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Project 217600.02
25 August 2023
R.001.Rev1
GAR

Attention: David Hamilton

Email: davidh@aland.com.au

Cover Letter - Summary of Contamination Investigation
Proposed Aland Leppington - Civic Centre
Lots 1 & 2 DP 812366, Rickard Road, Leppington NSW

1. Introduction

Douglas Partners Pty Ltd (DP) was commissioned by Leppington (1) 88 Development Pty Ltd (LD) to prepare a cover letter summarising the contamination investigation status of the proposed Aland Leppington Civic Centre located at Lots 1 & 2 Deposited Plan 812366, Leppington, NSW (the site, as shown on Drawing 1, Attachment A). DP understands that a planning proposal for rezoning of the site is being prepared and that LD intends to develop the site as a civic centre subdivision.

In October 2022, DP completed a preliminary site investigation for contamination (PSI)[1] for a wider area which included the subject site. This letter is required to support the proposal for re-zoning of the site being made to Camden Council and summarises the findings of the PSI in relation to the site.

2. Site Identification and Environmental Setting

The site has an approximate area of 3.26 ha and comprises the following parcels of land as detailed in Table 1.

Table 1: Site Identification

Lot / Deposited Plan	Historical Land Use	Approximate Area (ha)
1/812366	Rural residential	1.63
2/812366	Rural residential	1.63
Total		**3.26**

[1] DP (2022) *Report on Preliminary Site Investigation (Contamination), Proposed Residential Subdivision, 156, 166, 173 & 183 Rickard Road, Leppington NSW,* DP ref.217600.00.R.001.Rev0 dated 31 October 2022.

2.1 Topography

Regional topographic data indicates gently undulating rises across the general vicinity of the site. The site levels are gently sloping from the southeast to the northwest with an overall difference in level of approximately 10 m from the highest part of the site (Reduced Level [RL] 96 m relative to Australian Height Datum [AHD]) in the south eastern portion to the lowest (RL 86 m) in the north western portion.

2.2 Site Geology

Reference to the NSW Seamless Geological Series indicates that the site is underlain by Middle Triassic Aged Bringelly Shale (mapping unit Rwb) of the Wianamatta Group.

Bringelly Shale typically comprises shale, carbonaceous claystone, laminite, lithic sandstone and rare coal.

2.3 Soils Landscape

Reference to the Penrith 1:100 000 Soils Landscape Sheet (9030) indicates that the site is underlain by residual Blacktown soils.

The Blacktown soil landscape (mapping unit bt) is characterised by a topography of gently undulating rises on Wianamatta Group shales, with local relief to 30 m and slopes usually less than 5%, typically represented by broad rounded crests and ridges with gently inclined slopes. The mapping indicates that the shallow to moderately deep soil horizon (< 100 cm) comprises red and brown podzolic soils on crests, upper slopes and in well-drained areas. The deeper areas of the soil horizon (150 – 300 cm) comprises yellow podzolic soils and soloths on lower slopes and in areas of poor drainage. These soils are typically of low fertility, are moderately reactive, highly plastic, and generally have a poor soil drainage.

2.4 Acid Sulfate Soils

Published CSIRO acid sulfate soils risk mapping indicates that the site and surrounds is classified as '*Cq(p4)*', having an '*extremely low probability of occurrence*'.

2.5 Surface Water and Groundwater

The site does not contain any surface water bodies.

Multiple unnamed farm dams are present in all cardinal directions from the site. The site drains to the North West towards unnamed tributaries of Kemps Creek.
A search of the publicly available registered groundwater bore database indicated that there are no registered groundwater bores within 500 m of the site.

Based on the regional topography and the inferred flow direction of nearby water courses, the anticipated flow direction of groundwater beneath the site is to the north, towards Kemps Creek, the likely receiving surface water body for the groundwater flow path.

Given the local geology (i.e.: Bringelly Shale), the groundwater in the fractured rock beneath the site is anticipated to be saline and very low yield. Accordingly, there would be no significant potential beneficial uses of the groundwater.

3. Review of the PSI

In 2022, DP was engaged by LD to complete a PSI for the properties at Lots 1 & 2 DP 812366, Rickard Road, Leppington NSW (the 'wider site' as shown on Drawing 2, Attachment A) which was documented in the following report:

- DP (2022) *Report on Preliminary Site Investigation (Contamination), Proposed Residential Subdivision, 156, 166, 173 & 183 Rickard Road, Leppington NSW*, DP ref.217600.00.R.001.Rev0 dated 31 October 2022.

This letter summarises the findings of the PSI which are relevant to the site.

It was understood based on email correspondence and the drawings provided by LD, that a planning proposal was being prepared for the wider site which comprised Formerly Site A (approximately 4.3 ha - which included the subject site) and Formerly Site B (approximately 4.3 ha) located across Rickard Road to the southeast of the subject site. It was further understood that the PSI was required to inform the planning proposal and masterplan for the proposed development for this site which is residential and mixed use.

The objective of the PSI was to document the potential for contamination at the wider site based on past and present land uses and to comment on the need for further investigation and/or management with regard to future development.

The PSI scope of the works included completion of the following:

- A desktop review of:
  - Published geological, soil landscape and acid sulfate soil maps;
  - Groundwater bore searches;
  - Historical aerial photographs;
  - EPA public registers under the *Contaminated Land Management Act (1997)* NSW and *Protection of the Environment Operations Act (1997)* NSW; and
  - Available council records;
- Site walkover to identify potential past/present contaminating activities at the site; and
- Preparation of the PSI report to comment on site suitability for development, from a contamination perspective, and recommendations for further investigation.

The PSI site history information suggested that the site was historically used for rural and grazing purposes since at least 1947, with the construction of a residential building in the south eastern corner of the site on Lot 2 in 1955. Market garden activities and agricultural usage occurred on site since at least 1955 and appeared to peak in 1965, with additional buildings and/or sheds established in the north eastern corner of the site on Lot 1. By 1984 most of the site underwent land clearing, and additional residential buildings were constructed on the site. Most of the site was used for rural and residential purposes, with varying ground disturbance up until 2016, where the aerial photograph shows the land immediately adjacent to the north of the site was converted to a carpark associated with Leppington Railway Station.

The 2011 historical aerial photograph showed slight ground disturbance visible in the southern portion of the site on Lot 2. The 2022 historical aerial photograph also showed areas of slight to moderate ground disturbance in the western and southern portions of the site.

A site walkover was undertaken for the PSI by an Environmental Scientist on 7 October 2022. The following key features pertinent to the PSI were observed at the site:

- Houses and metal sheds were observed in the south eastern portion of the site on Lot 2, suspected to be partly constructed of hazardous building materials, such as asbestos-containing materials (Photographs 1 to 3, Appendix C of the PSI);
- The south eastern corner of Lot 2 also comprised a large metal shed built on a concrete slab, which was primarily used as a garage for private truck maintenance and repairs. The shed also contained intermediate bulk containers (IBC), some containing engine oils, and smaller containers for storage of fuels and chemicals (Photograph 4, Appendix C of the PSI);
- A shipping container was adjacent to the large metal shed, alongside additional IBCs used for storage of oil, a jerry can, and oil drums (Photograph 5, Appendix C of the PSI);
- A septic tank was identified in the south eastern corner of the site within Lot 2, appearing to be connected to a nearby PVC pipe, which was in poor condition (Photograph 6, Appendix C of the PSI).
- Another septic tank was also identified in the eastern area of the site on Lot 1 (Photograph 7, Appendix C of the PSI);
- Rubber tyres, a metal shed, and various machinery parts were aligned along the southern eastern boundary of Lot 2 (Photograph 8, Appendix C of the PSI);
- A stockpile containing various scraps of timber was identified in the south eastern area, and another stockpile appearing to be made of quarried material was situated in the vicinity southern eastern boundary of Lot 2 (Photographs 9 and 10, Appendix C of the PSI);
- A drainage channel, running a few metres long on a vertical axis, was observed in the eastern half of the site mostly within Lot 1 (Photograph 11, Appendix C of the PSI); and
- Potential fill, as indicated by slightly elevated areas of ground, was identified in the central portion of the site, mostly on Lot 1(Photograph 12, Appendix C of the PSI).

The following potential areas of environmental concern (PAEC) and potential sources of contamination, relevant to the site, were identified from the PSI desktop investigation and site walkover (as shown on Drawing 12, Appendix A of the PSI):

- PAEC1 - Potential for contamination of surface soils as the result of potential importation of fill material associated with levelling, stockpiled materials, demolition and construction of buildings and driveways;

- PAEC2 - Potential for contamination of surface soils as the result of chemical and fuel use and storage associated with:
    - Private businesses and associated garages and its surrounding vicinity being utilised for truck repairs, servicing, maintenance, and cleaning; and
    - Metal sheds housing fuels and chemicals.
- PAEC3 - Potential of contamination of surface soils as the result of historical market garden activities; and
- PAEC4 - Potential of contamination from former and current on-site buildings and sheds containing hazardous building materials such as asbestos and SMF.

4. Conclusions and Recommendations

Based on the review of the PSI, whilst the potential for gross widespread contamination associated with the identified PAEC/sources is generally considered to be low to medium, further assessment in the form of intrusive investigations will be required to assess the extent of any associated contamination and to confirm whether any other additional potential sources of contamination exist on the site.

In the event that contamination associated with these potential sources is present at the site, it is likely to be localised and readily amenable to clean-up (if required) through conventional remediation approaches. It is considered that the site can be made suitable for the proposed development subject to further investigation and subsequent remediation.

With respect to site contamination, the recommended further assessment should build on the information provided in this report with reference to National Environment Protection Council (NEPC, 1999) National Environment Protection Council (Assessment of Site Contamination) Measure 1999 (amended 2013) (NEPC, 2013).

This report should be read in conjunction with the recommendations and limitations sections listed in the above referenced PSI report. We trust that the above is suitable for your present requirements. Please do not hesitate to contact the undersigned with any further queries.

Please contact the undersigned if you have any questions on this matter.

