rubble (including brick, pipes, metal, asphaltic concrete, plastic and slag) in all test pits to a maximum depth of 0.8 m below ground level (bgl). Clayey sand and sandy clay filling with some sandstone, igneous and concrete gravel was observed in boreholes to a depth of 1.0 m bgl;
SHALY CLAY/ CLAY:	Light brown mottled red, shaly clay and orange brown clay with trace rootlets to depths between 0.1 m to 1.3 m bgl in TP201-TP207, GW1 and GW2;
SHALE/ LAMINITE:	Extremely low to very low strength shale/laminite (Ashfield Shale) was observed in GW1 and GW2 to depths of 2.4m and 6.8 m bgl respectively, then low to medium and high strength shale/siltstone to about 8.5 m bgl (Mittagong Formation); and
SANDSTONE:	Medium and high strength sandstone (Hawkesbury Sandstone) from a depth of 9.5 m bgl in GW1 and 8.15m bgl in GW2.

4. Proposed Development

The project involves the demolition of the existing Electrical Engineering building and the construction of a ten level teaching facility building with two basement levels under part of the building footprint. The lowest ground level is given as RL 16.240 m Australian Height Datum (AHD) which is

approximately 3 m below existing ground level. DP notes that demolition of the existing Electrical Engineering building occurred between May and July 2018.

The proposed development includes an open space area beyond the building footprints.

Plans showing the proposed development are included in Appendix A.

5. Remediation Strategy

The majority of the fill soils on the site will be excavated as part of the proposed basement construction or for general site formation.

Only the soils outside the basement footprint and on site boundaries will remain and, if the soils contain elevated concentrations of contaminants, a risk assessment may need to be undertaken to evaluate whether the soils will require remediation or whether the associated risks are acceptable.

The preferred remediation strategies are therefore as follows:

1. A grid-based inspection of the cleared areas of the site, the removal of all visible asbestos by picking and clearance certification by the Occupational Hygienist that the ground surface is free of visible asbestos;
2. Excavation of filling/soils and buried asbestos services from within the new basement zone (i.e. the majority of the site) and off-site disposal; and
3. Validation and assessment of contaminants remaining outside the basement footprint and along the site boundaries.

Detailed procedures covering the remediation of asbestos contamination at the site are provided in Section 9.

6. Remediation Acceptance Criteria

Bonded asbestos-containing material (ACM) is the most common form of asbestos contamination across Australia, generally arising from:

- Historic imported fill used by previous developments;
- Inadequate removal and disposal practices during demolition of buildings containing asbestos products;
- Widespread dumping of asbestos products and asbestos containing fill on vacant land and development sites; and
- Importation of asbestos contaminated building products from China.

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through

substantial physical damage. Bonded ACM in sound condition represents a low human health risk, whilst both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres. Consequently, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.

Where an assessment of asbestos to NEPC (2013) is undertaken, the RAC will be as shown on the following Table 2.

Table 2: Asbestos HSLs

Health Screening levels (w/w)	
	HSL C
Bonded ACM	0.02%
FA and AF (friable asbestos)	0.001%
All Forms of Asbestos	No visible asbestos in surface soil

Bonded ACM: Asbestos containing material which is in sound condition, bound in a matrix of cement or resin, and cannot pass a 7 mm x 7 mm sieve.

FA: Fibrous asbestos material including severely weathered cement sheet, insulation products and woven asbestos material. This material is typically unbonded or was previously bonded and is now significantly degraded and crumbling.

AF: Asbestos fines including free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.

7. Roles and Responsibilities

7.1 Principal

Laing O' Rourke retains the overall responsibility for ensuring that this AMP is appropriately implemented. Laing O'Rourke is to nominate a representative (the Principal's Representative), who is responsible for overseeing the implementation of this revised AMP. The actual implementation of the RAP may be conducted by the Principal Contractor on behalf of Laing O'Rourke.

7.2 Principal Contractor

The Principal Contractor (referred to hereon in as the Contractor) is foreseen to be the party responsible for the day-to-day implementation of this revised RAP and shall fulfil the responsibilities of the Principal Contractor as defined by SafeWork. It is noted that the Contractor may appoint appropriately qualified sub-contractors or sub-consultants to assist in fulfilling the requirements of the procedures. The PC may appoint a Contractor's Site Manager (CR) to be responsible for site activities.

In addition to the implementation of the AMP it will be the Contractor's responsibility:

1. To obtain specific related approvals as necessary to implement the earthworks, including for example, permits for removal of asbestos-containing materials, SafeWork notification, etc.;
2. To develop or request and review plans to manage site works as detailed in Section 9.1;
3. That all site works and other related activities are undertaken in accordance with this AMP;
4. To maintain all site records related to the implementation of the AMP;
5. That sufficient information has been provided to engage or direct all required parties, including sub-contractors, to implement the requirements of the AMP other than those that are the direct responsibility of the Contractor;
6. To manage the implementation of any recommendation made by those parties in relation to work undertaken in accordance with the AMP;
7. To inform, if appropriate, the relevant regulatory authorities, of any non-conformances with the procedures and requirements of the AMP in accordance with the procedures outlined in this document;
8. To retain records of any contingency actions;
9. On completion of the project, to review the AMP records for completeness and update as necessary; and
10. To recommend any modification to general documentation that would further improve the environmental outcomes of this AMP.

7.3 Asbestos Contractor

The Asbestos Contractor will be responsible for undertaking all licenced asbestos removal work involving any asbestos impacted soils. The Asbestos Contractor will hold a Class A (friable) or Class B (non-friable) asbestos removal licence issued by SafeWork NSW. While a Class B licence is the minimum requirement for the proposed asbestos removal work, engagement of a Class A licenced asbestos removal contractor should be considered to help prevent any delays that may occur due to identification of friable asbestos during the work.

The Asbestos Contractor can be the same entity as the Principal Contractor.

7.4 Sub-contractors

All sub-contractors are to be inducted onto the site and informed of their responsibilities in relation to this AMP as part of the induction. Signing of the site induction is to include agreement by the sub-contractors to abide by the AMP requirements. Where necessary, sub-contractors are also to be trained in accordance with the requirements of this document. All sub-contractors must conduct their operations in accordance with this AMP as well as all applicable regulatory requirements.

7.5 Environmental Consultant

The Environmental Consultant (EC) is to provide advice on implementing this AMP.

The EC will be responsible for:

- Undertaking additional investigations around TP 205 to delineate the extent of asbestos contamination;
- Undertaking any required assessments where applicable (e.g. waste classification, site validation etc.);
- Providing advice / recommendations arising from inspections with respect to compliance and implementation of this AMP;
- Reviewing documentation and results provided by the contractor (e.g. surveys, proposed materials to be imported);
- Notifying their client with the results of any assessments and any observed non-conformances in a timely manner; and
- Notify the Site Auditor of continued non-compliance by contractors with implementing this AMP.

7.6 Occupational Hygienist

The Occupational Hygienist is to provide advice on Work Health and Safety (WHS) issues for asbestos related works. The Occupational Hygienist is to be independent of the Asbestos Contractor and will hold an Asbestos Assessor Licence and/or be a Competent Person as required by the WHS Regulation (refer Section 7).

The Occupational Hygienist will be responsible for:

- Where appropriate updating the AMP;
- Examining and providing comment on WHS documentation with respect asbestos assessment and control;
- Undertaking airborne asbestos monitoring;
- Undertaking asbestos clearance inspections;
- Asbestos sampling;
- Providing advice and recommendations arising from monitoring and/or inspections;
- Notifying their client with the results of any assessments in a timely manner; and
- Notify the EC of continued non-compliance by contractors with this AMP.

The Environmental Consultant and Occupational Hygienist can be the same entity.

7.7 Site Workers

All workers on site are responsible for observing the requirements of this and other management plans (see Section 9.1). These responsibilities include the following:

- Being inducted on site and advised of the general nature of the remediation/environmental issues at the site;
- Being aware of the requirements of this plan;

- Wearing appropriate PPE;
- Only entering restricted areas when permitted; and
- Requesting clarification when unclear of requirements of this or any other plans (see Section 9.1).

8. Regulatory Requirements and Relevant Standards

All works must be conducted in accordance with the development consent conditions.

All works must be also undertaken in accordance with the relevant regulatory criteria, including *inter alia*:

- Protection of the Environment Operations (POEO) Act 1997;
- NSW *Work Health and Safety Act* 2011 (WHS Act);
- NSW *Work Health and Safety Regulation* 2011 (WHS Regulation);
- NSW *Contaminated Land Management Act* 1997;
- National Environment Protection Council, *National Environment Protection Measures 2013* (NEPC, 2013); and
- *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (WA DoH, 2009).

Reference to relevant Codes of Practice, Australian Standards and industry standards should also be made in determining appropriate safe work practices. These include, *inter alia:*

- SafeWork Australia: *How to Manage and Control Asbestos in the Workplace, Code of Practice, October 2018;*
- SafeWork Australia: *How to Safely Remove Asbestos, Code of Practice (COP), October 2018;*
- SafeWork NSW: *Code of Practice How to Manage and Control Asbestos in the Workplace September 2016*;
- SafeWork NSW: *Code of Practice How to Safely Remove Asbestos September 2016*;
- NOHSC *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003 (2005)];
- NOHSC *Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment 3rd Edition* [NOHSC:3008 (1995)] 3rd edition;
- AS/NZS 1715:2009 *Selection, Use and Maintenance of Respiratory Protective Devices;*
- AS/NZS 1716:2012 *Respiratory Protective Devices;* and
- WorkCover NSW (now SafeWork) *Working with Asbestos: Guide 2008.*

9. Safe Work Procedures for Asbestos Remediation Works

The actual sequence of works will depend on the construction works programme of the Contractor.

Should there be any discrepancy between the requirements of this AMP and any other relevant plan(s), specification(s), conditions, legislation, standards, codes or guidelines then the more stringent requirement(s) shall apply. Further, this AMP shall not abrogate any entity of their responsibility to work in accordance with statutory requirements, relevant codes, standards or guidelines, work instructions or industry best practice.

9.1 Asbestos Clearance of Ground Surface

Prior to the commencement of excavation work the sequence of works for the asbestos clearance include:

1. Occupational hygienist to conduct a grid-based asbestos clearance inspection in accordance with Schedule B2 of the NEPM (2013) guidelines to verify that no visible asbestos remains across the site. The survey must use lanes at a spacing of not greater than 5 m apart; and
2. Occupational hygienist to Issue an asbestos clearance certificate when all visible asbestos has been removed from the site.

9.2 Remediation of Asbestos Impacted Fill and Asbestos Buried Services

The remediation of asbestos impacted fill is required to be completed prior to the commencement of any other earthworks. The sequence of works for the soil remediation process for asbestos impacted fill in the vicinity of TP205 and buried asbestos services (if found) is as follows and as outlined in Section 9.2 of the RAP:

1. Notification and site establishment works in accordance with the WHS Regulation. Further information on this is provided in Section 10;
2. The Environmental Consultant (EC) will conduct further investigations to delineate the impacted soils prior to excavation and confirm/determine waste classification in the vicinity of TP205 and buried asbestos services (location to be confirmed by client);
3. Following the additional delineation investigation(s), the EC will demarcate the impacted area. If no investigation has been completed, the EC will mark on site an initial excavation area of 5 m by 5 m in plan;
4. Excavate soils that are identified by the additional delineation investigation as being asbestos impacted and stockpile. The EC will be present during the excavation to observe the nature of soils being excavated;
5. Asbestos buried services and surrounding fill is to be removed by a Class A or B licenced asbestos removalist. Asbestos waste from the buried services needs to be contained in accordance with Section 10.12. The surrounding fill is to be stockpiled separately from asbestos impacted fill;
6. Soil sampling from the stockpiled soils for assessment of waste classification by the EC as per the RAP;