Yours faithfully

Douglas Partners Pty Ltd

Grant Russell
Senior Associate

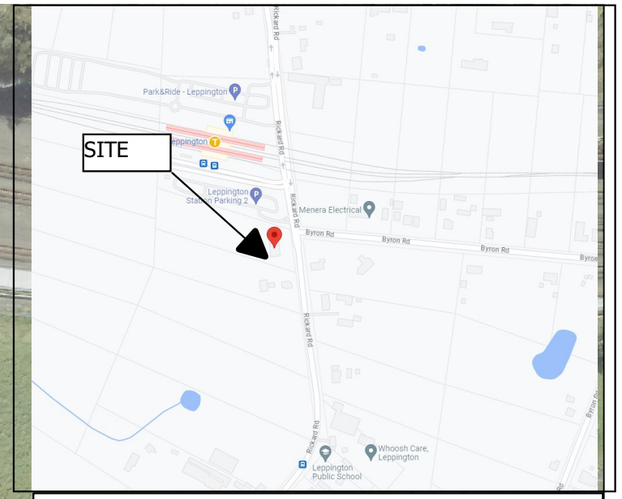
Reviewed by

p.p. **Dean Woods**
Principal

Attachment A: Drawings 1 and 2
Attachment B: DP (2022) PSI

Attachment A

Drawings 1 and 2



Site Locality

Lot 1 DP 812366

Lot 2 DP 812366

Site Boundary - Proposed Aland Leppington Civic Centre

Lot Boundaries

25 0 25 50 75 100 m

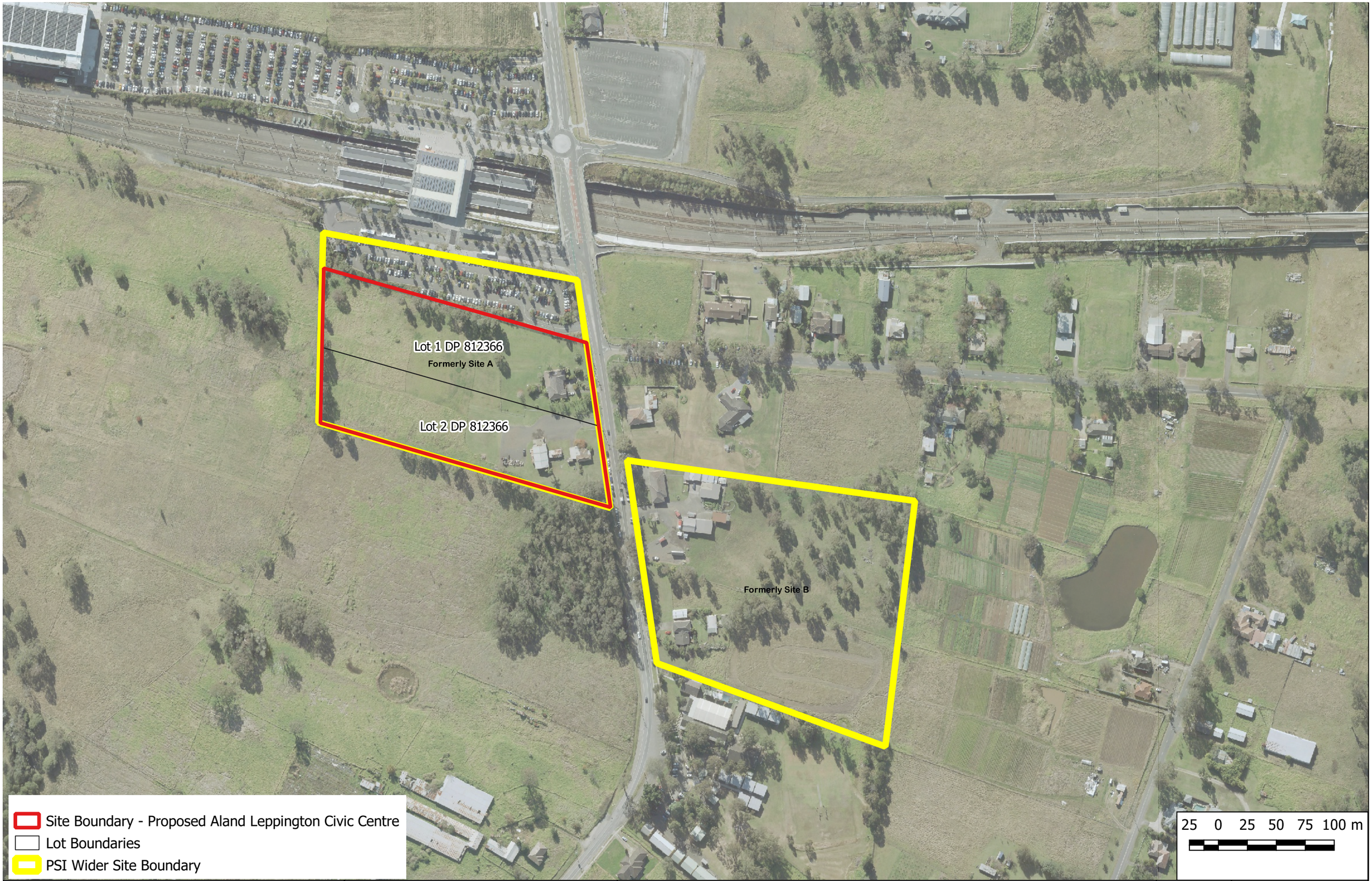
Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Leppington (1) 88 Development Pty Ltd		
OFFICE: Macarthur	DRAWN BY: GAR	
SCALE: As shown	DATE: 22.08.2023	

TITLE: **Site Location Plan**
Proposed Civic Centre
Lots 1 & 2 DP 812366

MGA

PROJ. #:	217600.02
DRAWING No:	1
REVISION:	0



Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Leppington (1) 88 Development Pty Ltd		
OFFICE: Macarthur	DRAWN BY: GAR	
SCALE: As shown	DATE: 22.08.2023	

TITLE: **Site Location and PSI Wider Site Boundary**
Proposed Civic Centre
Lots 1 & 2 DP 812366

N
MGA

PROJ. #: 217600.02	
DRAWING No:	2
REVISION:	0

Attachment B

DP (2022) PSI

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Preliminary Site Investigation (Contamination)

Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

Prepared for
Aland Developments

Project 217600.00
October 2022

Document History

Document details

Project No.	217600.00	Document No.	R.001.Rev0
Document title	Report on Preliminary Site Investigation Proposed Residential Subdivision		
Site address	156, 166, 173 & 183 Rickard Road, Leppington NSW		
Report prepared for	Aland Developments		
File name	217600.00.R.001.Rev0		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Ashika Jagdish	Chris Kline	31 October 2022

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	0	Aland Developments, David Hamilton

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	p.p. Ashika Jagdish	31 October 2022
Reviewer		31 October 2022

FS 604853

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Executive Summary

Douglas Partners Pty Ltd (DP) has been engaged by Aland Developments (Aland) to complete this preliminary site investigation (PSI) for the properties at 156, 166, 173 & 183 Rickard Road, Leppington NSW (the 'site'). We understand, based on email correspondence and the drawings provided by Aland, that a planning proposal is being prepared for the site which comprises Site A (approximately 4.3 ha) and Site B (approximately 4.3 ha). It is further understood that the PSI is required to inform the Planning Proposal and Masterplan for the proposed development for this site which is residential and mixed use.

The objective of the PSI is to assess the potential for contamination at the site based on past and present land uses and to comment on the need for further investigation and/or management with regard to future development.

The scope of the works included the following:

- A desktop review of:
  - Published geological, soil landscape and acid sulfate soil maps;
  - Groundwater bore searches;
  - Historical aerial photographs;
  - EPA public registers under the Contaminated Land Management Act (1997) NSW and Protection of the Environment Operations Act (1997) NSW;
  - Available council records;
- Site walkover to identify potential past/present contaminating activities at the site; and
- Preparation of this PSI report to comment on site suitability for development, from a contamination perspective, and recommendations for further investigation.

The results of the desktop investigation and site walkover identified that the site and surrounds have a history of rural land use and likely market garden activities since at least 1947. The most recent aerial photograph shows areas of slight to moderate ground disturbance in the western and southern portions of Site A, and the southern portion of Site B, respectively. An additional shed and concrete slab were also identified in the north western portion of Site B.

The following potential areas of environmental concern (PAEC) and potential sources of contamination were identified from the PSI desktop investigation and site walkover:

- PAEC1 - Potential for contamination of surface soils as the result of potential importation of fill material associated with levelling, stockpiled materials, demolition and construction of buildings and driveways, the onsite dam, and the construction of the railway station carpark in the northern portion of Site A;
- PAEC2 - Potential for contamination of surface soils as the result of chemical and fuel use and storage associated with:
  - Private businesses and associated garages and its surrounding vicinity being utilised for truck repairs, servicing, maintenance, and cleaning;
  - Metal sheds housing fuels and chemicals; and
  - Above ground fuel storage tanks and associated pipework and bowsers.

- PAEC3 - Potential of contamination of surface soils as the result of historical market garden activities and present-day plant nurseries;
- PAEC4 - Potential of contamination from former and current on-site buildings and sheds containing hazardous building materials such as asbestos and SMF; and
- PAEC 5 - Potential of contamination of surface soils in the north western portion of Site B, as the result of unknown materials being previously burnt, trace building and demolition waste, and a decommissioned and detached timber power pole.

Whilst the potential for gross widespread contamination associated with the above sources is generally considered to be low to medium, further assessment in the form of intrusive investigations will be required to assess the extent of any associated contamination (if any) and to confirm that no other additional potential sources of contamination exist on the site.

In the event that contamination associated with these potential sources is present at the site, it is likely to be localised and readily amenable to clean-up (if required) through conventional remediation approaches. It is considered that the site can be made suitable for the proposed development subject to further investigation and subsequent remediation.

With respect to site contamination, the recommended further assessment should build on the information provided in this report with reference to National Environment Protection Council (NEPC, 1999) National Environment Protection Council (Assessment of Site Contamination) Measure 1999 (amended 2013) (NEPC, 2013).

Douglas Partners
Geotechnics / Environment / Groundwater

Table of Contents

Report on Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by Aland Developments (Aland) to complete this preliminary site investigation (PSI) for the properties at 156, 166, 173 & 183 Rickard Road, Leppington NSW (the 'site', as shown on Drawing 1, Appendix A). We understand, based on email correspondence and the drawings provided by Aland, that a planning proposal for rezoning of the site is being prepared for the site which comprises Site A (approximately 4.3 ha) and Site B (approximately 4.3 ha). It is further understood that the PSI is required to inform the Planning Proposal and Masterplan for the proposed development.

The objective of the PSI is to assess the potential for contamination at the site based on past and present land uses and to comment on the need for further investigation and/or management with regard to future development.

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

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

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

2. Proposed Development

It is understood that the proposed development for this site is residential and mixed use.

3. Scope of Works

The scope of the works included the following:

- A desktop review of:
  - Published geological, soil landscape and acid sulfate soil maps;
  - Groundwater bore searches;
  - Historical aerial photographs;
  - EPA public registers under the *Contaminated Land Management Act 1997* (NSW) and *Protection of the Environment Operations Act 1997* (NSW);
  - Available council records;

- Site walkover to identify potential past/present contaminating activities at the site; and
- Preparation of this PSI report to comment on site suitability for future development, from a contamination perspective, and recommendations for further investigation.

4. Site Information

Site Address	156, 166, 173 & 183 Rickard Road, Leppington NSW
Legal Description	Lots 37 & 38A Deposited Plan (D.P.) 8979 Lots 1 & 2 D.P. 812366 Part Lot 1 D.P. 1200957
Area	Site A: Approximately 4.3 ha Site B: Approximately 4.3 ha Total Area: Approximately 8.6 ha
Zoning	Site A: o Zone B3 Commercial Core o Zone SP2 Infrastructure (approximately 0.3 ha along the eastern boundary) Site B: o Zone B7 Business Park
Local Council Area	Camden Council
Current Use	Site A: o Leppington railway station carpark (northern portion of Site A) o 183 Rickard Road (central portion of Site A) – Rural residential o 173 Rickard Road (southern portion of Site A) – Rural residential. A private truck repairs and maintenance business with associated garage was located in the eastern portion of the property. Site B: o 166 Rickard Road (northern portion of Site B) – Rural residential. A private truck servicing business with associated garage was located in the western portion of the property. o 156 Rickard Road (southern portion of Site B) - Rural residential
Surrounding Uses	North – Leppington railway station, beyond which is rural residential and Bringelly Road; East – Rural residential; South – Rural residential, educational (Leppington Public School directly south of Site B); and West – Rural residential.

The site boundary is shown in Figure 1 below.

Figure 1 Site boundary

5. Environmental Setting

5.1 Topography

Regional topographic data indicates gently undulating rises.

Site A levels are gently sloping from the southeast to the northwest with an overall difference in level of approximately 10 m from the highest part of the site (Reduced Level [RL] 96 m relative to Australian Height Datum [AHD]) in the south eastern portion to the lowest (RL 86 m) in the north western portion.

Site B levels are gently sloping from the southwest to the northeast, with an overall difference of approximately 6 m from the highest part of the site (RL 94 m relative to AHD) in the south western corner of the site to the lowest (RL 86 m) in the north eastern corner of the site.

5.2 Site Geology

Reference to the NSW Seamless Geological Seres indicates that Site A and Site B are both underlain by Middle Triassic Aged Bringelly Shale (mapping unit Rwb) of the Wianamatta Group.

Bringelly Shale typically comprises shale, carbonaceous claystone, laminite, lithic sandstone and rare coal.

5.3 Soils Landscape

Reference to the Penrith 1:100 000 Soils Landscape Sheet (9030) indicates that the site is underlain by residual Blacktown soils.

The Blacktown soil landscape (mapping unit bt) is characterised by a topography of gently undulating rises on Wianamatta Group shales, with local relief to 30 m and slopes usually less than 5%, typically represented by broad rounded crests and ridges with gently inclined slopes. The mapping indicates that the shallow to moderately deep soil horizon (< 100 cm) comprises red and brown podzolic soils on crests, upper slopes and in well-drained areas. The deeper areas of the soil horizon (150 – 300 cm) comprises yellow podzolic soils and soloths on lower slopes and in areas of poor drainage. These soils are typically of low fertility, are moderately reactive, highly plastic, and generally have a poor soil drainage.

5.4 Acid Sulfate Soils

Published CSIRO acid sulfate soils risk mapping indicates that the site and surrounds is classified as '*Cq(p4)*', having an '*extremely low probability of occurrence*'.

5.5 Surface Water and Groundwater

The site does not contain any surface water bodies with the exception of a small dam in the south eastern portion of Site B.

Multiple unnamed dams are present in all cardinal directions from the site. The site drains to the North West (Site A) and North East (Site B) to do unnamed tributaries of Kemps Creek

A search of the publicly available registered groundwater bore database indicated that there are no registered groundwater bores within 500 m of the site.

Based on the regional topography and the inferred flow direction of nearby water courses, the anticipated flow direction of groundwater beneath the site is to the north, towards Kemps Creek, the likely receiving surface water body for the groundwater flow path.

Given the local geology (i.e.: Bringelly Shale), the groundwater in the fractured rock beneath the site is anticipated to be saline and very low yield. Accordingly, there would be no significant potential beneficial uses of the groundwater.

6. Site History

A desktop review of site history information has been undertaken to identify potential areas of environmental concern (PAEC) and related contaminants of potential concern (COPC) which may arise from previous and current land uses. The desktop investigation was limited to the following:

- A review of historical aerial photographs;
- NSW EPA data base searches;
- Review of Council and Planning Records;
- A review of available online sources including https://trove.nla.gov.au; and
- Listing of other potential site contamination issues based on DP's experience with sites of a similar nature and scale.

The following sections detail the methodology of the desktop investigation.

6.1 Historical Aerial Photography

Historical aerial photographs from 1947, 1955, 1965, 1975, 1984, 1991, 1998 and 2005 (supplied by NSW Spatial Services) and from 2011, 2016 and 2022 (supplied by MetroMap) were reviewed to identify PAEC at the site. The aerial photographs are included as Drawings 2 to 11 in Appendix A. A summary of key features observed for the site and surrounding land is presented in Table 1.

Table 1: Summary of Historical Aerial Photographs

Year	Site	Surrounding Land Use
1947	The site appeared to be undeveloped land with grass cover and scattered trees likely used for grazing pastoral purposes. Ground disturbance was visible in the south western portion of Site B. A small dam was also present along the southern boundary in the south eastern portion of Site B.	Majority of the site's surroundings was undeveloped grass covered land with scattered trees. Market garden activities were present in the southern, south western, and western areas from the site, as tilling/cropping lines were visible. Some rural properties were present east and south from the site. Rickard Road and Byron Road were also present in the vicinity of the site.
1955	Tree cover density has increased in the site, however, the eastern portion of Site A appeared to have been cleared, with a residential dwelling and nearby sheds present in the south eastern corner. Market garden activities were evident in the southern portion of Site B, as cropping/tilling lines were visible.	Parts of the northern, eastern, western, and south western areas from the site appeared to have been cleared for agricultural purposes. Additional residential dwellings were visible in the southern area from the site.

Year	Site	Surrounding Land Use
1965	The northern portion of Site A was cleared and repurposed for agricultural use (likely to be for crop growth), and additional buildings, including residential dwellings and sheds were constructed in the north eastern portion of Site A. Further clearing had occurred in the central portion of Site A. Similarly, the southern portion of Site B had undergone additional clearing and repurposed for market garden activities.	Slight ground disturbance was visible directly south of Site B, and the dwelling had been removed. Further land clearing for agricultural usage has occurred north east, east, and south west from the site, as evidenced by tilling/cropping lines. A man-made dam was excavated east and south west from the site. Another dam, which flows into a tributary of Kemps Creek was present west from the site. Residential dwellings increased south and further south west from the site. Buildings, likely to be farm sheds, were present south from the site.
1975	The site has remained relatively unchanged since the 1965 aerial photograph. The former area of crop growth activity in the northern portion of Site A was now covered with vegetation (grass and tree cover).	Most of the cropping/tilling lines in all cardinal directions of the site's surroundings appeared to be overgrown with grass cover. Additional residential dwellings and farm sheds appeared to have been constructed north of Site B. Buildings associated with Leppington Public School were constructed directly south of Site B. Ground disturbance, possibly as a result of earthworks was also visible south of Site B. Man-made farm dams located east and south west from Site B have altered in shape and consistency. Another man-made dam was excavated north of Site B.
1984	Most of the tree cover in Site A was cleared and slight ground disturbance was visible in the central eastern portion. A rural residential property was visible in the south western corner Site B.	Ground disturbance, likely to be associated with agricultural activity, and a possible plant nursery was present north of Site A.
1991	A large shed-like structure was constructed in the south eastern corner of Site A. A possible stockpile of refuse material was present in the vicinity. The northern portion of Site B underwent land clearing with sparse ground	Multiple greenhouses and cropping/tilling lines became visible in the north, north eastern, and southern areas from the site.

Year	Site	Surrounding Land Use
	disturbances visible. A residential dwelling, sealed driveway and two potential sheds were constructed in the north western corner of Site B. A pool, either above-ground, or below-ground, was also visible. The southern portion of Site B increased in tree cover, and an unsealed oval shaped track was visible.	
1998	Additional cropping/tilling lines were present in the western portion of Site A, and ground disturbance was visible in the north eastern and south eastern corners. Ground disturbance in the form of an unsealed road was present in the northern portion of Site B.	Additional cropping/tilling lines were also visible directly west of Site A. A building associated with Leppington Public School appeared to have been constructed directly south of Site B. A few greenhouses were removed north from the site and some greenhouses were constructed further south and south west from the site. Additional residential dwellings were built further east from the site.
2005	Ground disturbance was visible in the western portion of Site A. Possible stockpiled refuse material was present in the south eastern portion of Site A. Sealed driveways, associated with the residential dwelling and shed, were constructed in the north eastern corner. Significant ground disturbances were present in the north eastern portion of Site B An extension of the farm shed in the north western corner of Site B had occurred.	Further clearing and rural, residential development had occurred directly north of Site B, and north west of the site.
2011	Slight ground disturbance was visible in the southern portion of Site A, and in the north eastern portion of Site B. An additional building, likely to be a house or farm shed, along with an extension of the sealed driveway, was built in the north western corner of Site B. Unknown materials, possibly refuse materials, appeared to be present	Ground disturbance, shipping containers and scattered materials of what appeared to be domestic refuse was present east of Site B. Additional greenhouses were constructed south west from the site.