7. If the EC visually identifies potential asbestos-containing material (PACM) in the excavation (i.e. excavation of asbestos impacted fill and excavation/s of fill surrounding asbestos buried services), or a fill composition highly likely to contain PACM, the excavation will be extended to chase out the fill (refer to the RAP) and stockpiled;
8. Collection of validation samples from the excavation (i.e. excavation of asbestos impacted fill and excavation/s of fill surrounding asbestos buried services), by the EC, using plant provided by the contractor at a sampling frequency in accordance with Section 13.1, or as deemed appropriate by the EC. Validation sampling will include 10 L samples and 500 mL samples;
9. Further excavation and validation of any remnant asbestos impacted fill (within excavation of asbestos impacted fill and excavation/s of fill surrounding asbestos buried services) using the above process as required (to be advised by the EC, following the receipt of laboratory data);
10. An asbestos clearance inspection for all areas where asbestos works have been undertaken is also required at completion of licensed asbestos removal work and prior to normal re-occupation of the area. Inspection can be by a Competent Person (in the case of non-friable asbestos removal) and this may include the EC;
11. Provision of advice from the EC when the identified asbestos impacted fill has been removed from the excavation (i.e. excavation of asbestos impacted fill and excavation/s of fill surrounding asbestos buried services);
12. The EC validation advice and the results of the clearance inspection must be received prior to the Contractor commencing any other earthworks;
13. Backfilling of the excavation (i.e. excavation of asbestos impacted fill and excavation/s of fill surrounding asbestos buried services) with materials meeting the requirements of the RAP, and also any geotechnical requirements;
14. All asbestos impacted fill to be tracked from cradle-to-grave by the Contractor and the records provided to the EC; and
15. Records relating to the remediation of asbestos impacted fill must be kept by the Contractor and provided to the EC for inclusion in their validation report.

The remediation may also require the inspection and clearance of the area by an Occupational Hygienist.

9.3 Excavation of Other Fill

Finds of additional asbestos should be undertaken in accordance with the RAP, however, additional information specific to asbestos is provided below. There is potential for asbestos contamination to be present in fill at any part of the site (see Section 2.2). Should additional occurrences of asbestos (i.e. occurrences not addressed by the remediation works) be identified during any phase of work (e.g. clearing, excavation or construction) the following general approach is to be adopted:

1. Foreman to barricade the impacted area and stop all works which are potentially impacted by or which will potentially impact the area of concern. Any asbestos materials to be covered with plastic / geofabric or keep damp
2. The Contractor to notify the PR and EC, the Asbestos Contractor and the Occupational Hygienist of the occurrence;

3. The EC to assess the identified issue / area of concern and provide advice to the PR regarding potential remediation/ management options;
4. The PR / Contractor to instruct the EC of the preferred remediation / management strategy;
5. The EC to prepare a plan detailing the works required for the preferred remediation/ management option;
6. The PR / Contractor to obtain any necessary approvals for undertaking the remediation / management works; and
7. The Contractor to undertake the remediation / management works in accordance with the provided plan upon instruction by the PR.

The EC is to liaise with the Asbestos Contractor, Occupational Hygienist and others, as necessary, when undertaking the above process. It is noted that if friable asbestos is encountered, air monitoring and clearance inspections must be undertaken by a Licensed Asbestos Assessor in accordance with the requirements of the WHS Regulation.

Following the removal of all known asbestos-contaminated fill from the site, all other fill is to be selectively excavated and removed from the site in designated areas prior to commencing the excavation of natural soils from an area in accordance with the following:

1. Removal of all fill from an area should be validated by the EC prior to commencing excavation of natural soils;
2. All excavated fill to be tracked from cradle-to-grave by the Contractor and the records provided to the EC; and
3. Records relating to the remediation of all finds of additional asbestos must be kept by the Contractor and provided to the EC for inclusion in their validation report.

9.4 Incident and Emergency Procedures

If during works an incident of non-conformance ('incident') with this or other plans (as outlined below) is observed by any party, then this is to be immediately reported to the Contractor. The Contractor is to record the incident and any rectification works which are then subsequently undertaken to address the non-conformance. Depending on the nature of the non-conformance, input from the Asbestos Contractor, EC and / or Occupational Hygienist may be required. Emergencies need to be managed in accordance with an Emergency Response Plan, as described in Sections 10.1, 10.2 and 10.8.

10. Outline Asbestos Work Health and Safety Plan

10.1 Overview and Required Plans

All site work must be undertaken in a controlled and safe manner with due regard to potential hazards, training / licencing requirements and safe work practices. To assist in achieving this goal the following documents, as a minimum, shall be developed by the Contractor (or the relevant subcontractors and provided to the Contractor for approval):

- Work Health and Safety Plan (WHSP): detailing the WHS procedures for the site, this may incorporate or include references to the below plans;
- Safe Work Method Statements (SWMS): which are to be specific to individual tasks undertaken at the site;
- Asbestos Removal Control Plan (ARCP): as detailed further below; and
- Emergency Response Plan (ERP): detailing the procedures to be implemented in an emergency.

The above documents are to comply with regulatory requirements, including the WHS Regulation and SafeWork NSW requirements.

The ARCP must be provided to the person who commissioned the works. The ARCP must include:

- Details of how the asbestos remediation works will be carried out, including the method to be used and the tools, equipment and personal protective equipment to be used; and
- Details of the asbestos to be disturbed, including the known locations, type and condition of the asbestos and where it is to be placed (or removed if required).

The licensed Asbestos Contractor must keep the ARCP in accordance with the WHS Regulation.

When preparing the ARCP, the licensed asbestos removalist should consult with the person who commissioned the work, the person with management or control of the workplace (if not the same person), workers and their health and safety representatives. Moreover, if issues are raised by workers during the works, then these plans should be reviewed and updated accordingly to take into consideration site conditions.