Year	Site	Surrounding Land Use
	adjacent to the eastern boundary of Site B.	
2016	A carpark associated with Leppington Railway Station, was constructed in the northern portion of Site A, with slight ground disturbances and stockpiling of refuse materials visible in the southern portion. Ground disturbances were also visible in the south western and north eastern corners of Site B. The north western corner of Site B also underwent changes including the addition of two small and one large farm sheds, and visible agricultural land use with associated fencing and concrete slabs. The former pool was also removed. Ground disturbance and possible refuse materials were present on the eastern boundary of Site B.	Former farm dams north of the site were filled as a result of the construction of Leppington Railway Station. Cropping/tilling lines, associated with agricultural land use were present east of the site. A plant nursery was also visible south east of the site. Greenhouses, formerly north of the site, were removed.
2022	Slight ground disturbances were present in the western and southern portions of Site A. An additional shed and concrete slabs were installed in the north western portion of Site B, with truck storage visible in the aerial photograph. Small stockpiling of unknown materials was also present in the vicinity. One of the sheds was extended and the nearby fencing was modified to resemble an animal enclosure/stockyard. Ground disturbances and further potential stockpiling of refuse materials were visible north of the animal enclosure. Ground disturbances, likely to be as a result of motorbike riding activities, was apparent in the southern portion of Site B. Stockpiling of refuse materials, likely to be timber, was visible in the north eastern portion of Site B.	Greenhouses, formerly south west of the site, were removed. Tarpaulin shading and temporary modular classrooms (associated with Leppington Public School) were installed south of Site B.

6.2 Public Registers and Planning Records

EPA Notices available under Section 58 of the Contaminated Lands Management Act (CLM Act) Database searched 28 September 2022	There were no records of notices for the site or adjacent sites.
Sites notified to EPA under Section 60 of the CLM Act Database searched 28 September 2022	The site and adjacent sites were not listed as a notified contaminated site.
Licences listed under Section 308 of the Protection of the Environment Operations Act 1997 (POEO Act) Database searched 28 September 2022	There was one record issued to an adjacent site: • Koala Petroleum Pty Ltd – 166 Ingleburn Road, Leppington [approximately 530 m south west] – Petroleum products storage – Licence surrendered 15 July 2003
Council Records	A request was made on 28th September 2022 to Camden Council for the release of any Council information of relevance to the site under the Government Information (Public Access) Act 2009 (GIPA), however a response was still pending at the time of reporting.

6.3 Planning Records

A property search was completed using the NSW Government ePlanning planning portal on 5 October 2022 which indicated the following:

- Site A is zoned B3 (Commercial Core) and SP2 (Infrastructure), and Site B is zoned B7 (Business Park) under State Environmental Planning Policy (Precincts-Western Parkland City) 2021;
- The south eastern corner of Site A is classified as Vegetation Buffer and Vegetation Category 2 for bushfire prone land;
- The western boundary of Site B is classified as Vegetation Buffer for bushfire prone land;
- The site is not within an environmentally sensitive area;

- The site is not shown be listed on the state heritage register;
- The site is not subject to any flood related restrictions; and
- The site is not within a mine subsidence district.

6.4 Other Sources

A search on https://trove.nla.gov.au was conducted on 28 September 2022 and no relevant information relating to this PSI was found.

6.5 Site History Integrity Assessment

The information used to establish the history of the site was sourced from reputable and reliable reference documents, many of which were official records held by Government departments/agencies. The databases maintained by various Government agencies potentially can contain high quality information, but some of these do not contain any data at all.

In particular, aerial photographs can provide high quality information that is generally independent of memory or documentation. They are only available at intervals of several years, so some gaps exist in the information from this source. The observed site features are open to different interpretations and can be affected by the time of day and/or year at which they were taken, as well as specific events, such as flooding. Care has been taken to consider different possible interpretations of aerial photographs and to consider them in conjunction with other lines of evidence.

Given that historical aerial photographs identified that the site and surrounds have been generally used for rural and residential purposes, a title search, SafeWork NSW Dangerous goods search, interview with site personnel, and Section 10.7 certificate were not considered to be warranted for this PSI at this stage, however, consideration of these searches should be given as the development continues.

6.6 Summary of Site History

The site history information suggests that the site was historically used for rural and grazing purposes since at least 1947, with the construction of a residential building in the south eastern corner of Site A in 1955. Market garden activities and agricultural usage occurred on site since at least 1955 and appeared to peak in 1965, with additional buildings and/or sheds established in the north eastern corner of Site A. By 1984 majority of Site A underwent land clearing, and additional residential buildings were constructed on site. By 1991, the northern portion of Site B had undergone further land clearing, with the construction of a residential dwelling and sheds in the north western corner. Most of the site was used for rural and residential purposes, with varying ground disturbance up until 2016, where the aerial photograph shows the northern portion of Site A was converted to a carpark associated with Leppington Railway Station and the north western corner of Site B underwent changes including additional farm sheds, visible agricultural land use, and the removal of the former pool.

7. Site Walkover

A site walkover was undertaken by an Environmental Scientist on 7 October 2022. The general site topography was consistent with that described in Section 5.1. The site layout appears to have remained unchanged from the 2022 aerial photograph. The following key site features pertinent to the PSI were observed (refer to photographs in Appendix C).

7.1 Site A

- Houses and metal sheds were observed in the south eastern portion of Site A, suspected to be partly constructed of hazardous building materials, such as asbestos-containing materials (Photographs 1 to 3);
- The south eastern corner also comprised a large metal shed built on a concrete slab, which was primarily used as a garage for private truck maintenance and repairs. The shed also contained intermediate bulk containers (IBC), some containing engine oils, and smaller containers for storage of fuels and chemicals (Photograph 4);
- A shipping container was adjacent to the large metal shed, alongside additional IBCs used for storage of oil, a jerry can, and oil drums (Photograph 5);
- A septic tank was identified in the south eastern corner of Site A, appearing to be connected to a nearby PVC pipe, which was in poor condition (Photograph 6). Another septic tank was also identified in the eastern area of Site A (Photograph 7);
- Rubber tyres, a metal shed, and various machinery parts were aligned along the southern eastern boundary (Photograph 8);
- A stockpile containing various scraps of timber was identified in the south eastern area, and another stockpile appearing to be made of quarried material was situated in the vicinity (Photographs 9 and 10);
- A drainage channel, running a few metres long on a vertical axis, was observed in the eastern half of the site (Photograph 11); and
- Potential fill, as indicated by slightly elevated areas of ground, was identified in the central portion (Photograph 12).

7.2 Site B

- Houses and metal sheds were observed in the north western and south western portions of Site B, with some structures suspected of being partially constructed of hazardous building materials, such as asbestos-containing materials (Photographs 13 to 15);
- A large shed was present in the north western portion and was primarily being used as a garage for the maintenance and servicing of trucks associated with a trucking business. The shed was on a concrete slab and housed some oil drums and various smaller containers of chemicals and fuels (Photograph 16);
- A 13,000 L above ground storage tank (AST) used for the storage of diesel was present directly south of the large shed (Photograph 17);

- A smaller metal shed, with no flooring and containing an oil drum, was observed directly east of the AST (Photograph 18);
- East of the smaller metal shed was a small drainage line, which consisted of water run-off with an oily sheen, likely to be either from the AST or nearby truck washing activities (Photographs 19 and 20);
- Detergent and chemical run-off as a result of upkeep, washing and cleaning of trucks was also observed in the vicinity (Photograph 21);
- A stockpile comprising approximately 100 m^3 of brown silty clay material (approximate stockpile dimensions of 20 m length, 5 m width, 1 m height), which was overgrown with grass, was identified (Photograph 22);
- An IBC containing oil/fuel, liquified petroleum gas cylinders and rubber tyres were also identified in the north western portion (Photograph 23);
- The north western portion also comprised a small vegetable garden, which indicated potential use of pesticides, alongside another metal shed, which may house other chemicals/fuels (Photograph 24);
- An animal pen/stockyard was present adjacent to the small vegetable garden (Photograph 25);
- A septic tank was observed in the north western portion (Photograph 26). Approximately 20 m east of this, the grass cover appeared to have increased height, density, and a darker green pigment than the grass on the remaining areas of Site B. This is likely to be as a result of direct nutrient overflow from the septic tank (Photograph 27);
- Minor ground disturbance was also identified in the north western portion, where unknown materials appeared to have been previously burnt on site (Photograph 28). Trace building and demolition waste including fragments of concrete pipe, clay tiles and brick, and oil drums, were in proximity (Photographs 29, 30 and 31);
- Potential filling was observed in the northern portion of Site B, as indicated by slightly elevated ground levels (Photograph 32);
- Two timber stockpiles, one consisting of wood (Photograph 33), the other of processed timber (Photograph 34), were observed in the north eastern portions of Site B;
- A decommissioned power pole which was removed from the ground was observed to be laying horizontally in the north western portion (Photographs 35 and 36);
- Stockpiled scrap metal material was identified in the eastern area of the site (Photograph 37);
- Ground disturbances, likely to be as a result of motorbike riding activities, was apparent in the southern portion (Photograph 38);
- The south western corner contained a small plant nursery area, including the growth of multiple Prickly Pear plants, indicating potential pesticide usage (Photograph 39); and
- A small farm dam was observed along the southern boundary in the south eastern portion (Photograph 40).

8. Preliminary Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e. it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

Potential Sources

Based on the current investigation, the following potential sources of contamination and associated COPC have been identified.