10.2 Induction

All site personnel must be inducted by the Contractor. The induction is to include, but not be limited to, general hazards associated with construction works, hazards specific to the site including asbestos, evacuation and emergency response plans, first aid provisions and providers, what to do in the case of finds of additional asbestos and any aspects of this AMP applicable to their tasks.

10.3 Hazards at the Site

Various hazards can be present at construction sites and should be identified by the Contractor prior to commencement of works. Hazards present at the site may include the following:

- Thermal stress (heat / cold exposure);
- Excavations;
- Buried services;
- Noise;
- Dust;
- Electrical equipment;

- Heavy equipment and plant/truck operation;
- Asbestos and asbestos fibres; and
- Chemical hazards.

10.4 Licensed Contractor and Training

All asbestos works involving bonded asbestos must be undertaken by an Asbestos Contractor with a Class A or Class B asbestos removal licence issued by SafeWork NSW (formerly WorkCover). The Asbestos Contractor must ensure that the remediation work is adequately supervised and carried out in a safe manner. Supervisory personnel shall be trained as required by the WHS Regulation (Specific unit(s) of competency apply) and have a detailed knowledge of the precautions and procedures outlined in *Code of Practice: How to Safely Remove Asbestos* (SafeWork NSW 2016) and shall, in light of this knowledge and experience, assume the responsibilities as detailed in the Code. These include planning, directing and monitoring asbestos removal works to ensure the required controls are implemented, in addition to ensuring that the consultant is reliably and regularly informed of the progress of the removal works.

Prior to engagement in the work, all asbestos remediation workers shall be instructed (in addition to the site induction) in the relevant aspects of asbestos health hazards, safe working procedures, and the wearing and maintenance of protective clothing and equipment. In addition, all asbestos removal workers must be trained in accordance with the requirements of the WHS Regulation.

The Asbestos Contractor must keep a record of the training provided to each of their workers carrying out licenced asbestos removal work and ensure these records are readily accessible at the asbestos removal area.

The Asbestos Contractor should also provide the following information to all of their asbestos removal workers and to all applicants for employment as an asbestos removal worker:

- The health risks and effects associated with exposure to asbestos;
- The need for, and details of, health monitoring of a worker carrying out licensed asbestos removal work; and
- Details of legislation and codes of practice relating to the control and safe removal of asbestos.

10.5 Notification

SafeWork NSW must be notified five days in advance of any licensed asbestos removal work.

The Asbestos Contractor must, before commencing the licensed asbestos removal work, inform the person with management or control of the workplace that licensed asbestos removal work is to be carried out at the workplace and when the work is to commence.

The person with management or control of the workplace must ensure that their workers, and any other persons at the workplace, and the person who commissioned the asbestos removal work, are

informed that asbestos removal work is to be carried out at the workplace and when the work is to commence, before the work commences

10.6 Isolation and Signage for Asbestos Areas

The Asbestos Contractor will ensure that the asbestos removal area is adequately isolated and signposted.

All warning signs must comply with AS 1319 *Safety Signs for the Occupational Environment* and the *Code of Practice: How to Manage and Control Asbestos in the Workplace* (SafeWork NSW 2016).

Deep excavations or unstable areas shall also be isolated in accordance with WHS Regulation.

10.7 Restriction of Access to Asbestos Works Area

Access to the asbestos work area(s) will be restricted to:

- Workers engaged in the asbestos remediation works;
- Other persons associated with the asbestos remediation work such as the Occupational Hygienist; and
- Anyone allowed under the WHS Regulation or another law to be in the asbestos works area.

10.8 Personal Protective Equipment

As a minimum, all personnel on site will be required to wear the following personal protective equipment (PPE) at all times during asbestos remediation works:

- Steel-capped boots (preferably lace-less);
- Safety glasses;
- Hard hat meeting AS/NZS 1801-1997 and AS/NZS 1801:1997/Amdt 1:1999 requirements;
- High visibility clothing; and
- Gloves.

Additional PPE that may be required for non-friable asbestos removal at the Site typically includes:

- RPE consisting of a P1/P2/P3 rated disposable dust mask or a half-face respirator fitted with a P1, P2 or P3 particulate filter. RPE should comply with AS/NZS 1716:2003 *Respiratory Protective Devices* and be used in accordance with AS/NZS 1715:2009 *Selection, use and maintenance of respiratory protective equipment*;
- Disposable coveralls that prevent tearing and penetration of asbestos fibres (e.g. coveralls type 5, category 3 per EN ISO 13982–1 or equivalent); and
- Disposable boot covers made of a material consistent with the disposable coveralls or:

- Gumboots may be worn in the asbestos removal area if they are decontaminated upon exiting the asbestos removal area; or
- A separate set of work boot may be maintained in the asbestos work area.

If friable asbestos materials are to be removed or disturbed, then a higher grade PPE may be required.

Care should be taken to ensure PPE compatibility and that a suitable degree of worker comfort is maintained.

Regardless of the PPE adopted, asbestos removal workers must undertake appropriate personal decontamination upon leaving the asbestos work area as outlined in the *Code of Practice: How to Safely Remove Asbestos* (SafeWork NSW, 2016).

Workers in enclosed excavator cabins equipped with High Efficiency Particulate Air (HEPA) filtered air conditioning systems may not require use of certain PPE (such as RPE) but should have appropriate PPE (including RPE) on hand for general egress and emergency purposes.

Additionally, it is noted that the above requirements apply to the remediation works once asbestos impacted soils are exposed (e.g. prior to placement and capping). Prior to any change to the above PPE requirements advice should be sought from the Occupational Hygienist.

Other PPE shall be adopted as required by task-based SWMS.

10.9 Wet Methods

A constant low-pressure water supply is required for wetting down asbestos / asbestos impacted soils. This may be achieved via mains or tanker supplied water fitted to a garden hose with a pistol grip. If no water supply is readily available, a portable pressurised vessel, such as a pump-up garden sprayer, may be suitable for small areas.

10.10 Asbestos Remediation Equipment

All equipment used for the remediation of asbestos should be inspected before the commencement of the remediation work, after any repairs and at least once every seven days when it is continually being used. A register with details of these inspections, the state of the equipment and any repairs should be maintained.