- S1: Fill: Associated with levelling, stockpiled materials, bulk earthworks, the onsite dam, demolition and construction of buildings and driveways, and the construction of the railway station carpark on the site.
    - COPC include metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphate pesticides (OPPs), phenols and asbestos.
- S2: Chemical and fuel use and storage: Current on-site sheds and surrounding areas were identified to be housing certain fuels and chemicals. In addition, a 13,000 L diesel AST was identified in Site B associated with trucking business. Therefore, there is potential for contamination of surface soils and surrounding vicinities, as a result of spillages, storage malpractice and use of detergents (as used in the upkeep and cleaning of trucks).
    - COPC include TRH, BTEX, PAHs, heavy metals, OCPs, OPPs and volatile organic compounds (VOC).
- S3: Historical market garden activities and current on-site plant nurseries: Commonly associated with the use of pesticides. There is potential for contamination of surface soils from market garden/pesticide related COPC including:
    - OCPs;
    - OPPs; and
    - Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc).
- S4: Current and former buildings.
    - COPC include asbestos, synthetic mineral fibres (SMF), lead and PCB.
- S5: Timber power poles: A decommissioned and detached timber power pole was identified laying horizontally in the north western vicinity of Site B.
    - COPC include metals/metalloids, creosote, TRH, PAH, and phenols.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current residents;
- R2: Construction and maintenance workers

- R3: General public (railway station carpark);
- R4: End users (residential); and
- R5: Adjacent site users (rural, residential, maintenance workers, general public).

The following potential environmental receptors have been identified:

- R6: Surface water (Tributaries of Kemps Creek with subsequent dams present to the west, far north and southeast from the site);
- R7: Groundwater; and
- R8: Terrestrial ecosystems.

Potential Pathways

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

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and/or vapours;
- P3: Surface water run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies;
- P5: Leaching of contaminants and vertical migration into groundwater; and
- P6: Contact with terrestrial ecology.

Summary of Potentially Complete Exposure Pathways

A 'source–pathway–receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S6) and receptors (R1 to R8) are provided in below Table 2.

Table 2: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill, Metals, TRH, BTEX, PAH, OCP, OPPs and asbestos S2: Chemical and fuel use, metals, TRH, BTEX, PAH, OCPs, OPPs and VOCs S3: Historical market garden activities	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater	R1: Current residents R2: Construction and maintenance workers R3: General public R4: End users (residential) R5: Adjacent site users (rural, residential, maintenance workers, general public)	Given the identified potential contaminant sources, the initial fate (lay down mechanism) of most of the potential contaminants is likely to be expressed firstly in

Source and COPC	Transport Pathway	Receptor	Risk Management Action
and current on-site plant nurseries, pesticides, OCPs, OPPs, and heavy metals S4: Current and former buildings, asbestos, SMF, lead (in paint) and PCB S5: Timber power poles, metals/metalloids, creosote, TRH, PAH, and phenols	P6: Contact with terrestrial ecology	R6: Surface water (Tributaries of Kemps Creek with subsequent dams present to the west, far north and south east from the site) R7: Groundwater; and R8: Terrestrial ecosystems	surface and fill soils. An intrusive investigation is recommended to assess possible contamination including testing of the soils and groundwater.

9. Conclusions and Recommendations

The results of the desktop investigation and site walkover identified that the site and surrounds have a history of rural land use and likely market garden activities since at least 1947. The most recent aerial photograph shows areas of slight to moderate ground disturbance in the western and southern portions of Site A, and the southern portion of Site B, respectively. An additional shed and concrete slab were also identified in the north western portion of Site B.

The following PAEC and potential sources of contamination were identified from the PSI desktop investigation and site walkover and are shown on Drawing 12, Appendix A:

- PAEC1 - Potential for contamination of surface soils as the result of potential importation of fill material associated with levelling, stockpiled materials, demolition and construction of buildings and driveways, the onsite dam, and the construction of the railway station carpark in the northern portion of Site A;
- PAEC2 - Potential for contamination of surface soils as the result of chemical and fuel use and storage associated with:
    - Private businesses and associated garages and its surrounding vicinity being utilised for truck repairs, servicing, maintenance, and cleaning;
    - Metal sheds housing fuels and chemicals; and
    - Above ground fuel storage tanks and associated pipework and bowsers.

- PAEC3 - Potential of contamination of surface soils as the result of historical market garden activities and present-day plant nurseries;
- PAEC4 - Potential of contamination from former and current on-site buildings and sheds containing hazardous building materials such as asbestos and SMF; and
- PAEC 5 - Potential of contamination of surface soils in the north western portion of Site B, as the result of unknown materials being previously burnt, trace building and demolition waste, and a decommissioned and detached timber power pole.

Whilst the potential for gross widespread contamination associated with the above sources is generally considered to be low to medium, further assessment in the form of intrusive investigations will be required to assess the extent of any associated contamination and to confirm that no other additional potential sources of contamination exist on the site.

In the event that contamination associated with these potential sources is present at the site, it is likely to be localised and readily amenable to clean-up (if required) through conventional remediation approaches. It is considered that the site can be made suitable for the proposed development subject to further investigation and subsequent remediation.

With respect to site contamination, the recommended further assessment should build on the information provided in this report with reference to National Environment Protection Council (NEPC, 1999) National Environment Protection Council (Assessment of Site Contamination) Measure 1999 (amended 2013) (NEPC, 2013).

10. References

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

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

11. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at Lots 1 & 2 DP812366 and Lots 36A & 37 DP8979, Leppington in accordance with DP's proposal dated 24 August 2022 and acceptance received from David Hamilton. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Aland Developments for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

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

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

Douglas Partners Pty Ltd

Appendix A

Drawings 1 to 12

Leppington Railway Station

Part Lot 1 D.P. 1200957

183 Rickard Road

Site A

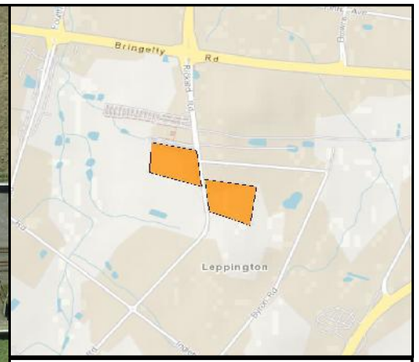
173 Rickard Road

Rickard Road

166 Rickard Road

Site B

156 Rickard Road



Site Locality

Legend

Site Boundary

Property Boundary

0 100 200 m

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 12.10.2022	

TITLE: **Site Layout and Location**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

MGA

PROJ. #:	217600.00
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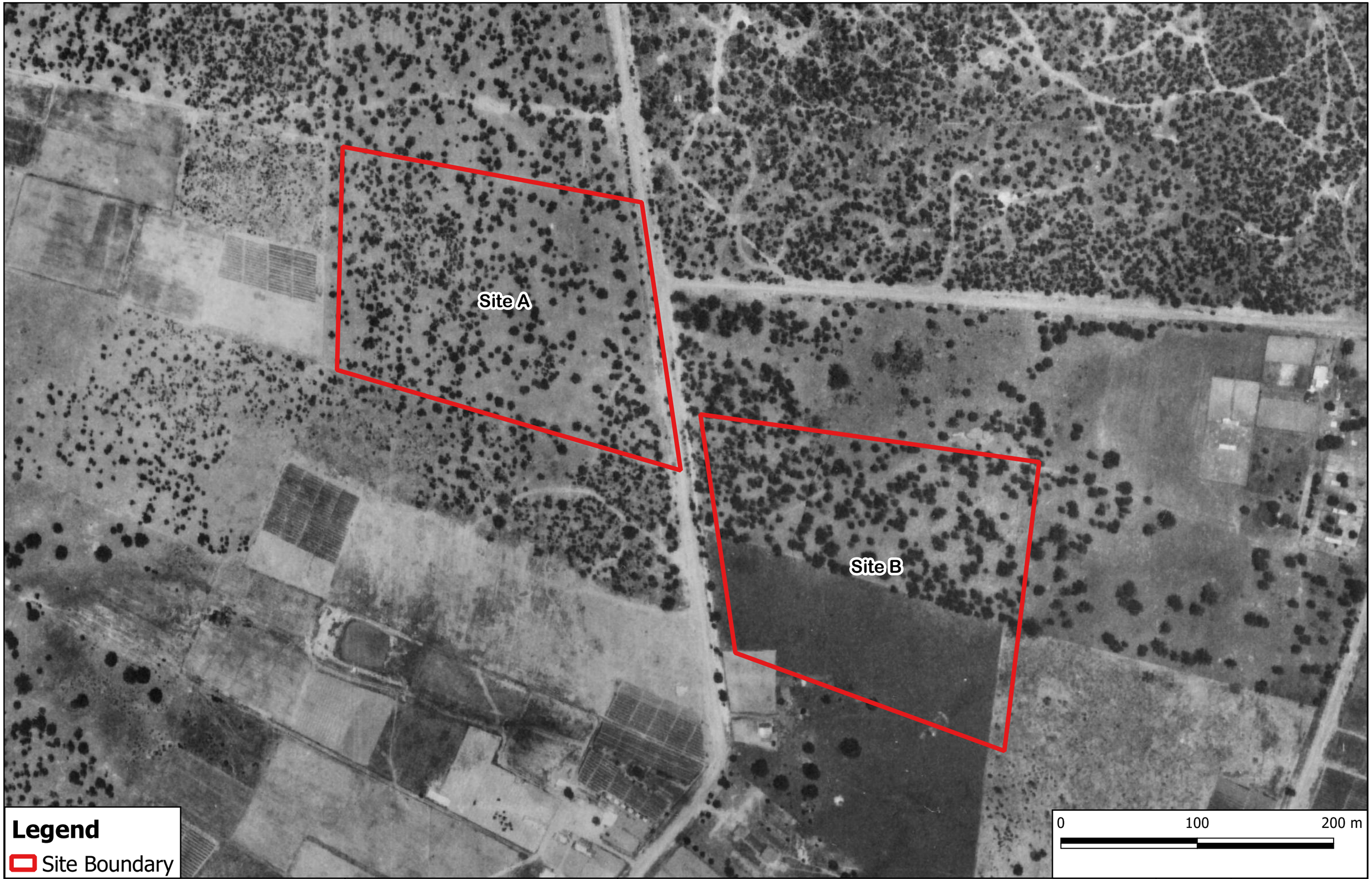
REVISION:	0



Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 05.10.2022	

TITLE: **Historical Aerial Photograph - 1947**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