10.11 Decontamination

When exiting the asbestos removal area, which is to be via the one entry / exit point, each person is to undertake personal decontaminate. Personal decontamination involves the following:

- Rinsing boots in the bucket filled with detergent solution at the entry / exit point. Rinsing is to remove mud from the boots;

- Removing overalls, gloves and then respirator and placing in the plastic bags within the provided disposal bin located at the entry/exit point. For privacy this can be undertaken in a designated decontamination area surrounded by black plastic at the entry / exit point; and
- Thoroughly washing of hands (including under nails) with detergent.

This procedure should comply with the SafeWork Australia: *How to Safely Remove Asbestos, Code of Practice (COP), October 2018* (see NSW COP for removal pages 29 and 30).

A water supply for decontamination purposes is to be maintained at the entry / exit point at all times.

With respect to any plant or equipment used in the asbestos removal area, these are to be appropriately decontaminated at the edge of the asbestos removal area prior to leaving this area. Vehicles, excavators, etc. are to be washed down and all mud removed, with particular attention given to tyres, tracks, underside of the vehicle's body and other areas which would have come in contact with the asbestos impacted soils (e.g. excavator buckets). This is to be undertaken at the entry / exit gate to the exclusion zone and monitored by the Asbestos Contractor.

The amount of water generated from these decontamination activities is not expected to be significant and hence will infiltrate into the surface within the exclusion zone. However, if the volume of water used causes surface migration then the exclusion zone is to be bunded to an appropriate height to prevent water migrating outside the exclusion zone. In this regard changes to the delineated exclusion areas and other entry / exit points within the site and hence any changes to the decontamination point are to be made aware to site personnel by the Contractor.

Any contaminated water collected as part of the above decontamination works (or asbestos works more generally) is to be placed in a suitable leak-proof receptacle and disposed of as asbestos containing waste. Alternatively, if this water is otherwise appropriate to dispose to sewer it is to pass through a particulate filter or other trap that capture asbestos before entering the sewer mains. The filter or trap should be capable of capturing particles down to 5 μm.

Any other equipment (e.g. shovels) leaving the exclusion zone are to be decontaminated. Where possible this should be done with a detergent solution within the exclusion zone. If not possible to decontaminate equipment, then the equipment must be sealed in a suitable container until is reused for asbestos removal purposes. Such containers must be appropriately labelled to warn of the asbestos risk and the exterior of the container decontaminated prior to it leaving the asbestos removal area.

10.12 Asbestos Waste

All asbestos waste, including used disposable coveralls, respirators, plastic sheeting and items deemed contaminated with asbestos are to be kept damp until double-sealed and in 200 micorn thick plastic sheeting, asbestos waste bags or other suitable receptacle. The sealed waste shall be appropriately labelled as containing asbestos and removed from site as soon as practicable.

Asbestos waste shall not be allowed to accumulate excessively within the work area and shall be bagged or placed in appropriate receptacles as the work proceeds.

Controlled wetting of waste shall be used to eliminate asbestos dust emission during bag sealing or in case of subsequent rupture of a bag.

Bags and sheeting which have contained asbestos material shall not be reused.

Bags and sheeting marked as asbestos waste shall not be used for any other purpose.

Asbestos waste bags shall not be filled more than half full, in order to minimise the risk of bag tearing / splitting and to assist in manual handling of bags. The neck end of each bag shall be twisted tightly, folded over and the neck secured in the folded position with wire ties, adhesive tape or other effective method.

Sealed asbestos waste shall be detailed clean of any visible asbestos residue before being removed from the asbestos removal area.

All drums or bins used for the storage and disposal of asbestos waste are to be in a good condition, with lids and rims in good working order, and free of hazardous residues. The drums or bins should be lined with plastic (minimum 200 µm thickness), and labels warning of the asbestos waste should be placed on the top and side of each drum or bin, with the words, 'Danger: Asbestos. Do not break seal'. This may be substituted with a similar warning. If the drum or bin is to be re-used, the asbestos waste must be packed and sealed so that when the drum or bin is emptied there is no residual asbestos contamination. Controlled wetting of the waste should be used to reduce asbestos dust emissions. Where possible, the drums or bins should be placed in the asbestos work area before asbestos work begins. The drums or bins should have their rims sealed and their outer surfaces wet wiped and inspected before they are removed from the asbestos work area. If it is not possible to locate the drums or bins inside the asbestos work area, they should be located as close to the work area as possible. Routes for moving the waste from the asbestos work area to the waste drums or bins should be designated prior to the commencement of each task. Drums or bins used to store asbestos waste should be stored in a secure location within the site when they are not in use. Drums or bins should not be moved manually once they have been filled. Trolleys or drum lifters should be used. Removal should be undertaken according to NSW COP removal regarding "Asbestos waste skips, vehicle trays and similar containers".

Asbestos for Disposal to be Separated, Wrapped and Labelled

Asbestos waste must be:

- Separated from other material for disposal where that is reasonably practicable;
- Wrapped or contained in a manner that prevents asbestos fibres entering the atmosphere during transportation; and
- Appropriately labelled to warn of the asbestos hard.

Current requirements for asbestos waste disposal must be adhered to and copies of asbestos waste disposal certificates / receipts must be provided.

10.13 Loading and Transport of Contaminated Material

DP understands that off-site disposal of large volumes of asbestos waste is not necessarily required, however, if required, then the following procedures apply. Transport of all material to and from the site shall be via a clearly delineated, pre-defined haul route. Removal of waste materials from the site shall only be carried out by an appropriately licensed contractor holding all relevant permits, consents and approvals.

The work is to be conducted such that all site vehicles:

- Conduct deliveries during the specified hours of works, or in accordance with Roads and Maritime Services as appropriate;
- Are securely sealed to prevent any dust or odour emissions during transportation;
- Are decontaminated prior to leaving the site to ensure spoil is not tracked / spilled onto public roads or footpaths;
- Exit the site in a forward direction where possible; and
- Tracking of all asbestos waste is to be in accordance with the NSW EPA asbestos waste monitoring requirements.

Details of all soils removed from the site shall be documented by the Contractor in accordance with regulatory requirements and Section 11.

10.14 Disposal of Material

Should off-site disposal of wastes be required, all waste classifications for soils, including asbestos contaminated soils, are to be confirmed by the E C in accordance with the NSW EPA *Waste Classification Guidelines* 2014 prior to removal of soils from site. Reference should also be made to Section 12.2 of the RAP.

All materials removed from the site shall be tracked and disposed to a location legally allowed to receive them in accordance with the POEO Act. Documentation is to be obtained and recorded in accordance with regulatory requirements and Section 11 below and is to be provided to the receiving site prior to transport and / or acceptance of the materials. It is noted that any asbestos waste / asbestos impacted soil transported in NSW weighing more than 100 kg or consisting of more than 10 m^2 of asbestos sheeting in one load is required to be recorded utilising the NSW EPA tool, WasteLocate.

10.15 Dust Control

Given asbestos has been identified on the site it is important to mitigate risk through appropriate dust control measures and that such measures are adhered to. Generation of dust, therefore, is to be eliminated to the extent reasonably practicable and, beyond this, kept to a minimum at all times.

During working hours, water sprays are to be used to keep the surface of any works areas and stockpiled soils (which are to be kept to a minimum) reasonably damp, in order to suppress any dust.

Water used for dust suppression is to be only the minimum required to prevent dust generation and must not to be allowed to escape the confines of the works areas. If dust is unable to be appropriately managed at any time, works are to cease until the dust is sufficiently suppressed.

In summary, the following dust control procedures are to be employed to comply with this requirement as necessary:

- Ceasing works during periods of high winds;
- Erection of dust screens around the perimeter of the site;
- Securely covering all loads entering or exiting the site;
- Use of water sprays across the site to suppress dust;
- Covering of all excavated filling stockpiles remaining onsite more than 24 hours;
- Keeping excavation and stockpile surfaces moist; and
- Regular checking of the fugitive dust to ensure compliance. Immediately implement measures to rectify any cases of fugitive dust.

Attention to dust suppression will be particularly important during the movement of asbestos impacted soils.

During non-working hours, all soil stockpiles impacted or potentially impacted by asbestos are to be covered with plastic and/or geofabric, securely weighted to ensure they are not blown away by strong winds.

11. Documentation Requirements

11.1 Documentation Requirements

The following documents are to be prepared / obtained by the relevant party, and provided to other parties (the PR, Contractor, Asbestos Contractor, EC and / or Occupational Hygienist) as required for the asbestos related works. The purpose of the documentation is to assist all works being conducted such that they are in accordance with all applicable regulations and that appropriate records of the works are kept for future reference. Documentation should be provided by the relevant parties in a timely manner to allow the works to be conducted efficiently.

11.1.1 Principal

The PR to prepare / obtain any licences and approvals required for the works which are not the responsibility of the Contractor to provide.

11.1.2 Principal Contractor

The Contractor to prepare / obtain the following documents:

- Any licences and approvals required for the works which are the responsibility of the Contractor to provide;

- Records relating to the remediation of asbestos impacted fill must be kept by the Contractor and provided to the EC for inclusion in their validation report;
- Similarly, records relating to the remediation of additional asbestos finds must also be kept by the Contractor and provided to the EC for inclusion in their validation report;
- All asbestos impacted fill to be tracked from cradle-to-grave by the Contractor and the records provided to the EC;
- Similarly, all additional asbestos finds and additional asbestos impacted fill is also to be tracked from cradle-to-grave by the Contractor and the records provided to the EC;
- Excavation and stockpiling records: these will record the source of any stockpiled material, the date of excavation and any issues of concern;
- Transportation Record: comprising a record of all truck-loads of soil entering or leaving the site, including truck identification (e.g. registration number), date, time, load characteristics (i.e. classification, on-site source, destination, WasteLocate records (if required));
- Disposal dockets: for any soil materials disposed off-site. The contractor will supply records of transportation, spoil source, spoil disposal location and receipt provided by the receiving waste facility (i.e. the receiving sites transportation records);
- Imported materials records: records for any soil imported onto the site, including source site, classification reports, inspection records of soil upon receipt at site and transportation records;
- Delivery dockets, data sheets and approvals for imported materials; and
- Incident Reports: any WHS or environmental incidents which occur during the works to be documented and the PR and appropriate regulatory authority to be informed in accordance with regulatory requirements.

Note: Also refer to requirements for imported materials as set out in the RAP.

11.1.3 Environmental Consultant

The Environmental Consultant to prepare / obtain the following documents:

- Waste classification reports, including records of sampling and analysis;
- Finds of additional asbestos reports; and
- Validation report, including records of inspections, sampling and analysis, and suitability of the soils remaining on the site for the proposed site use. For further details, refer to RAP.

11.1.4 Occupational Hygienist

The Occupational Hygienist to prepare / obtain the following documents:

- Airborne asbestos monitoring records (if required);
- Clearance certificates for licensed asbestos removal work; and
- Associated laboratory analysis reports.

12. Conclusions

It is considered that conformance with this AMP will mitigate the potential impacts on human health and the environment during the removal of the asbestos impacted soils within the site.

The Environmental Consultant is to be informed if there are any changes to the remediation approach and if so this AMP must be updated in consultation with the relevant parties.

13. Limitations

Douglas Partners (DP) has prepared this AMP for this project at Building J03, Electrical Engineering, Darlington in accordance with DP's proposal SYD190090 dated 11 February 2019 and acceptance received from Laing O'Rourke dated 18 February 2019. The work was carried out under DP's Conditions of Engagement. This AMP is provided for the exclusive use of Laing O'Rourke for this project only and for the purposes as described in the plan. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this AMP beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this AMP, DP has necessarily relied upon information provided by the client and / or their agents.