N
MGA

PROJ. #: 217600.00	
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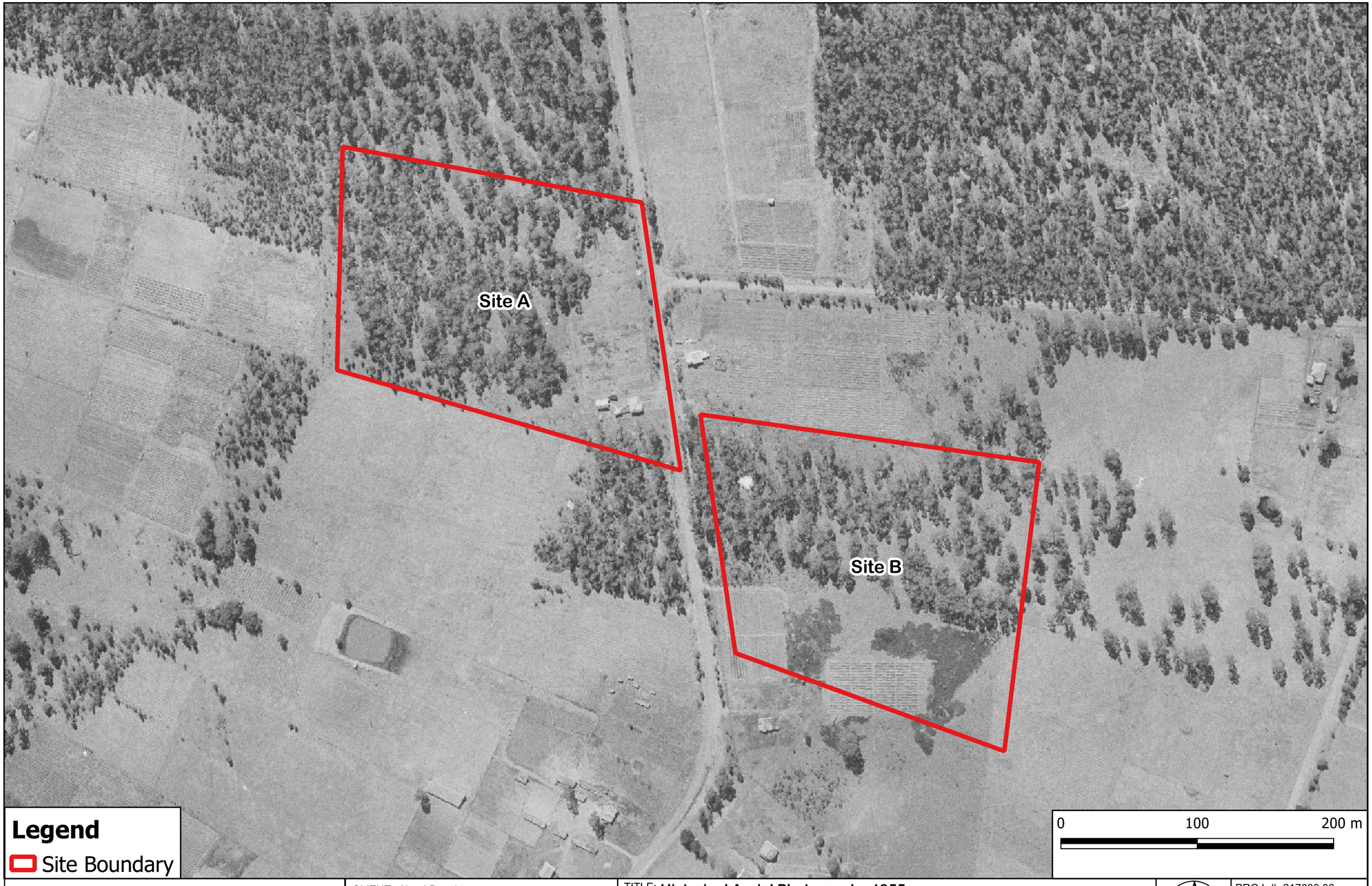

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 05.10.2022	

TITLE: **Historical Aerial Photograph - 1955**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

N
MGA

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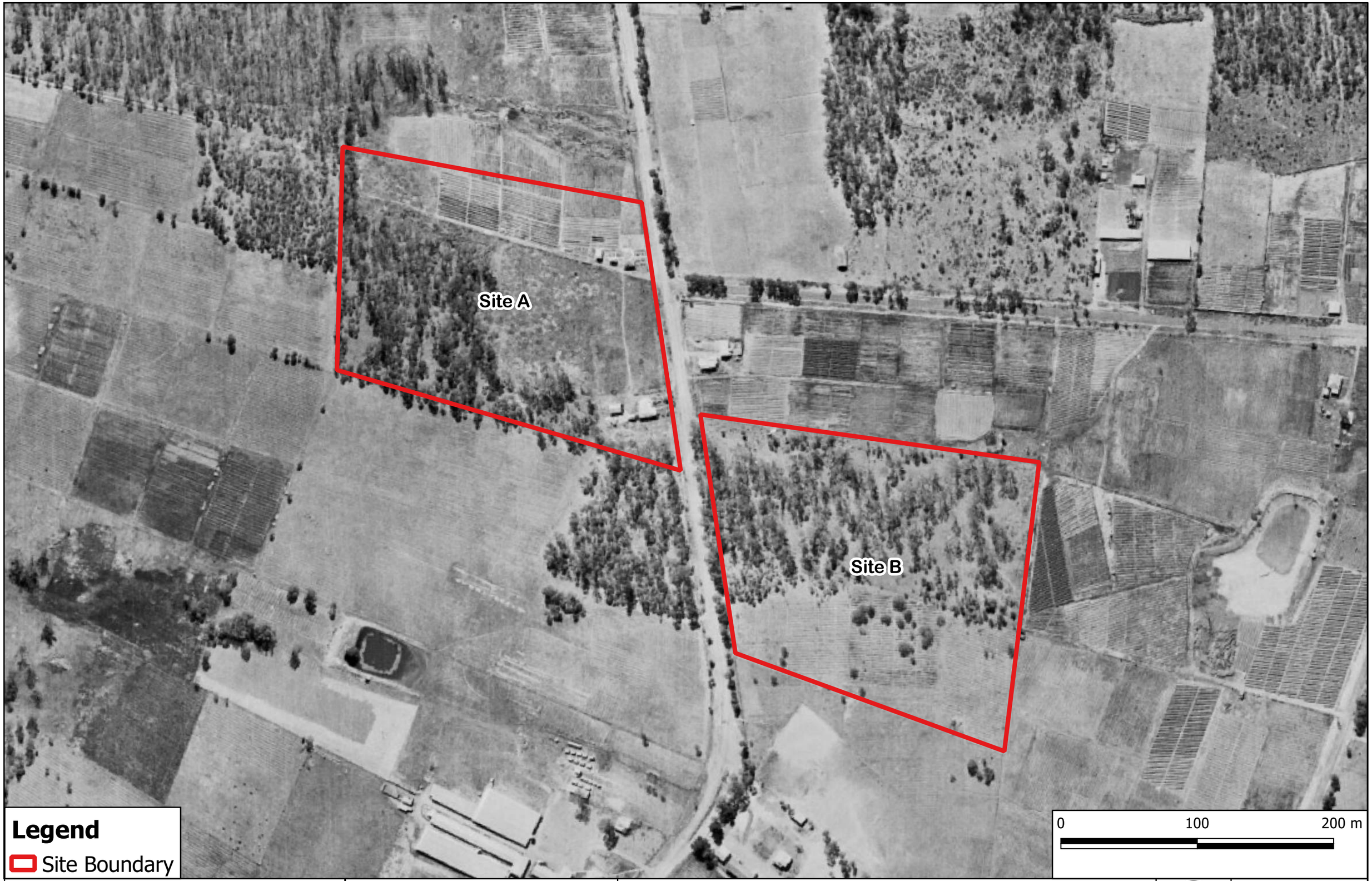

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 05.10.2022	

TITLE: **Historical Aerial Photograph - 1965**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

N
MGA

PROJ. #: 217600.00	
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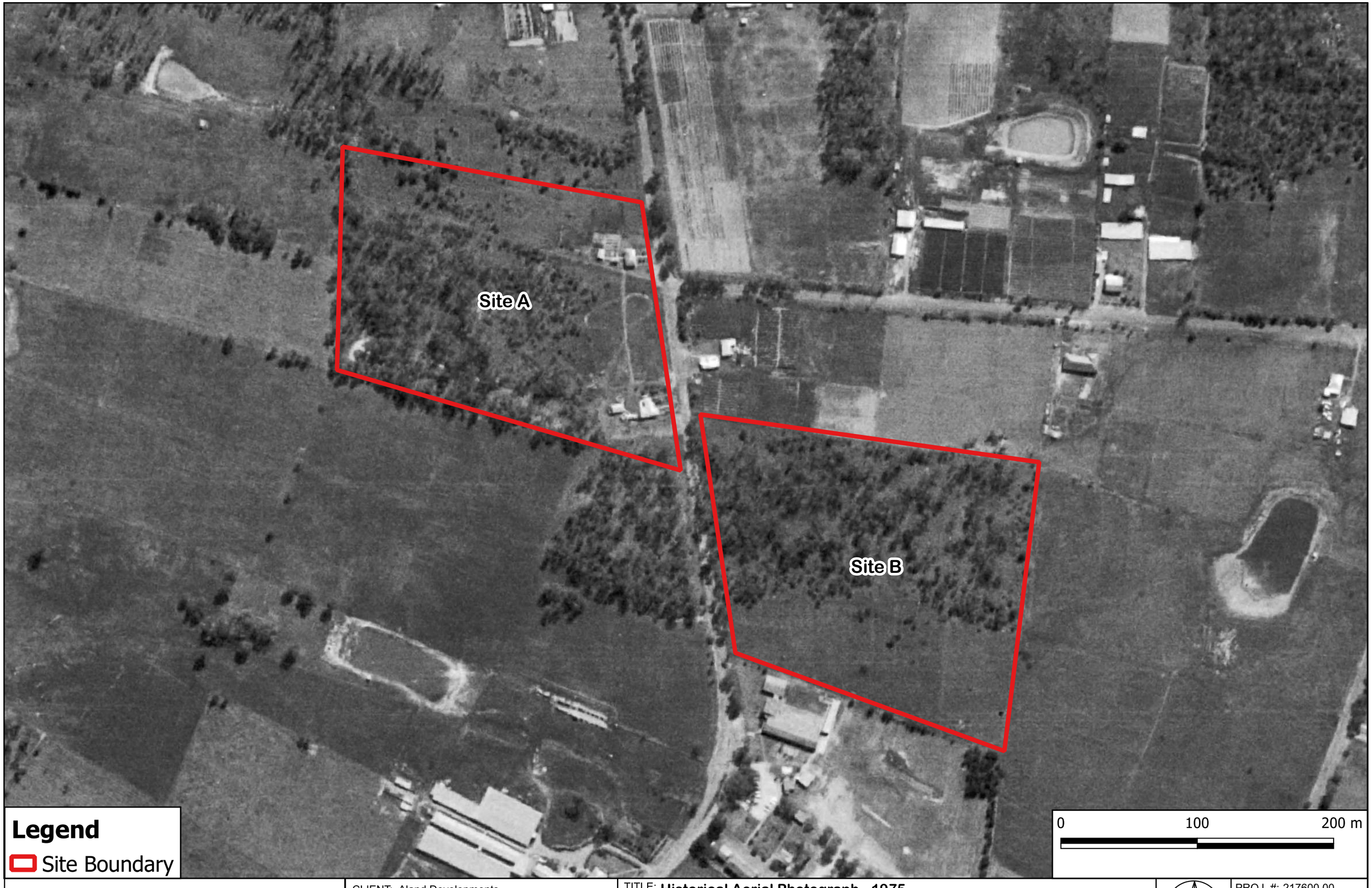