This AMP has been prepared based on the results of previous investigations at the site and the proposed construction works and remediation approach in the RAP. Should site conditions encountered during works differ from those currently understood and as outlined in this report, proposed construction works be altered or the remediation approach amended without DP's knowledge and agreement, this AMP would no longer be valid for remediation of the site.

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

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

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 an expressed statement, interpretation, outcome or conclusion stated in this report.

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

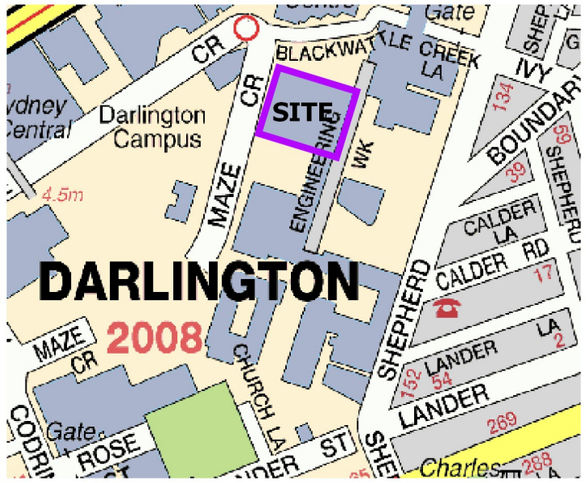
The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk.

Douglas Partners Pty Ltd

Appendix A

Drawings

About This Report



Locality Plan

Legend

- Approximate Site Boundary
- Previous DCP test location (DP, 2016a)
- Previous borehole location (DP, 2016a)
- DSI borehole location (DP, 2018a)
- Supplementary investigation Borehole and monitoring well location (DP, 2018c)
- Supplementary investigation testpit location (DP, 2018c)
- Supplementary investigation asbestos containing fibre cement sample location (DP, 2018c)

0 10 20 30 m

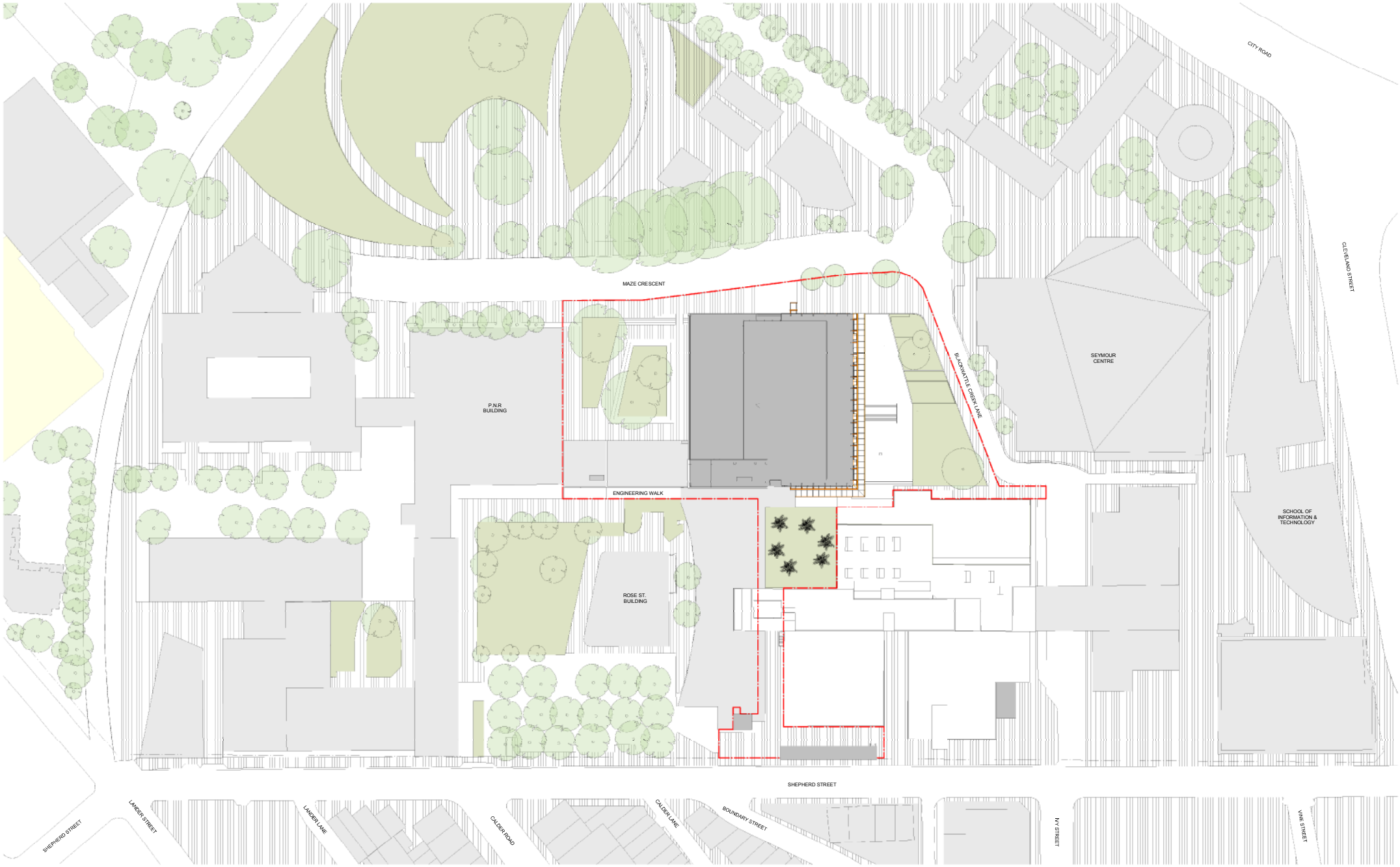
Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Laing O'Rourke Australia Construction Pty Ltd		
OFFICE:	Sydney	DRAWN BY:	LT
SCALE:	As Shown	DATE:	22/02/2019

TITLE: **Test Location Plan**
Building J03, Electrical Engineering, The University of Sydney
Maze Crescent, Darlington