Legend

Site Boundary

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 05.10.2022	

TITLE: **Historical Aerial Photograph - 1975**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

N
MGA

PROJ. #: 217600.00	
DRAWING No:	5
REVISION:	0

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 05.10.2022	

TITLE: **Historical Aerial Photograph - 1984**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

MGA

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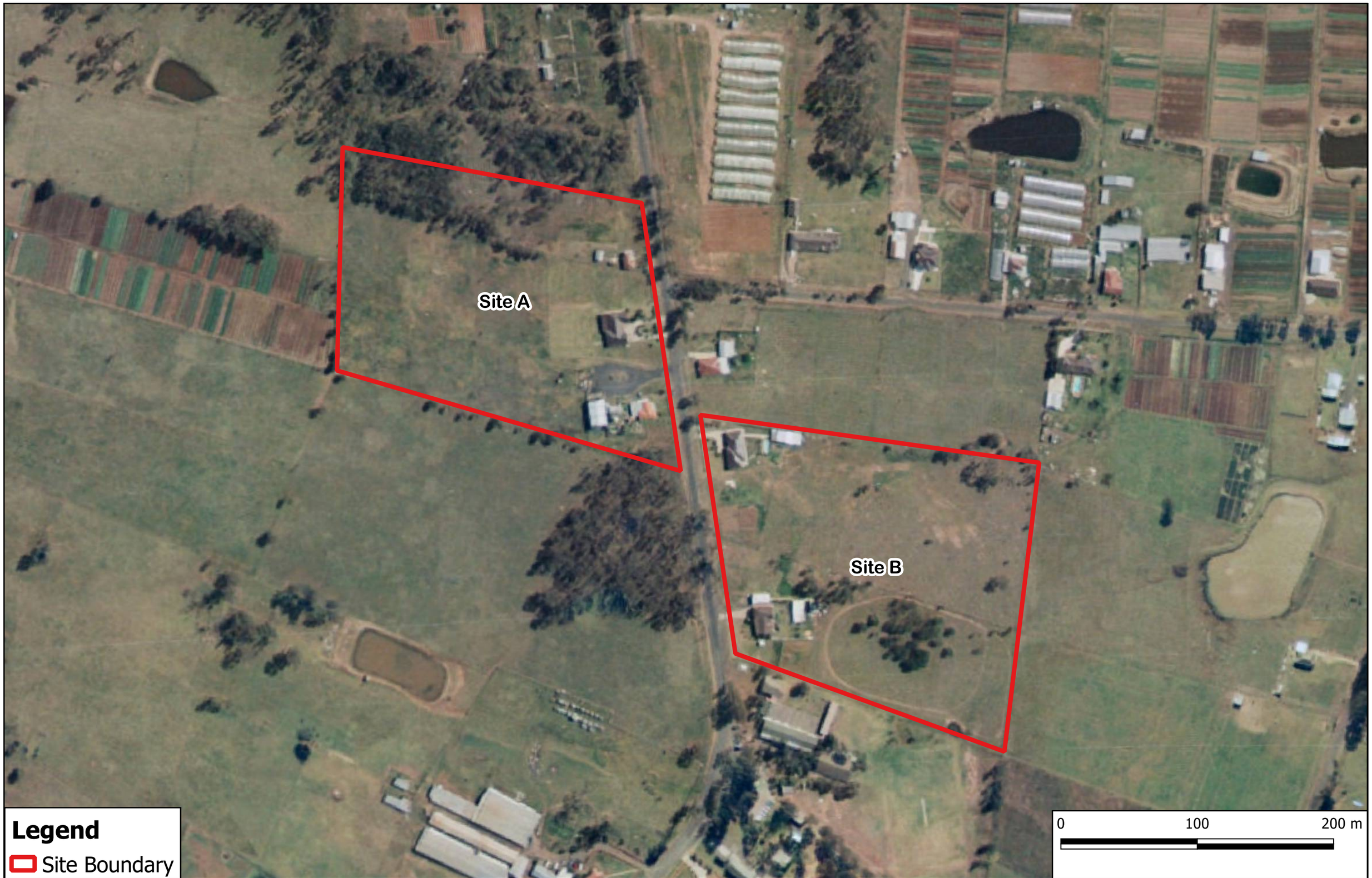

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 05.10.2022	

TITLE: **Historical Aerial Photograph - 1991**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

MGA

PROJ. #:	217600.00
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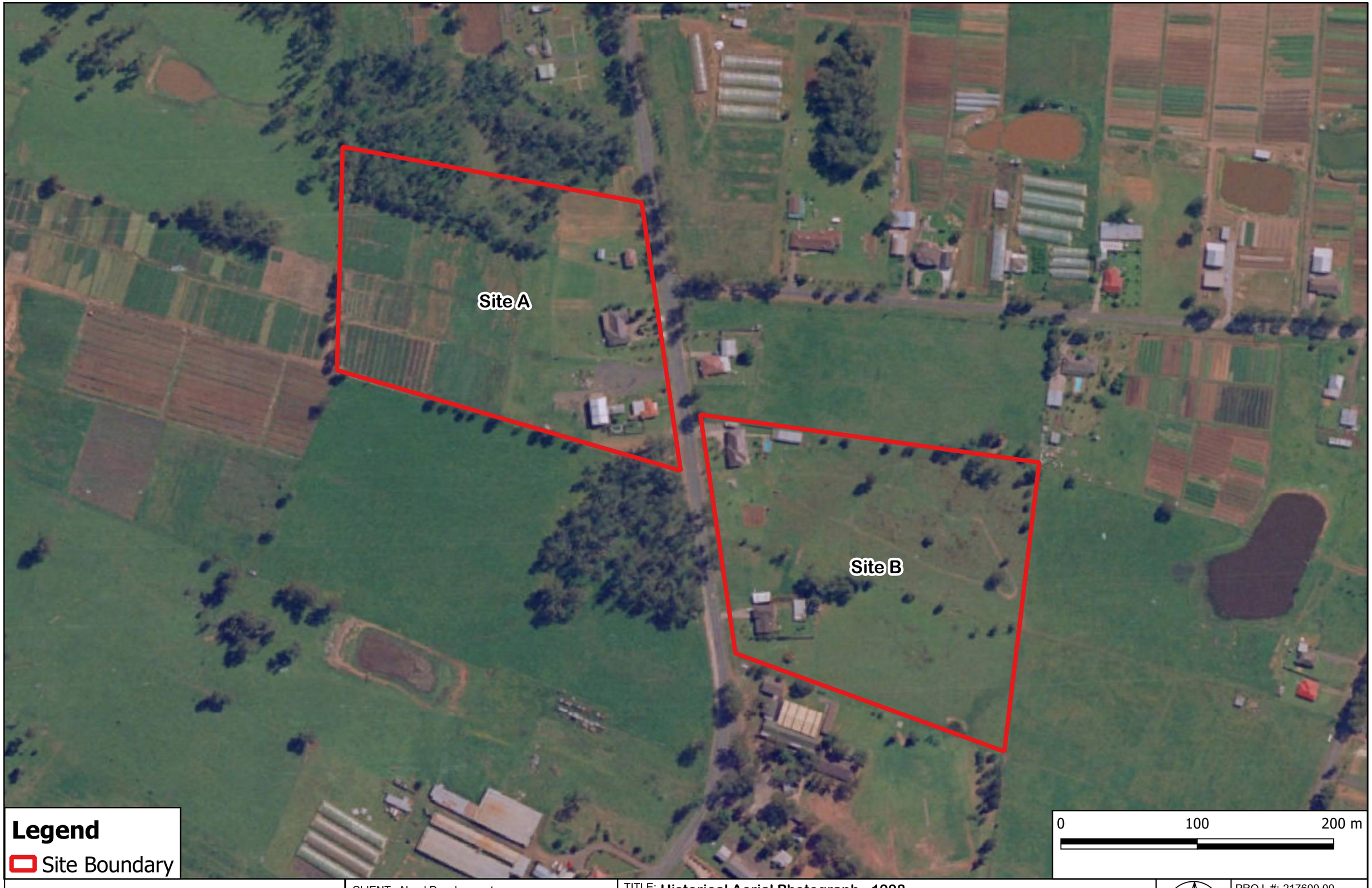

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 05.10.2022	

TITLE: **Historical Aerial Photograph - 1998**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

N
MGA

PROJ. #: 217600.00	
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Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 05.10.2022	

TITLE: **Historical Aerial Photograph - 2005**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

PROJ. #:	217600.00
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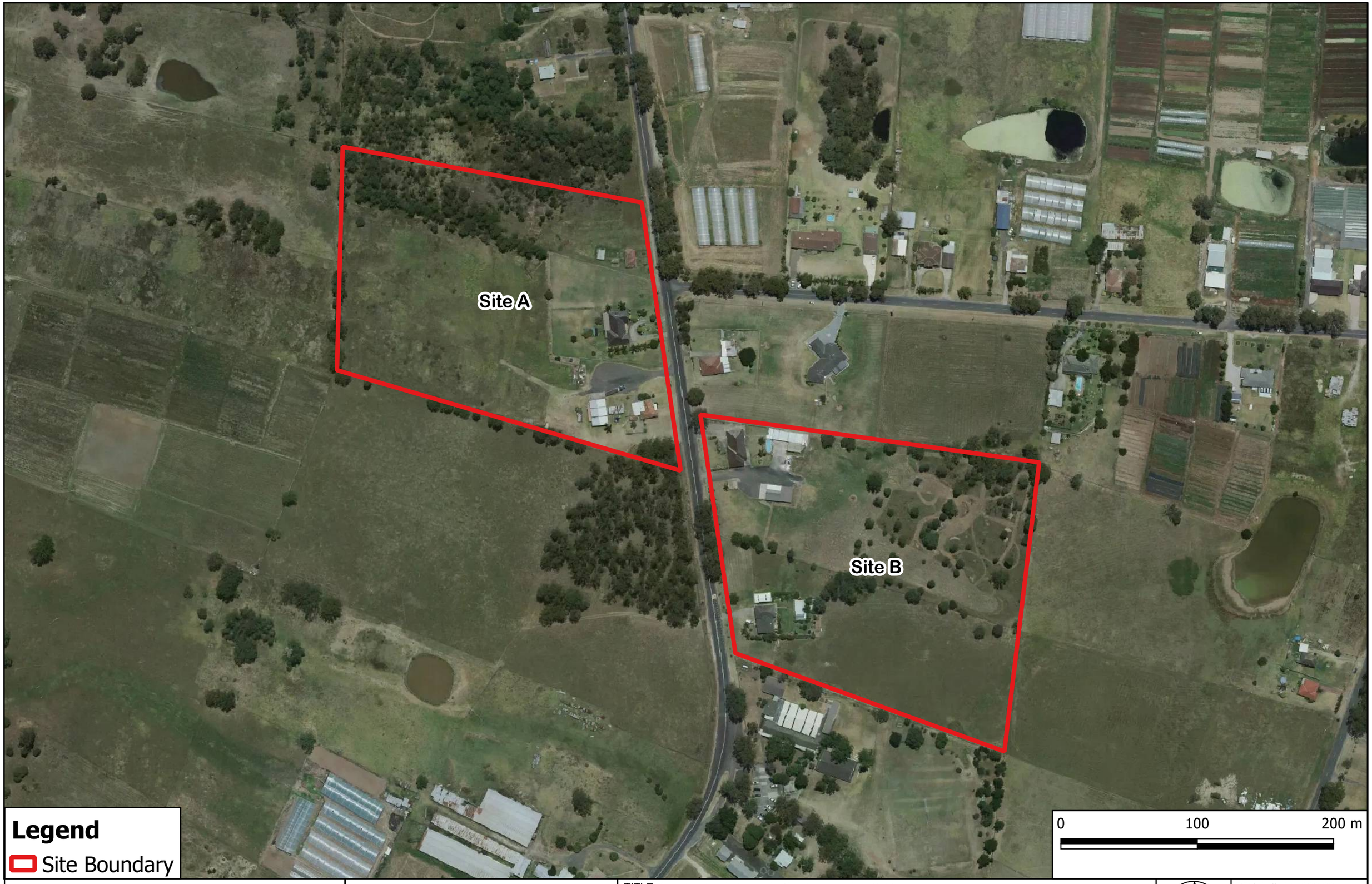

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 05.10.2022	

TITLE: **Historical Aerial Photograph - 2011**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

N
MGA

PROJ. #: 217600.00	
DRAWING No:	10
REVISION:	0

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 05.10.2022	

TITLE: **Historical Aerial Photograph - 2016**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

N
MGA

PROJ. #: 217600.00	
DRAWING No:	11
REVISION:	0

Site A

Trace Building and Demolition Waste

Unknown Burnt Material

Decommissioned Timber Power Pole

Site B

Legend

- Site Boundary
- PAEC1
- PAEC2
- PAEC3 (Present day plant nurseries)
- PAEC3 (Areas of historical market garden activities)
- PAEC4
- PAEC5

0 75 150 m

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Aland Developments		
OFFICE: Macarthur	DRAWN BY: AJ	
SCALE: As shown	DATE: 28.10.2022	

TITLE: **Potential Areas of Environmental Concern**
Preliminary Site Investigation (Contamination)
Proposed Residential Subdivision
156, 166, 173 & 183 Rickard Road, Leppington NSW

N
MGA

PROJ. #: 217600.00	
DRAWING No:	12
REVISION:	0

Appendix B

About This Report

About this Report

Douglas Partners

Introduction

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

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

Copyright

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Appendix C

Photographic Plates

Photograph 1 - Buildings in south eastern portion of Site A, suspected to be partially constructed of asbestos containing material (ACM).

Photograph 2 - 'Hardiflex' fibre material, suspected to contain ACM, used in laundry in south eastern portion of Site A.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	1
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 3 - Suspected fragment of ACM observed in the south eastern portion of Site A.

Photograph 4 - Large metal shed used as a garage for truck maintenance and repairs, containing intermediate bulk containers (IBC) and smaller fuels and chemical storage.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT: 217600.00
	Preliminary Site Investigation (Contamination)	PLATE No: 2
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV: 0
	CLIENT: Aland Developments	DATE: Oct-22

Photograph 5 - A shipping container, additional IBCs, jerry can and oil drums located in the south eastern portion of Site A.

Photograph 6 - Septic tank identified in the south eastern corner of Site A, appearing to be connected to a nearby PVC pipe, which was in poor condition.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	3
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 7 - Septic tank located in the eastern area of Site A.

Photograph 8 - Rubber tyres, a metal shed and various machinery parts were aligned along the southern eastern boundary of Site A.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	4
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 9 - Timber stockpile located in the south eastern area of Site A.

Photograph 10 - Stockpiled quarried material located in the south eastern area of Site A.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	5
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 11 - Drainage channel observed in the eastern half of the Site A.

Photograph 12 - Potential fill, as indicated by slightly elevated areas of ground, located in the central portion of Site A.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT: 217600.00
	Preliminary Site Investigation (Contamination)	PLATE No: 6
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV: 0
	CLIENT: Aland Developments	DATE: Oct-22

Photograph 13 - Houses and sheds in north western portion of Site B, potentially containing ACM.

Photograph 14 - Houses and sheds in south western portion of Site B, potentially containing ACM.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	7
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 15 - Sheds in south western portion of Site B, potentially containing ACM.

Photograph 16 - Large metal shed used as a garage for truck maintenance and service, containing oil drums and smaller fuels and chemical storage.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	8
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 17 - A 13,000 L above ground storage tank (AST) used for the storage of diesel was present directly south of the large shed.

Photograph 18 - Metal shed with oil drum observed directly east of the AST.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	9
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 19 - Drainage line with water run-off containing an oily sheen.

Photograph 20 - Drainage line with water run-off containing an oily sheen.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	10
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 21 - Detergent and chemical run-off as a result of upkeep, washing and cleaning of trucks.

Photograph 22 - Stockpiled material comprising approximately 100 m^3 brown silty clay material (approximate dimensions of 20 m length, 5 m width, 1 m height).

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	11
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 23 - An IBC containing oil/fuel, liquified petroleum gas cylinders identified in the north western area of Site B.

Photograph 24 - Small vegetable garden, which indicated potential use of pesticides, alongside another metal shed, which may house other chemicals/fuels was observed in the north western portion of Site B.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	12
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 25 - Animal stockyard located adjacent to the small vegetable garden.

Photograph 26 - Septic tank located in the north western portion of Site B.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT: 217600.00
	Preliminary Site Investigation (Contamination)	PLATE No: 13
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV: 0
	CLIENT: Aland Developments	DATE: Oct-22

Photograph 27 - Grass cover with increased height, density and a deeper green pigment, likely to be as a result of nutrient overflow from the septic tank in Site B.

Photograph 28 - Ground disturbance in the north western area of the site, where unknown materials appeared to have been previously burnt.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	14
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 29 - Trace fragments of concrete pipe and clay tiles observed in the north western portion of Site B.

Photograph 30 - Trace brick observed in the north western portion of Site B.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	15
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 31 - Oil drums observed in the north western portion of Site B.

Photograph 32 - Potential filling observed in the northern portion of Site B, as indicated by slightly elevated ground levels.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	16
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 33 - Wood stockpile observed in the north eastern portion of Site B.

Photograph 34 - Processed timber stockpile observed in the north eastern portion of Site B.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	17
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 35 - Decommissioned power pole which was removed from the ground and found laying horizontally in the north western area of Site B.

Photograph 36 - Decommissioned power pole which was removed from the ground and found laying horizontally in the north western area of Site B.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	18
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 37 - Stockpiled scrap metal material was identified in the eastern area of Site B.

Photograph 38 - Ground disturbances, likely to be as a result of motorbike riding activities, was apparent in the southern portion.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT:	217600.00
	Preliminary Site Investigation (Contamination)	PLATE No:	10
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV:	0
	CLIENT: Aland Developments	DATE:	Oct-22

Photograph 39 - Small plant nursery, including the growth of multiple Prickly Pear plants, indicating potential pesticide usage, identified in the south western portion of Site B.

Photograph 40 - Small farm dam observed along the southern boundary in the south eastern corner of Site B.

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT: 217600.00
	Preliminary Site Investigation (Contamination)	PLATE No: 10
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV: 0
	CLIENT: Aland Developments	DATE: Oct-22

Photograph 41 - Leppington railway station carpark (northern portion of Site A).

Photograph 42 - Leppington railway station carpark (northern portion of Site A).

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJECT: 217600.00
	Preliminary Site Investigation (Contamination)	PLATE No: 10
	156, 166, 173 & 183 Rickard Road, Leppington NSW	REV: 0
	CLIENT: Aland Developments	DATE: Oct-22