N

PROJECT No:	85658.06
DRAWING No:	1
REVISION:	0



Rev	Description	By	Date

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Project
THE UNIVERSITY OF SYDNEY ETP STAGE 1

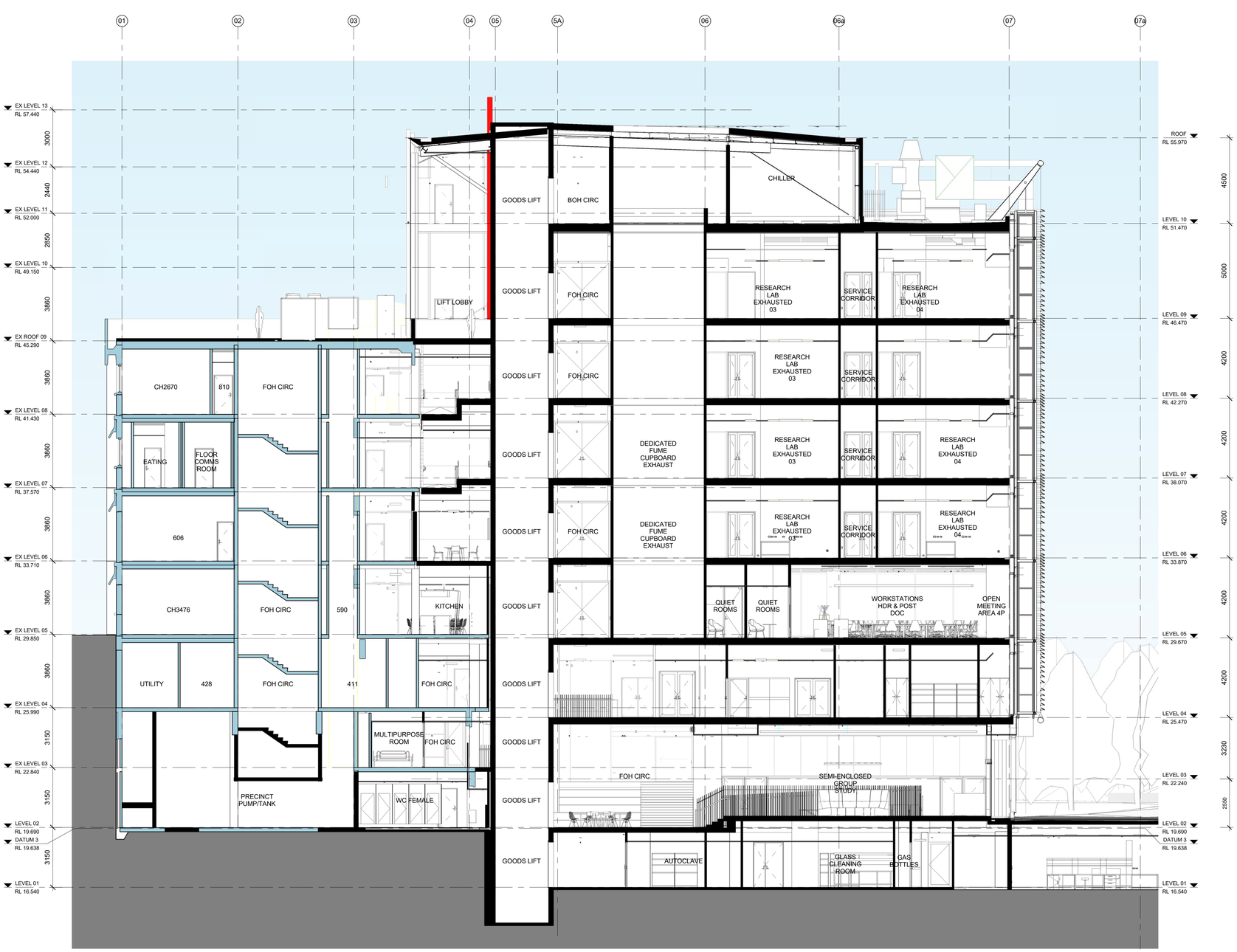
Electrical Engineering Building
University in Darlington, NSW 2008

Drawing Title
SITE PLAN - PROPOSED

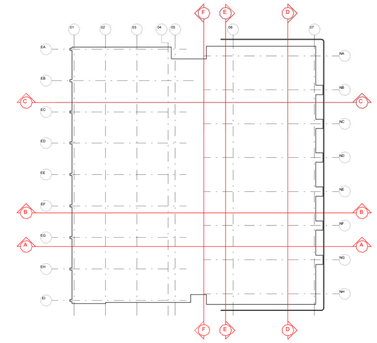
A1 DRAWING SHEET		Drawn:	Author
Co-ordinated:	Michael Grave	Scale:	1 : 500 @ A1
Project Architect:	Michael Bradburn	Date:	09/25/17
Project Director:	David Holm	Revision:	
Drawing Number:	A-DA-1122	North:	

Cox Architecture Pty Ltd ACN 002 535 891

PLOT STAMP DATE: 2/11/2017 10:38:45 AM



1 SECTION A
15-02 SCALE 1 : 100



Rev	Description	By	Date
A	SCHEMATIC DESIGN STAGE	SPG	26/03/2018
B	70% DETAILED DESIGN ISSUE	CG	01/11/2018
C	90% DETAILED DESIGN ISSUE	SPG	18/01/2019
D	90% DETAILED DESIGN ISSUE	IC	25/02/2019

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Project

THE UNIVERSITY OF SYDNEY ETP STAGE 1

Electrical Engineering Building
University in Darlington, NSW 2008

Drawing Title

SECTION A

Document Control Status:

90% DETAILED DESIGN

Project Number: 215132.00	**Drawn:** IC
Co-ordinated: SPG	**Scale:** As indicated @ B1
Project Architect: Michael Bradburn	**Date:** 25/02/2019
Project Director: David Holm	**Revision:** D
Drawing Number: K33-COX-ARC-DRG-41-01	**North:**